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9 Ways to Save

With Allis-Chalmers Type "R" Crusher

1 RECESSED SPIDER CAP reduces wear... adds to life of crusher because *feed itself* takes wear when it fills recessed cap. Uniform distribution of feed under all operating conditions.

2 LARGE, AMPLE FEED OPENING will take unregulated feed. Eliminates need for feeders... *saves* installation expense and labor... *simplifies* your crushing plant layout.

3 ONE PIECE MANGANESE steel concave ring can be easily and *inexpensively* replaced. Ring is held in place by a unique self-locking device... can't work loose. Does not require zincing.

4 CRUSHING CHAMBER is scientifically designed to give you continuous *high capacity* of desired product size. You get a more uniform, cubical product, closely graded to your requirements.

5 FLOOD LUBRICATION of moving parts gives you trouble-free service... reduces wear and maintenance. Oil is *cooled and filtered* as it circulates. Has oil pressure safety switch.

6 DUST PROTECTION — A large, effective dust seal protects all internal working parts... *reduces wear* by keeping grit and dirt out of eccentric bearing at all times.

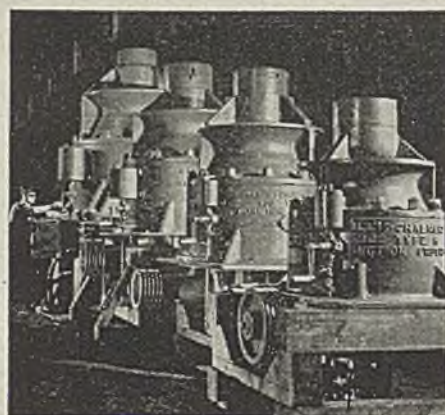
7 EXCLUSIVE "SPEED-SET" CONTROL, *instantly* regulates product to exacting size requirements... with the turn of a hand crank. Allows quick adjustment for wear on mantle and concave ring.

8 AUTOMATIC RELIEF VALVE is a safeguard that lowers crusher head, allows tramp iron and foreign materials to pass. Opens at predetermined pressure. *Protects* crusher from damage.

9 LARGE HYDRAULIC JACK greatly reduces expensive outage time by *quickly* restoring crusher to duty after power or other interruptions. Saves man-hours as well as down-time.

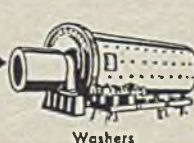
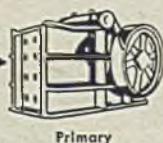
YES, THESE ARE NINE IMPORTANT CONSTRUCTION FEATURES that make the Type "R" Crusher a real money saver. And there are other reasons, too, why operators prefer the Type "R". Fast, easy clearing, for example. In case of power interruption the crushing chamber can be emptied in a *matter of minutes*. No laborious digging out the crusher by hand... the whole crushing head lowers, unloading the chamber. Crusher is quickly restored to operation with exclusive Allis-Chalmers "*Speed Set*" control, by simply turning a hand crank.

Plan to put this cost-cutting crusher to work for you — it will bring you better crushing at a lower cost per ton. Contact your nearby A-C office today for complete details. ALLIS-CHALMERS, MILWAUKEE 1, WIS.



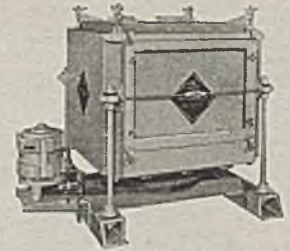
High performance Type "R" Reduction Crushers are available in four sizes, with 3,5,6, and 8 inch receiving openings. Bulletin B6006.

ALLIS CHALMERS



LOW-HEAD SIFTERS SOLVE PLASTICS GRADING PROBLEM

It was a rush job — a large Eastern chemical plant had to have equipment to grade plastics through 14 mesh and 7XX 65 mesh silk at a rate of two tons per hour.



Side-opening permits easy access to sieves.

The equipment was needed quickly because of a need to get the plant into continuous operation at once.

Allis-Chalmers engineers were called in . . . made a rapid but thorough analysis of the plant's production process . . . recommended two Heavy Duty Low-Head Gyratry Sifters for the job.

A COMPLETE UNIT

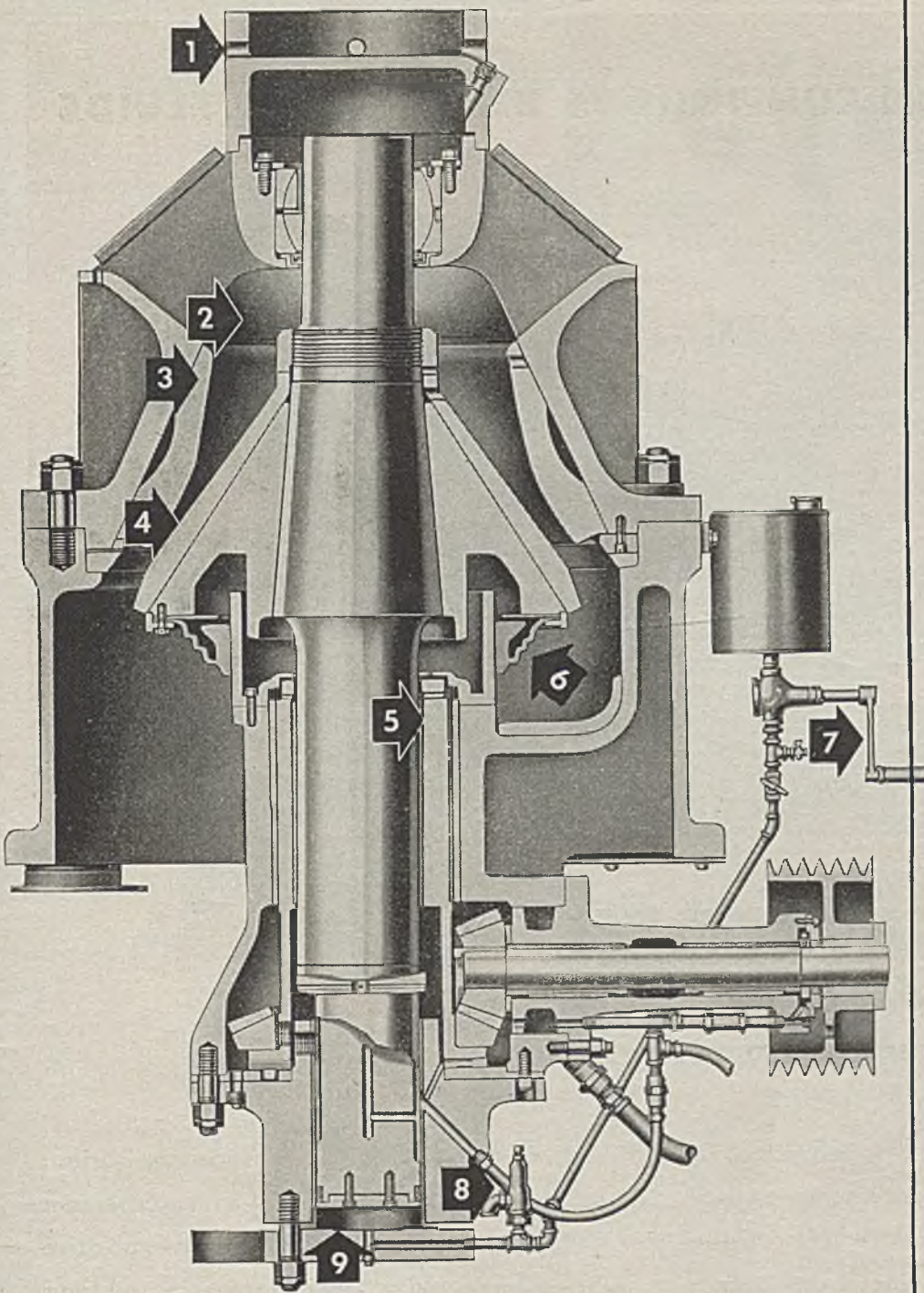
The Allis-Chalmers Sifters were hustled into the plant for a test run. Installation time and expense were negligible because Low-Head Sifters are self-contained units . . . come complete with motor, drive, and base.

So satisfactorily did these machines meet percentage and capacity requirements that they stayed right on the job . . . grading plastics to specifications — efficiently, economically.

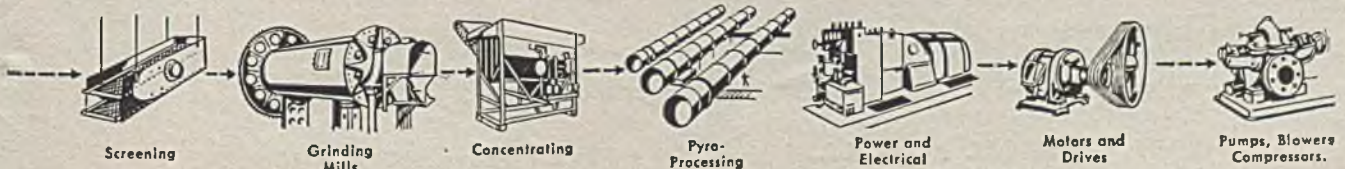
BETTER PRODUCT — LOWER COST

Compact Low-Head Gyratry Sifters have solved many similar problems . . . have gained wide acceptance because they offer such advantages as: *high* percentage availability, *high* product capacity, *low* initial cost, *very low* maintenance and power requirements. Bulletin B6124. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 2061-A

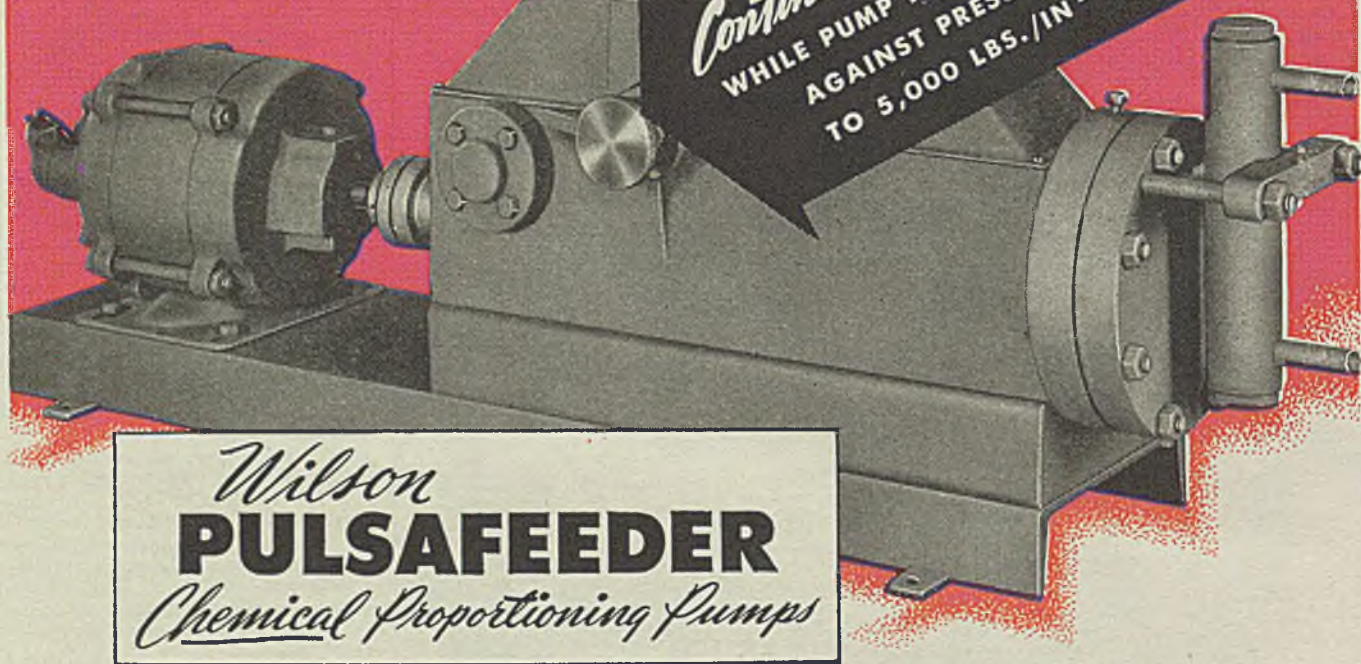


One of the Big 3 in Electric Power Equipment Biggest of All in Range of Industrial Products



FOR PRECISION CONTINUOUS BLENDING OF FLUIDS

RATE OF FEEDING
Continuously Adjustable
WHILE PUMP IS IN OPERATION...
AGAINST PRESSURES
TO 5,000 LBS./IN²



No need to stop the system, or the pump, for adjustment, minor or major, of rate of flow with the Wilson Pulsafeeder. Hand wheel provides micrometer adjustment of rate—from zero to full maximum. Models available for feeding up to 800 gallons per hour. Hydraulically-balanced diaphragm head isolates pump from fluid being

handled, protects fluids from contamination. Box construction provides oil-bath lubrication for all moving parts except motor, gives positive lubrication to assure low maintenance and long life. Write for description and specifications. *Process Equipment Division, Lapp Insulator Co., Inc., 166 Maple Street, LeRoy, N. Y.*

Lapp *Process Equipment*

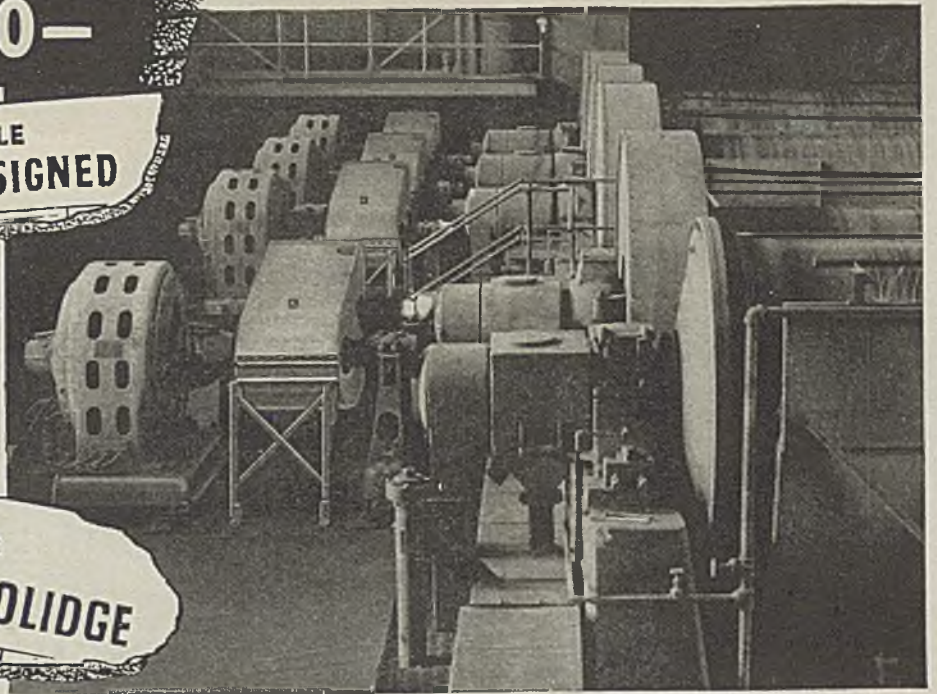
LAPP CHEMICAL PORCELAIN VALVES • PIPE • RASCHIG RINGS...
WILSON PULSAFEEDER CHEMICAL PROPORTIONING PUMPS...

26 YEARS AGO—

**LOS ANGELES CHRONICLE
VERSAILLES TREATY SIGNED**

LIQUOR OUTLAWED

Chicago Daily Tribune
HARDING AND COOLIDGE



**LINK-BELT *Silverstreak* SILENT CHAIN DRIVES
INSTALLED IN 1920**

Still Giving Good Service

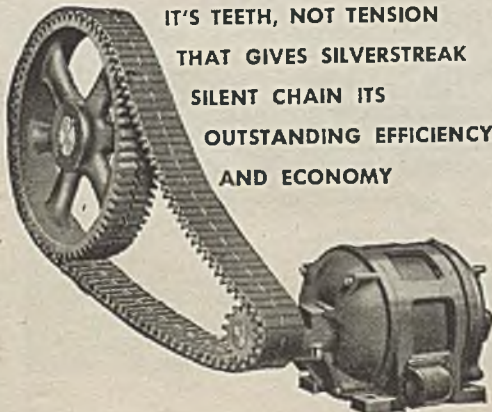
In a year notable for several historic events, four 400 h.p. Link-Belt Silent Chain Drives were put in service in the plant of the Lone Star Cement Corporation at Nazareth, Pa. Two 200 h.p. drives were installed the preceding year. These six drives have been running practically continuously ever since, under the grueling conditions of cement mill service. Only during the recent war years was the plant operated less than 24 hours per day.

Records like this bear out the statement often repeated about Link-Belt Drives: "Always low in first cost, lowest in cost-per-year of service." Enclosed in oil-retaining, dust-tight casings, properly lubricated, they have a long life. Neither age, moisture, temperature nor periods of idleness have any effect on these all-steel drives. They run slack on short centers, with minimum bearing pressure, and transmit every r.p.m. from motor to driven machine.

Link-Belt Silent Chain Data Book 125 contains full engineering and application data. Send for a copy, today!

Remember - -

**IT'S TEETH, NOT TENSION
THAT GIVES SILVERSTREAK
SILENT CHAIN ITS
OUTSTANDING EFFICIENCY
AND ECONOMY**



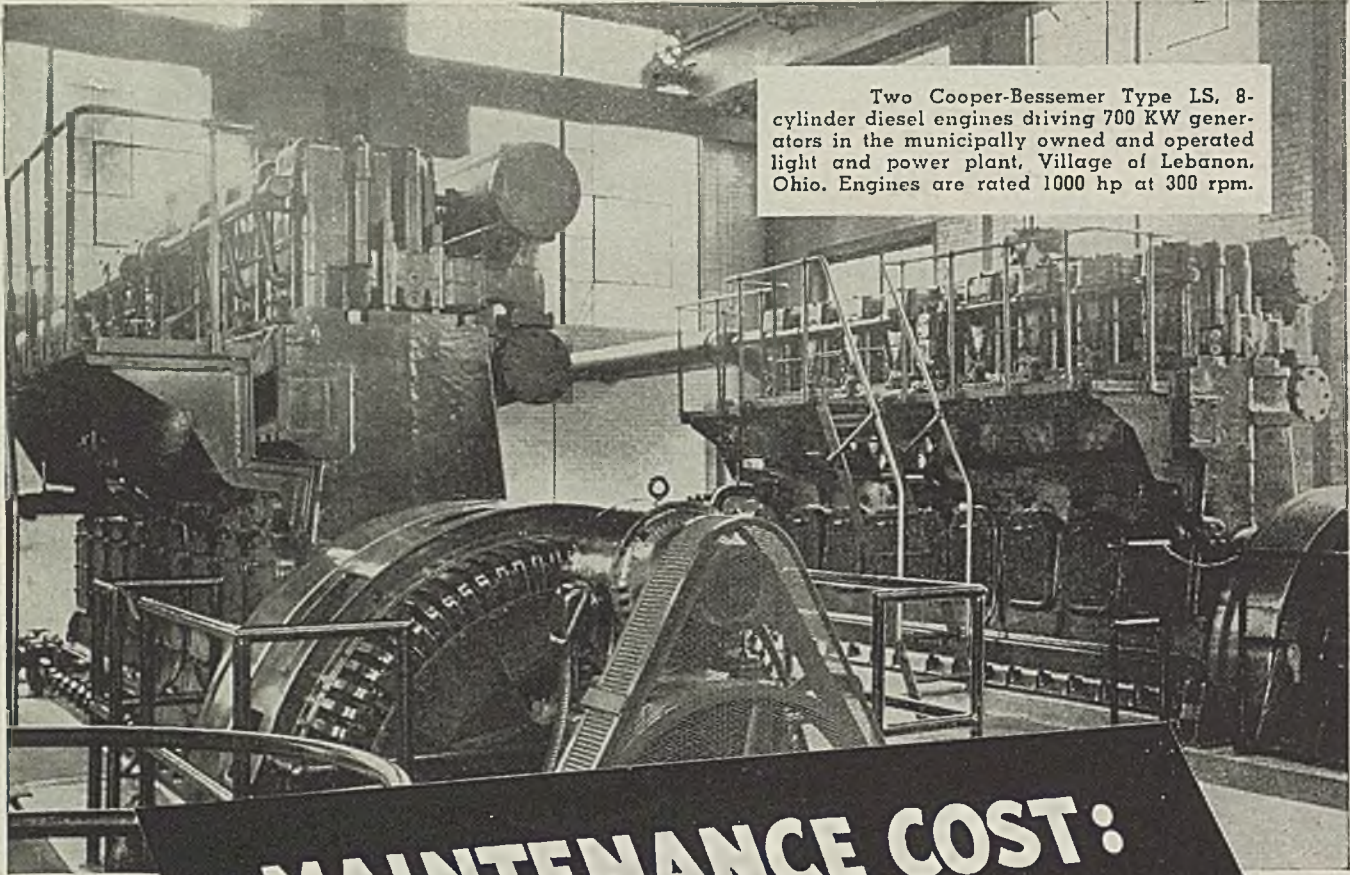
LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24,
Los Angeles 33, Seattle 4, Toronto 8. Offices, Factory Branch Stores and Distributors in
Principal Cities.

10.345



SEE OUR EXHIBIT—NATIONAL CHEMICAL EXPOSITION—CHICAGO—SEPTEMBER 10-14



Two Cooper-Bessemer Type LS, 8-cylinder diesel engines driving 700 KW generators in the municipally owned and operated light and power plant, Village of Lebanon, Ohio. Engines are rated 1000 hp at 300 rpm.

**MAINTENANCE COST:
less than 1% per year**

THESSE two Cooper-Bessemer diesels powering the Lebanon, Ohio, municipal power and light plant have been in continual service since November, 1941. Maintenance cost is averaging less than 1 percent of engine cost per year. Here is a typical example of the maintenance economy demonstrated time and again in Cooper-Bessemer installations.

How about operating economy and efficiency? Mr. L. F. Wertz, Lebanon's capable plant superintendent, says, "Our fuel bill runs less than ½ cent per KW generated. Last month lube oil consumption cost us only .015 cents per KW. Bonds issued to finance our new plant are being retired much faster than originally estimated due to the earnings made possible by the efficiency of our Cooper-Bessemer Diesels." Mr. Wertz might also tell you that power is delivered at a highly

competitive rate and that village-consumed power, valued at \$12,000 per year, is furnished free.

Modern, long-lived Cooper-Bessemer diesels are available in sizes and types for virtually all heavy-duty requirements, stationary or mobile. Contact the nearest Cooper-Bessemer office for complete details.



**THE
Cooper-Bessemer
CORPORATION**

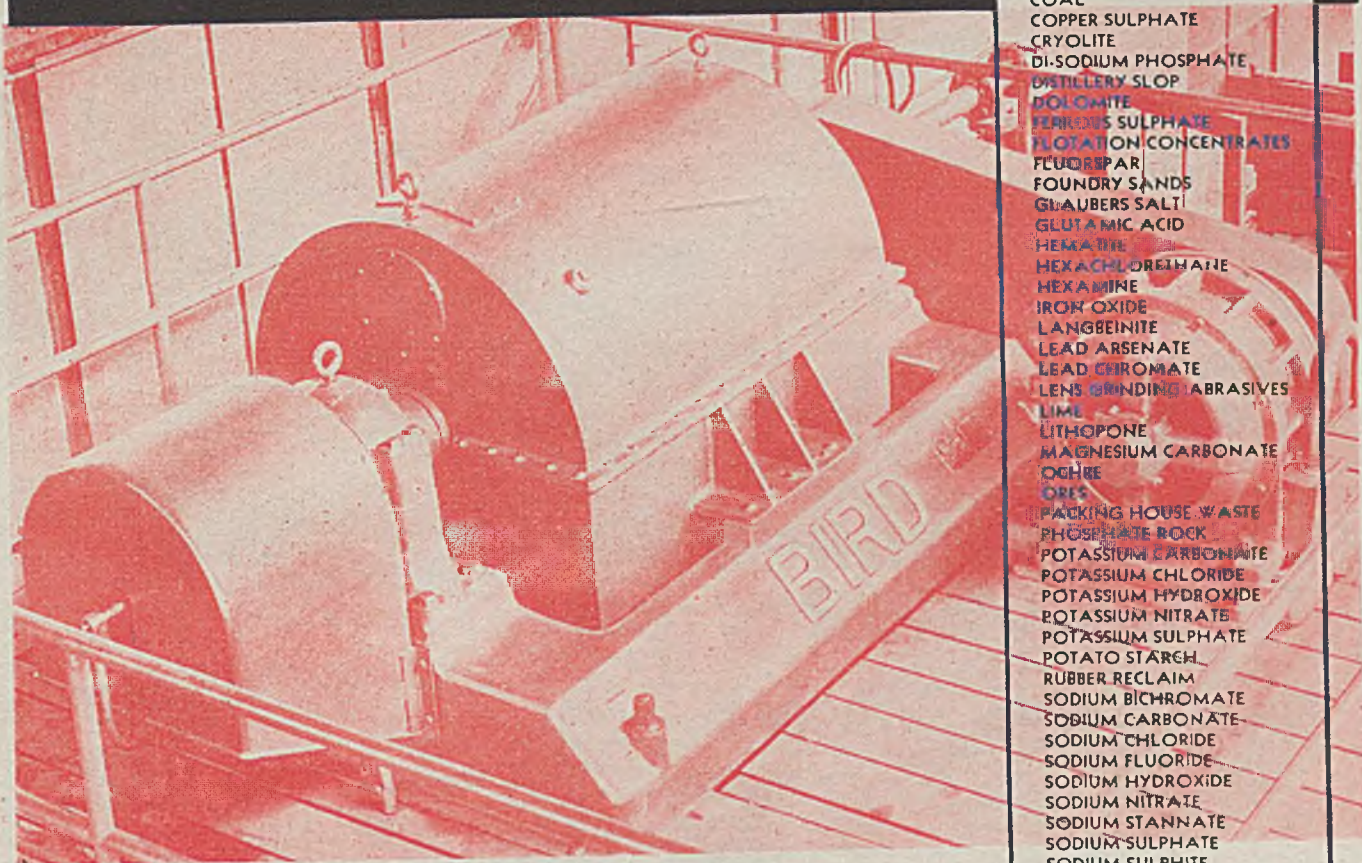
Mt. Vernon, Ohio • Grove City, Pa.

New York, Washington, Gloucester, Dallas, Houston, St. Louis, Los Angeles, Seattle, San Francisco, and the Calmes Engineering Company, New Orleans, La.

BUILDERS OF DEPENDABLE ENGINES FOR 112 YEARS

You Can FILTER Solids Like These

**GET A BETTER CAKE and CLEANER FILTRATE
FILTER THEM FASTER
DO THE JOB AT LOWER NET COST**



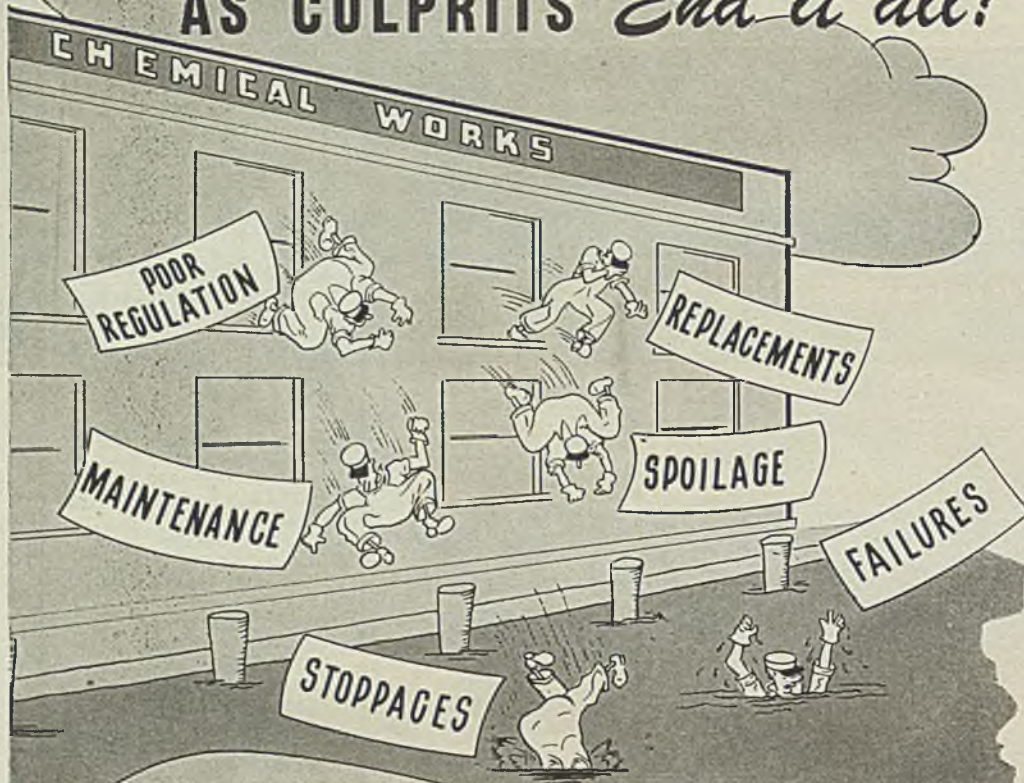
**With the
BIRD Continuous Centrifugal FILTER**

The BIRD effects the separation by sedimentation multiplied by as much as 1800 times gravity. There are no filter cloths to block, blind or change—no filter screens or media of any kind—no vacuum—no auxiliaries. The entire operation is self-contained, continuous, wholly under cover. It takes up little more space than your desk. Ask us to tell you what the BIRD can do on *your* job.

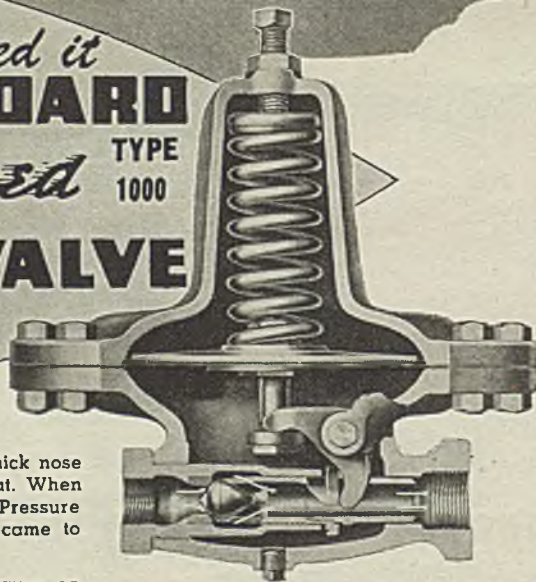
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- ALUMINUM OXIDE
- AMMONIUM ALUM
- AMMONIUM CHLORIDE
- AMMONIUM NITRATE
- AMMONIUM SULPHATE
- ANILINE SLUDGE
- BARIUM CARBONATE
- BARIUM CHLORIDE
- BARIUM SULPHATE
- BARYTES
- BERYLLIUM SULPHATE
- BLACK ASH
- BORAX
- CALCIUM ARSENATE
- CALCIUM HYPOCHLORITE
- CARNALLITE
- CEMENT
- COAL
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- DI-SODIUM PHOSPHATE
- DISTILLERY SLOP
- DOLomite
- FERRIC SULPHATE
- FLOTATION CONCENTRATES
- FLUORSPAR
- FOUNDRY SANDS
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- GLUTAMIC ACID
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- HEXACHLORETHANE
- HEXAMINE
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- POTASSIUM HYDROXIDE
- POTASSIUM NITRATE
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- SODIUM CHLORIDE
- SODIUM FLUORIDE
- SODIUM HYDROXIDE
- SODIUM NITRATE
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SOUTH WALPOLE • MASSACHUSETTS

CRIME WAVE OVER AS CULPRITS *End it all!*



Here's what caused it
CASH STANDARD
Streamlined TYPE 1000
 PRESSURE
REDUCING VALVE



GOOD REASON why these culprits took a quick nose dive into the "drink." It was their only out. When the CASH STANDARD Streamlined type 1000 Pressure Reducing Valve was installed, their activities came to an abrupt end.

You too can rid your plant of such daily plagues as high costs and operating troubles due to poor valve performance.

Simply put it up to the CASH STANDARD "TYPE 1000"—find out in detail about the streamlined design—the construction—the performance that works so completely in your favor Send for Bulletin "962."

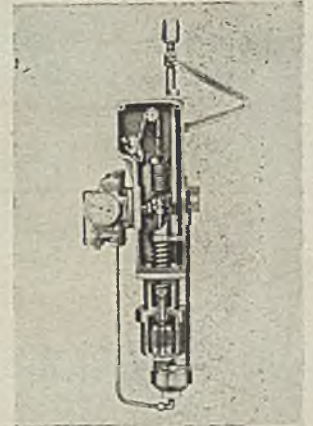
Maximum Capacity When Needed Most • Accurate Pressure Control Under Toughest Working Conditions • Trouble-Free Service • Smooth Operation • Tight Closure • Accurate Regulation • Speedier Production Results • Elimination of Failures • Constant Delivery Pressure • Cost Saving Operation • No Spoilage • Practically Zero in Maintenance Costs.

CASH STANDARD
 CONTROLS..
 VALVES

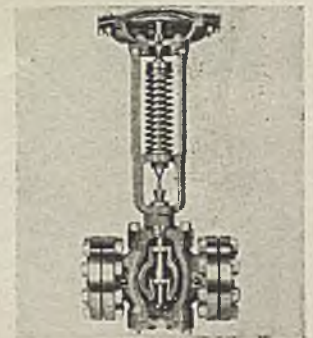
A. W. CASH COMPANY
 DECATUR, ILLINOIS

BULLETINS
 AVAILABLE
 ON OTHER
 CASH STANDARD
 VALVES

Send for them



Bulletin 963 features the CASH STANDARD Type 100 Series of Super-Sensitive Controllers—various types for automatically operating valves, dampers, rheostats, stokers, pulverizers, fans, and other apparatus. 16 pages filled with descriptions and applications.



Bulletin 968 features the CASH STANDARD Type 34 Pressure Reducing Valve—direct operated—direct acting for handling steam, hot water, cold water, air, oil, brine—and most liquids and gases except some injurious chemicals. Illustrates and describes the different styles available and tells about their applications. Three pages of capacity charts.



Bulletin 956 features the CASH STANDARD Type 4030 Back Pressure Valve—designed to automatically maintain a constant pressure in the evaporator corresponding to a constant temperature desired. Shows an Ammonia and Freon Gas Capacity Chart based on ABSOLUTE pressures.

**ALWAYS USE THE RIGHT TYPE
VALVE FOR THE SERVICE**

**BE SURE TO PLACE VALVES
CORRECTLY IN THE LINE**

**CHOOSE JENKINS VALVES FOR
LIFETIME ECONOMY**

Getting down to earth on valve costs

The real cost of a valve depends on three factors – selection of the right pattern and metal, installation with proper care in the right location, and choice of the valve best engineered for endurance. That's why more and more plants have adopted the Jenkins 3-Point Formula as their buying guide in new construction or renovation.

By choosing Jenkins Valves you get valves made with *extra endurance* which assures *extra economy*. You also get expert advice on the selection and placement of valves from top-rated valve specialists, Jenkins engineers, whenever you need it. Base your valve buying on the 3-Point Formula. Make sure of the *extra value* that means *lowest cost in the long run*.

Jenkins Bros., 80 White Street, New York 13; Bridgeport; Atlanta; Boston; Philadelphia; Chicago. Jenkins Bros., Ltd., Montreal; London, England.



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SINCE  1864

JENKINS VALVES

For every Industrial, Engineering, Marine, Plumbing,
Heating Service . . . In Bronze, Iron, Cast Steel and
Corrosion-resisting Alloys . . . 125 to 600 lbs. pressure.

Sold Through Reliable Industrial Distributors Everywhere

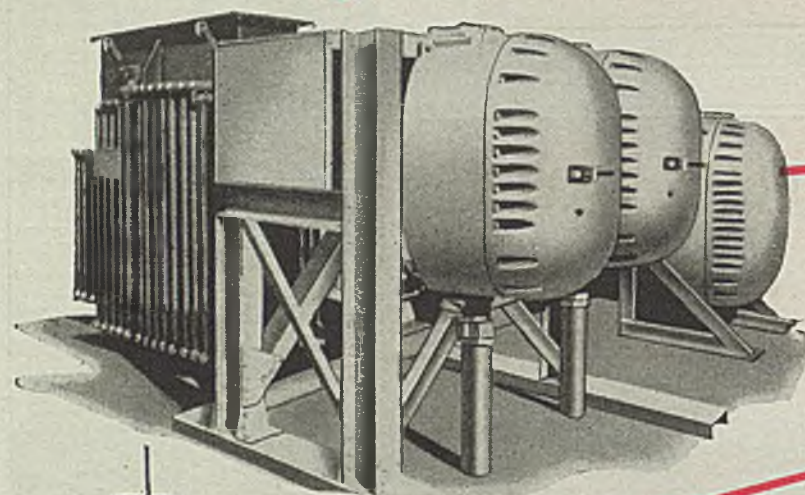


JENKINS Fig. 370 Bronze Gate Valve
125 lbs. Steam 200 lbs. O. W. G.

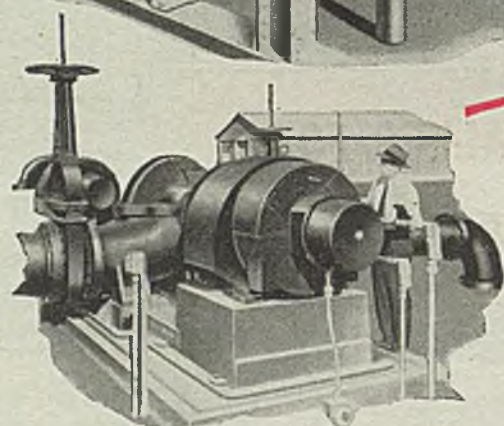
A solid wedge, inside screw, non-rising spindle type, Fig. 370 is recommended wherever a full, free flow is required. In steam service it resists pressure strains, stands up well in vibrating currents. Non-rising spindle permits use in restricted space. Can be repacked under full pressure when entirely opened.

**ONE OF OVER 600 EXTRA VALUE VALVES
MADE BY JENKINS VALVE SPECIALISTS**

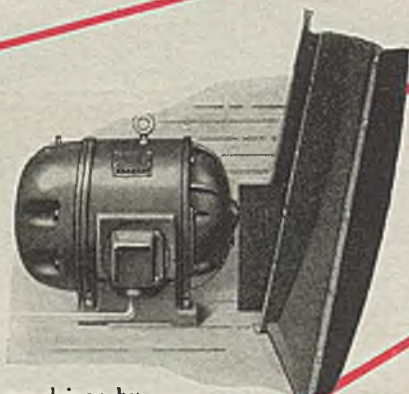
HOW THEY *Stymied* Power Failures



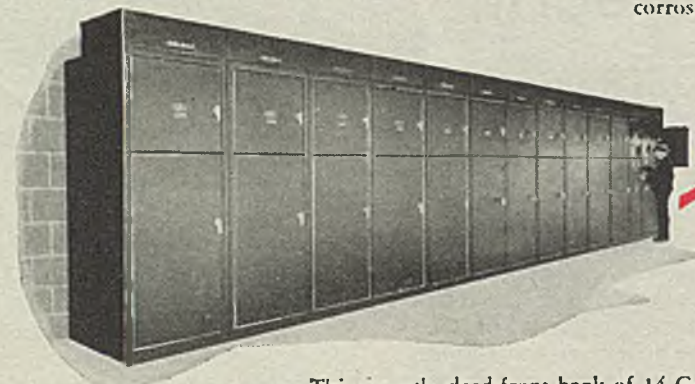
Load-center unit substations equipped with circuit breakers, are located near the Tidewater Avon cracking units. Oil-cooled transformer is shown in the background.



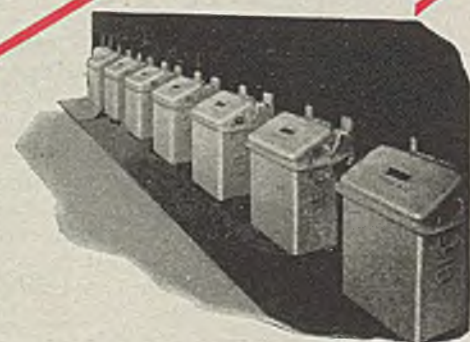
These 450-hp, 900 rpm synchronous circulating pump motors are made with splashproof enclosures, permitting them to be installed outdoors in this mild climate without any special housings.



Cooling tower fans are driven by G-E 50-hp totally enclosed, fan-cooled induction motors. Features include superior insulation and corrosion-resisting paint.



This smooth, dead-front bank of 14 G-E Limitamp combination motor starters is housed in a separate switch house. Contactors are oil-immersed and fuses are housed in individual steel cubicles.



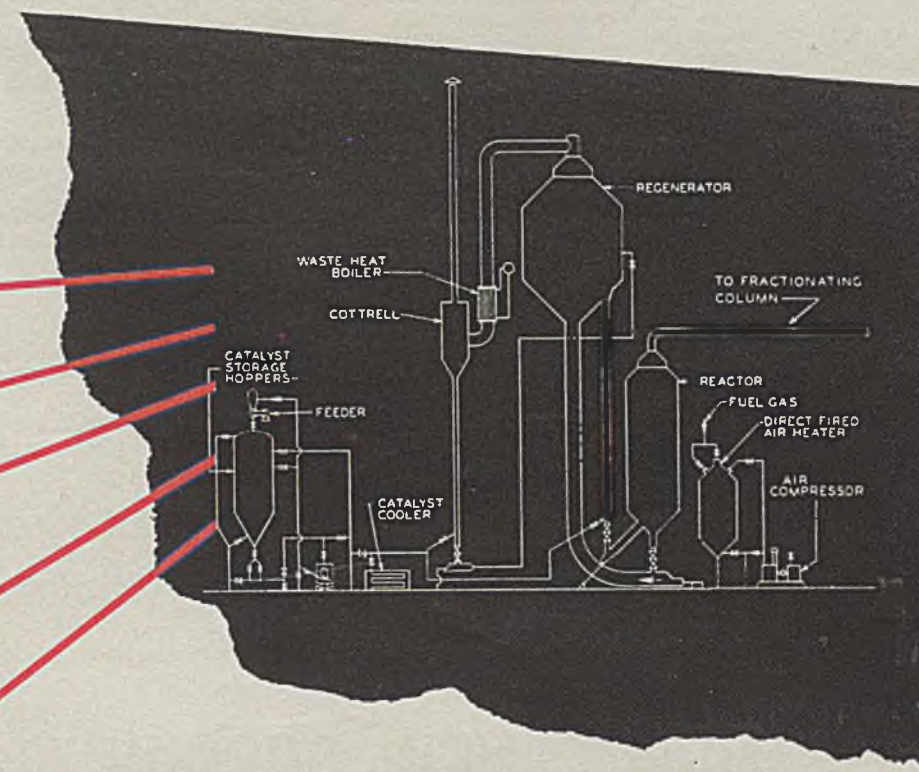
This rack assembly of G-E oil-immersed combination starters controls low-voltage motors. Starters are installed as a complete control group. Maintenance is also simplified.



POWER SYSTEMS

for Chemical Plant Service

at Avon!



Designers of the electric power system in this new Tide Water cracking plant made *continuity of service* their chief objective—and G-E equipment helped them achieve it!

In the new cracking plant of the Tide Water Associated Oil Co. at Avon, Calif., the continuous nature of the fluid-catalytic process makes even occasional power interruptions intolerable. Failures have to be "squelched" before they start!

Avon's designers asked General Electric to provide power transmission equipment, motors, and controls which would stay on the job with a minimum of maintenance. Specifications were met to the letter *without* installing costly "custom made" equipment. We were able to supply standard equipment with all the construction "extras" required.

The result is a power system which points up G-E's ability to meet the exacting electrical requirements of all refinery processes, whether in general use or still in the pilot-plant stage. Here's a quick description of the Avon system:

POWER DISTRIBUTION — Power at 12,000 volts from a nearby utility is carried into the plant over two independent circuits. Should one circuit fail, the load is automatically transferred by high-capacity G-E oil circuit breakers. This arrangement also eliminates service interruptions for maintaining breakers. Six feeder circuits, all controlled and protected by G-E circuit breakers, distribute the power to utilization points. Full-rated performance of motors and lighting fixtures is assured by G-E load-center unit substations, designed

for operation in semi-hazardous areas, close to the load. Both high- and low-voltage circuits are buried underground out of harm's way.

CONTROLS — Induction motors for driving tank mixers, precipitators, and other equipment are controlled by G-E Limitamp combination starters. The current-limiting fuses are rated for short-circuit kva up to 150,000 at 2300 volts, 250,000 at 4160 volts. Low-voltage starters for the smaller motors, also of adequate interrupting capacity, are conveniently racked for fast inspection and easy servicing.

MOTORS — Standard G-E synchronous motors in splashproof enclosures are used. Special housings to protect outdoor pump and fan motors were not needed. Electric heaters keep moisture out of the windings during shut-down periods. All induction motors feature G-E's totally enclosed, fan-cooled construction.

G.E. makes the electrical industry's most complete line of equipment specially designed for chemical plant service. This fact is welcomed by many chemical engineers for the freedom it gives them in matching power distribution and utilization systems to continuous processes. Your nearest G-E office will be glad to discuss any electrical problem with you. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

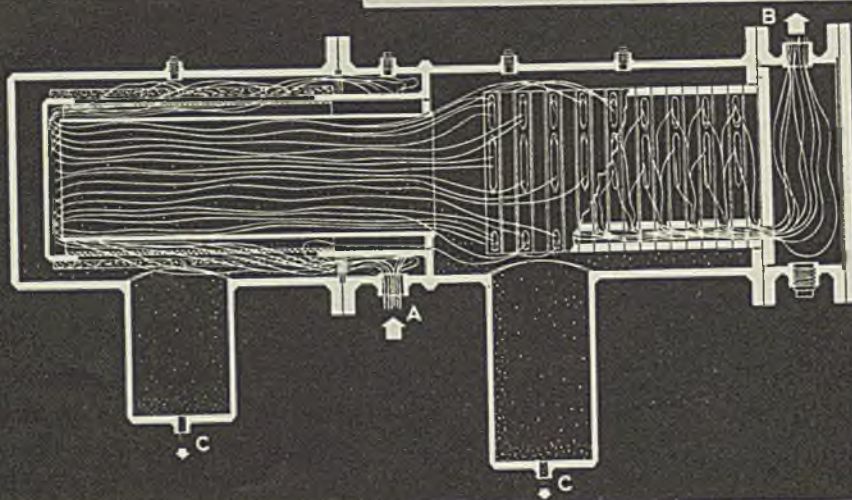
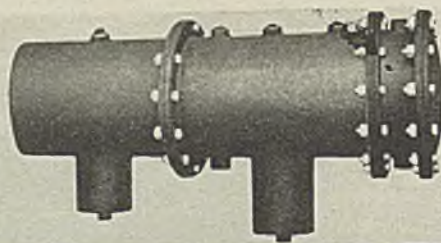
GENERAL



ELECTRIC

660-21-132

A mixture of a hydrocarbon and water, for example, enters at "A", passes first through the coalescing section and then the separation section. The dried hydrocarbon outlet is at "B", ejected water outlets are at "C".



NOW... NEW POSSIBILITIES...

for complete phase separation of immiscible liquids

The separation of liquids is simply effected in continuous-flow operations by means of the Selaseparator . . . a compact, efficient unit utilizing basic principles of capillary physics and surface chemistry.

The mixture to be processed enters the Selaseparator where selective porous membranes divide the liquids completely and discharge the components through different outlets. But little energy is required and there are no moving parts to be kept in working order.

Selaseparators are at present successfully operating to break emulsions on steam distillation streams and on phase separation of water from benzol and other organic liquids. This new processing tool opens the door to many cost-reducing product improvements and new applications are continually being made.

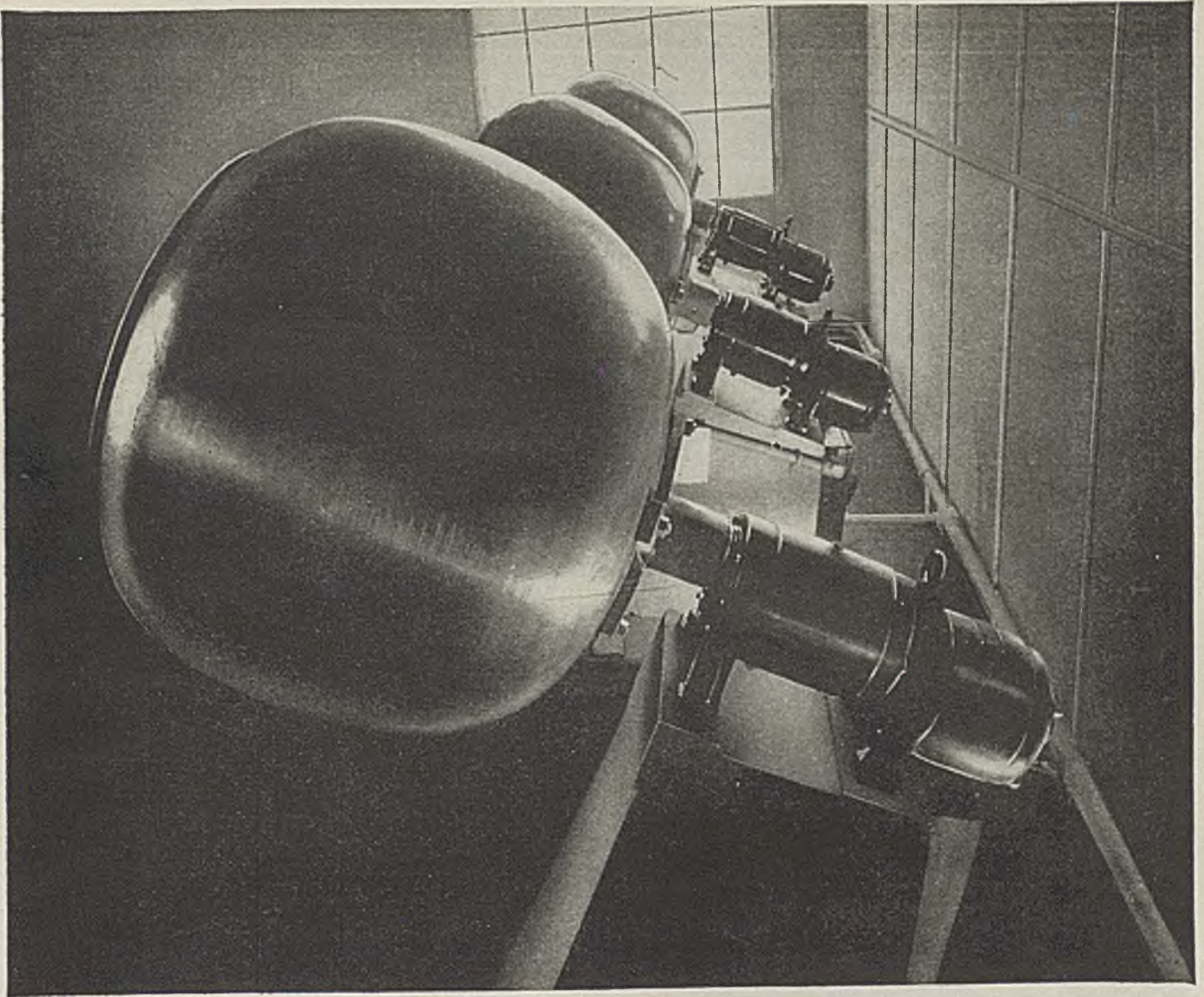
How can your processes benefit by application of the new Selaseparator? Inexpensive pilot plant and laboratory units are available. Write for particulars.

SEE IT IN OPERATION AT THE CHEM SHOW

SELAS CORPORATION OF AMERICA PHILA 34 PA



• AUGUST 1946 • CHEMICAL ENGINEERING



What is it?



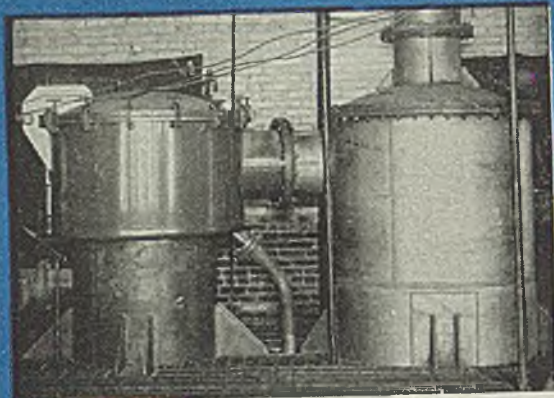
That's what everybody says upon seeing this picture for the first time. The photograph was taken in the plant of a large, nationally-known drug manufacturer and the odd-looking objects are tumbling barrels in which pills receive their sugar coating!

Furnishing the power to keep the tumblers tumbling are 5 H.P. Master Triple Parallel Gearmotors equipped with Timken Tapered Roller Bearings. This is one of the more unusual applications of Master Gearmotors. They are used for hundreds of different purposes in scores of different industries in sizes ranging from 1/10 to 100 H.P.—Timken Bearing Equipped.

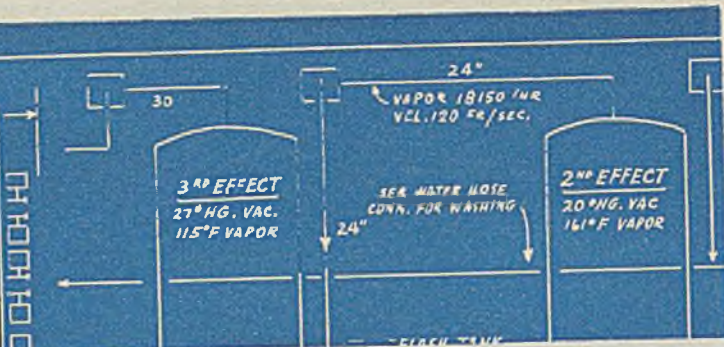
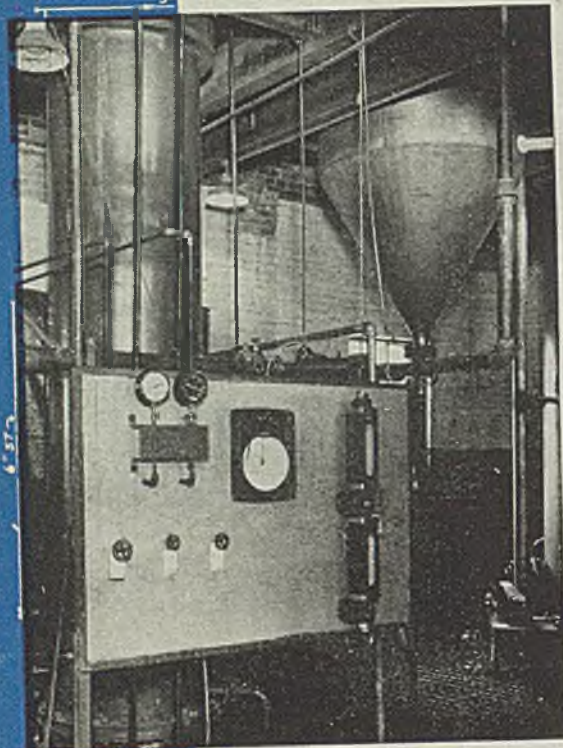
For eighteen years the Master Electric Company, Dayton, Ohio has used Timken Bearings on the gear shafts of these Gearmotors and found them equal to every demand in speed and load capacity—radial loads, thrust loads and both together in any combination. They also hold moving parts in constant alignment, increase endurance; reduce maintenance.

When buying bearings for your equipment; look for the trademark "TIMKEN" stamped on every bearing; then you'll be sure of getting tapered roller bearing performance at its peak. The Timken Roller Bearing Company, Canton 6, Ohio.





Above and below are two views of a Swenson evaporation installation for handling pectin.



Swenson Process Engineering

... avenue to
**Better Products and
Lower Costs ...**

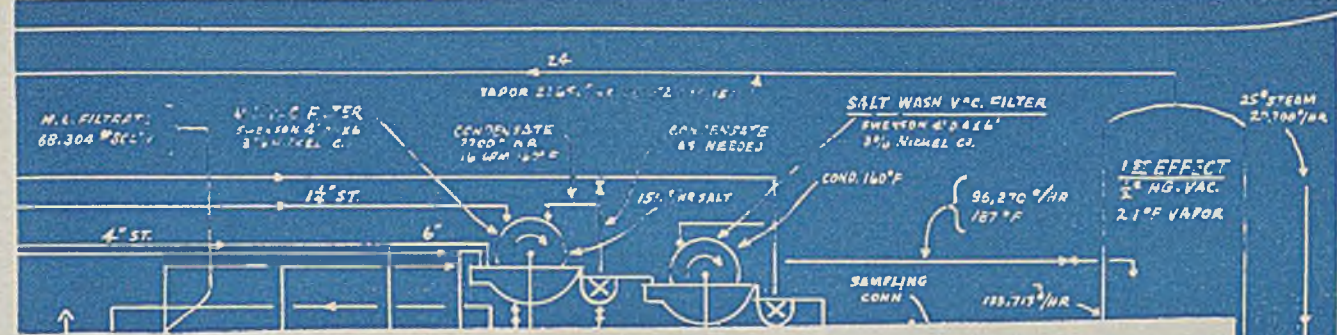
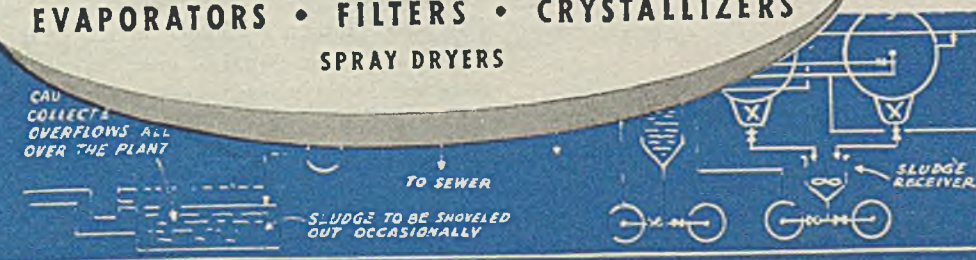
Swenson Process Engineering begins with a study by Swenson Engineers to develop equipment and methods that will provide better products at lower costs. It ends only when the entire process is operating at its most efficient level. Where Swenson Process Engineering has been used, production methods have been simplified, recovery of chemicals improved, waste disposal made more efficient, and economies effected in heat, power, labor, and materials.

Swenson Process Engineering has contributed to the improvement of a wide variety of chemical processes. Swenson Engineers will welcome a consultation regarding your process problems.

SWENSON

EVAPORATORS • FILTERS • CRYSTALLIZERS
SPRAY DRYERS

- LEGEND**
- ↔ VALVE NORM.
 - ↔ VALVE FOR P.
 - ↔ VALVE NORM.
 - ↑ ATMOSPHERIC
 - ⊕ AGITATOR
 - ⊕ CHECK VALVE
 - Y FUNNEL OR VEILLE OVERFLOW
 - 6 1/2" ST. - 6" STEEL PIPE
 - 6 1/2" ST. - 6" NICKEL PIPE



Improved production of Pectin ... another result of Swenson

Process Engineering

Pectin, organic in nature, is highly susceptible to thermal decomposition, with the result that excessive or prolonged heat exposure decreases gel strength and damages flavor. Hence accurate time and temperature control is essential in the concentration of pectin liquors.

Because of this heat sensitivity, Swenson Engineers, using the Swenson Long Tube Vertical Evaporator, developed a single pass cycle for each evaporator effect. By this means, the length of heat exposure time during evaporation was reduced to a minimum, permitting the use of rapid, high temperature evaporation with complete safety to the product. Gel strength was retained and flavor was kept full and natural.

SWENSON EVAPORATOR COMPANY
15669 Lathrop Ave. Division of Whiting Corporation Harvey, Illinois

Only SWENSON PROVIDES THIS FIVE-WAY SERVICE

1

Analysis of Requirements

2

Design and Layout

3

Manufacture of Equipment

4

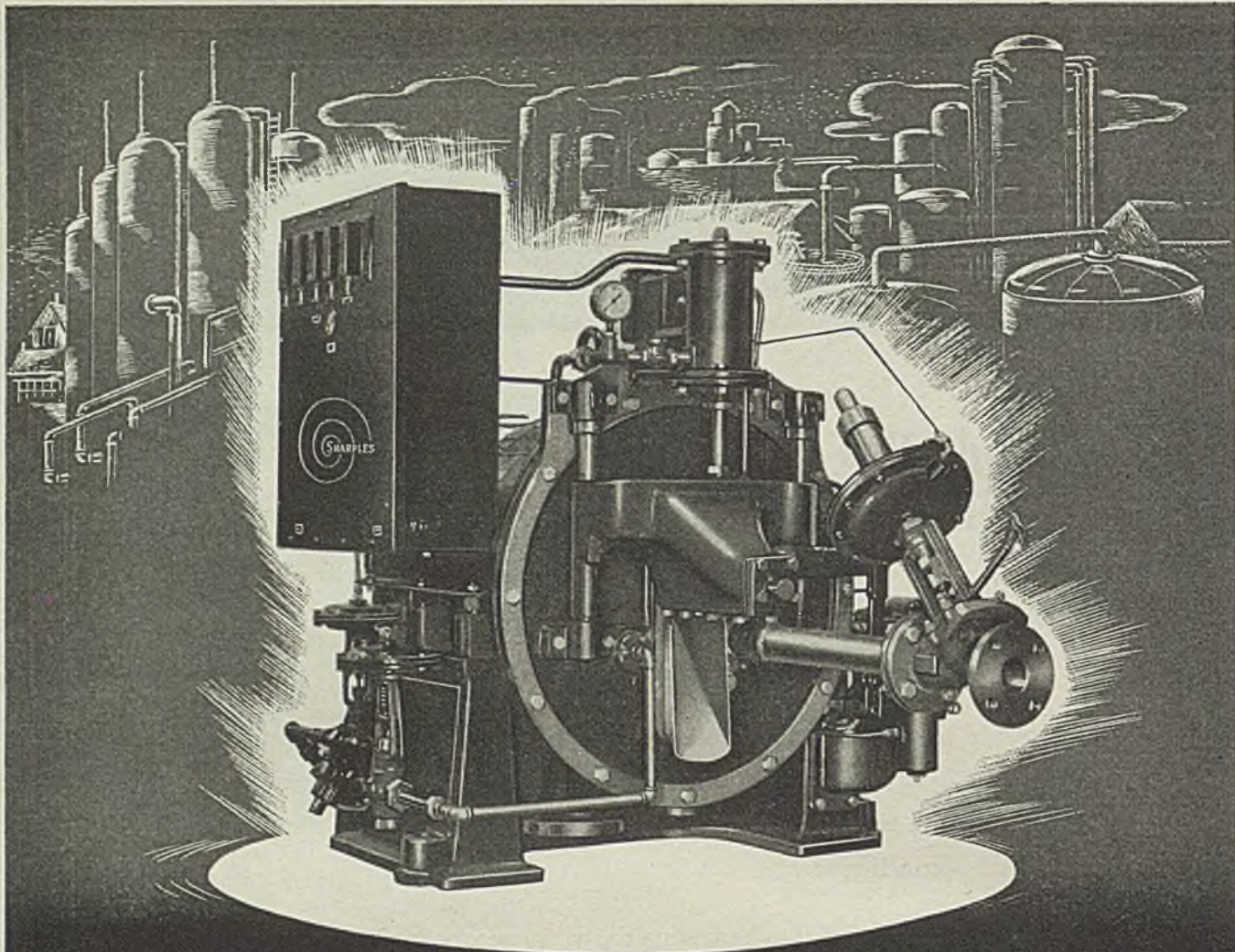
Test Operation

5

Periodic Check-Ups

SWENSON EVAPORATOR CO
HARVEY, ILL., U.S.A.

Req.	Title - FLOW SHEET & MATERIAL BALANCE
Ch'd FM	Capacity
Scale 1/2" = ONE FT.	For
Appr.	U-2285
Appr.	



DEHYDRATION OF CRYSTALS

...by Sharples

This completely automatic Crystal Drier is suitable for the dehydration of

AMMONIUM SULPHATE . . . synthetic and coke-oven by-product.

BORIC ACID

COPPERAS . . . (ferrous sulphate) . . . from titanium sulphate, sulphate mother liquor.

COPPER SULPHATE . . . granular grade.

NAPHTHALENE . . . and many other organic crystals from volatile solvent mother liquors.

POTASSIUM CHLORIDE

POTASSIUM DICHROMATE

SODIUM CHLORATE

SODIUM CHLORIDE . . . from electrolytic caustic mother liquor.

THESE ARE ONLY A FEW OF THE APPLICATIONS. . . THERE IS A SHARPLES ENGINEER TO HELP YOU SOLVE YOUR CRYSTAL DRYING PROBLEM.

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U.S.I. CHEMICAL NEWS

AUGUST ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1946

New Concentrates Produce Superior Household Sprays

Potent New Chemical Augments Pyrethrins In D&O Pyrenones

New concentrates, which will permit the manufacture of highly effective, low-cost household sprays, have been announced by Dodge and Olcott, Inc. Known as D&O Pyrenone Concentrates, they are carefully-proportioned combinations of pyrethrins with a new D&O-developed chemical, piperonyl butoxide (D&O No. 333). Liquid insecticides and aerosols made with this new compound are superior to straight pyrethrum insecticides in range of effectiveness, stability, and residual killing power. They are completely free from toxicological hazards, irritation, odor, and other undesirable characteristics.

Only one of these compounds—Pyreneone No. 20 *New*—is ready for use at the present time. It is considered to be the ideal formulation for the manufacture of liquid general-purpose household insecticides. Other Pyrenones will be announced within the next few months. Adequate amounts of these compounds for experimentation and testing are now available. Full-scale commercial deliveries will begin in the late fall, and ample supplies will be ready in time for the 1947 season.

New Chemical

Piperonyl butoxide (D&O No. 333), the new chemical developed by Dodge and Olcott, Inc. to augment straight pyrethrins, is a close relative of the already well-known piperonyl cyclohexenone (D&O 312). Piperonyl cyclohexenone has been, and is, giving extraordinary results in agricultural and certain other fields, and has been used very effectively in the formulation of household

(Continued on next page)

Urethan Holds Promise In Treatment of Leukemia

A definite palliative effect is noted in many cases of leukemia when urethan treatments are used, according to the findings of a group of British scientists. Up to the present, however, no cure has been discovered for this disease which is known as "cancer of the blood."

The British scientists state in a recent issue of a medical journal that in the most favorable cases treated with urethan, a fall in total white blood count to normal limits and a rise in hemoglobin were noted. They also claim to have observed enlarged lymph nodes and a reduction in the size of the spleen.

The results reported are similar to those obtained from X-ray therapy which has been employed for some time to give temporary relief and to prolong life in the chronic forms of the disease. Prior to the use of urethan, many drugs, including arsenic and benzene, were tried, but with little success.

U.S.I. Completes Plans for New Chemical Research Laboratory

Project At Stamford, Conn., Will Be Devoted To Research On
Resins, Solvents, Organic Chemicals, And Manufacturing Methods

With the completion of plans for a new chemical research laboratory, another project in U.S.I.'s postwar program of expansion is now under way. A site for the building, which will house more than 200 skilled investigators, has been

selected at Stamford, Conn. About half of the total 100,000 square feet within the walls of the new laboratory and auxiliary buildings will be devoted to U.S.I. projects; the other half will be used for research activities of Air Reduction Company, Incorporated.

U.S.I. research conducted at this laboratory will be concerned with solvents, resins, organic chemicals, and engineering development. A pilot plant, suitable for carrying out fairly large scale experiments, will be available in order to obtain information for building commercial-size plants.

Complete Facilities

The laboratory will be equipped with the most modern research facilities. Some of these, such as the technical library, the patent files, the drafting room, the analytical laboratory, the machine shop, and the physics laboratory will be shared by the research staffs of U.S.I. and Air Reduction.

The laboratory buildings will be red brick structures of modified colonial design. The main building will be three-stories high, L-shaped, with a clock tower at the juncture of the two wings. The separate laboratories of Air Reduction and U.S.I. will occupy the two larger wings, and a smaller wing will house equipment for pilot plant operations.

To Occupy 40 Acres

Title to 40 acres of land to accommodate the proposed laboratories and pilot plant has been acquired. The site of the new laboratory is in the western part of Stamford, and can be seen from the main line of the New York, New Haven & Hartford Railroad at a point about a mile south of the Stamford station. One corner of the 40-acre plot runs into the Township of Greenwich.

At present the chemical research laboratories of Air Reduction and U.S.I. are situated at 41 Magee Avenue, Stamford, where Air Reduction's liquefaction research laboratory and rare gases division are also located.

THE MONTH IN RUBBER

An antiseptic rubber, also claimed to be insecticidal, is invented . . . A new anti-aging substance for rubber sole mixtures is announced . . . Testing procedures for evaluating natural and synthetic rubbers are catalogued . . . A new blowing agent for sponge rubber is developed . . . A material said to be similar to GR-5, and compatible with natural rubber and numerous other synthetic rubbers, goes into full-scale production . . . Rubber bones for dogs are now chocolate flavored . . . A new plasticizer and extender for latex is put on the market . . . Inner tubes made with GR-1 (Butyl) rubber are stated to have superior resistance to tearing . . . A chlorinated synthetic rubber is made available . . . Graphs showing market prices of rubber products from 1910 to 1945 are published . . . A new wax emulsion for use on rubber products of any color is produced.

U.S.I. Announces New Natural Feed Ingredients

Supplementing its line of feed ingredients which include Special Liquid Curbay, Curbay B-G, and Vacatone, U.S.I. is now offering two natural riboflavin products obtained from vegetative fermentation operations. They are *U.S.I. Brand Riboflavin Mixture #1*, containing one gram of active riboflavin per ounce of material, and *U.S.I. Brand Riboflavin Concentrate #85*, consisting of 85 parts per hundred of active riboflavin along with a natural carrier and a new vitamin of the B-complex. Inquiries should be directed to U. S. Industrial Chemicals, Inc.



Artist's conception of the new chemical research laboratory at Stamford, Conn., scheduled for completion within a year.

Addition of Methionine Spurs Growth Of Rats on Protein-Deficient Diet

New Concentrates

(Continued from preceding page)

insecticides. However, its newer relative, piperonyl butoxide, has unique advantages, particularly in oil base sprays and in aerosols, because of its greater effectiveness against common household insects and its complete solubility in the mediums used for dilution.

Piperonyl butoxide is a colorless, odorless liquid completely miscible with mineral oils and readily soluble up to any desirable proportions in Freon-12 and other gases used in aerosols. Pyrenone concentrates, therefore, require no secondary solvents or coupling agents, thus avoiding all the complications and the toxicological hazards which might occur from their use.

Piperonyl butoxide is an insecticide when used alone. It will kill many varieties of insects at reasonably low concentrations, but its action is slow. When it is combined with even minute proportions of pyrethrins, the speed of action is immensely increased, and the concentration required to produce effective results is greatly decreased.

Pyrenone No. 20 New

After a long series of tests utilizing various combinations of piperonyl butoxide and pyrethrum, Pyrenone No. 20 New was developed as an ideal concentrate for the manufacture of general-purpose household sprays of the oil types. It can be used at 1-to-19 dilution with any suitable base oil. The result will be a crystal-clear solution having the characteristic light golden yellow of pyrethrum sprays. Both the concentrate and the sprays made from it have only a faint natural pyrethrum odor, and whatever odor may derive from the base oil used as a diluent.

Pyrenone sprays made at the recommended 1-to-19 dilution without the addition of any other toxic ingredient will be found to have rapid and satisfactory knockdown when tested under the usual conditions. By Peet-Grady standards, a Pyrenone spray made at 1-to-19 dilution is far above the minimum for a Grade AA spray. Pyrenone sprays will be found to be satisfactorily effective against the customary range of household insects.

Pyrenone is a registered trade mark of Dodge and Olcott, Inc.

When added to a diet low in protein, methionine can significantly increase the growth-rate of rats, according to a paper presented recently before an American scientific society. The authors also claim that the addition of methionine aids the rats in resisting high concentrations of benzene in the atmosphere. Methionine, one of the ten essential amino acids, is now being synthesized by a U.S.I. process which cuts costs about 97 per cent.

Four groups of 6-9 male albino rats, weighing about 180 grams each, were fed a protein-deficient diet, consisting of 69 per cent sugar, 9 per cent casein, 15 per cent lard, 4 per cent salt mixture, and 3 per cent cellophane with 500 mg. of yeast and 2 drops of cod liver oil daily. The diet of two groups was supplemented with 0.8 per cent of methionine daily. One group on the basic diet and one on the supplemented diet were exposed to an atmosphere of 90 per cent benzene for 42 hours weekly.

Both the methionine groups gained significantly more weight than their corresponding basic groups. The methionine group which was exposed to benzene showed far less ill effects than the basic group.

Easy Drum-Handling



This new all-metal drum support comes from its manufacturer packed in its own, individual carton ready for mounting. It is claimed to convert any metal drum into a dispenser in a few minutes.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

To prevent leakage from broken acid bottles a new acid-resistant coating is announced which is said to provide a protective armor around the bottles, and to hold its shape even though the glass underneath is shattered. (No. 093)

USI

An automatic paint brush cleaner, described as a unit consisting of a patented device and a special liquid, is reported to do a rapid and complete job, even removing the paint in the heel of the brush. (No. 094)

USI

To put out solvent fires, as well as gas and oil fires, a mechanical foam has been developed, which is claimed to meet all the rigid conditions of the new joint Army-Navy specifications. (No. 095)

USI

A new rustproof for steel is described as protecting metal during the manufacturing stages and permitting a tighter bond with paints. (No. 096)

USI

To withstand 1,000 degrees F., new glass-based coatings are announced which are alleged to be rustproof, solventproof, and abrasionproof, and to withstand a 200-hour salt-spray test. (No. 097)

USI

A new moisture tester makes 3 moisture determinations per minute on sheet material, such as paper, cardboard, and veneer, according to the manufacturer. (No. 098)

USI

To evaporate heat-sensitive solutions, or solutions which tend to decompose, discolor, or separate in crusts, is the purpose of a new "rapid current evaporator." The apparatus is readily adaptable to plant operating conditions, the makers state. (No. 099)

USI

To speed textile finishing, a new catalyst is announced which is described as odorless, and water soluble. It is claimed to accelerate the action of thermoplastic resins used in finishing textiles. (No. 100)

USI

A new-type continuous viscosimeter is described as permitting instantaneous observation of viscosity values existing in a moving fluid stream under full-line pressure. (No. 101)

USI

A cold-setting padding glue, claimed to resist extremes of heat and cold, can be applied by hand brush or spray gun, according to the manufacturer. One gallon is reported to cover 200 square feet of padding area. (No. 102)

USI

To paint any automobile in one hour without the use of brushes or spray guns is the purpose of a new material which is reported to produce a factory-like job. The material is sold with a two-year guarantee. (No. 103)

U.S.I. INDUSTRIAL CHEMICALS, INC.

60 EAST 42ND ST., NEW YORK 17, N. Y.

U.S.I.

BRANCHES IN ALL PRINCIPAL CITIES

ALCOHOLS

Amyl Alcohol
Butanol (Normal Butyl Alcohol)
Fusel Oil—Refined

Ethanol (Ethyl Alcohol)

Specially Denatured—all regular and anhydrous formulas
Completely Denatured—all regular and anhydrous formulas
Pure—190 proof, C.P. 96% Absolute

*Super Pyro Anti-freeze
*Solox proprietary Solvent

*ANSOLS

Ansol M
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*Registered Trade Mark

ACETIC ESTERS

Amyl Acetate
Butyl Acetate
Ethyl Acetate

OXALIC ESTERS

Dibutyl Oxalate
Diethyl Oxalate

PHTHALIC ESTERS

Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate

OTHER ESTERS

*Diatal
Diethyl Carbonate
Ethyl Chloroformate
Ethyl Formate

INTERMEDIATES

Acetoacetanilide
Acetoacetyl-ortho-anisidide
Acetoacetyl-ortho-chloranilide
Acetoacetyl-ortho-toluidide
Acetoacetyl-para-chloranilide
Alpha-acetylbutyrolactone
5-Chloro-2-pentanone
5-Diethylamino-2-pentanone
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Alpha-Oxalpropionate
Ethyl Sodium Oxalacetate
Methyl Cyclopropyl Ketone

ETHERS

Ethyl Ether
Ethyl Ether Absolute—A.C.S.

FEED CONCENTRATES

*Curbay B-G
*Curbay Special Liquid
*Vacalene 40 *Riboflavin Concentrates

ACETONE

Chemically Pure

RESINS

Ester Gums—all types
Congo Gums—raw, fused & esterified
*Araploz—alkyds and allied materials
*Arafene—pure phenolics
*Arochem—modified types
Natural Resins—all standard grades

OTHER PRODUCTS

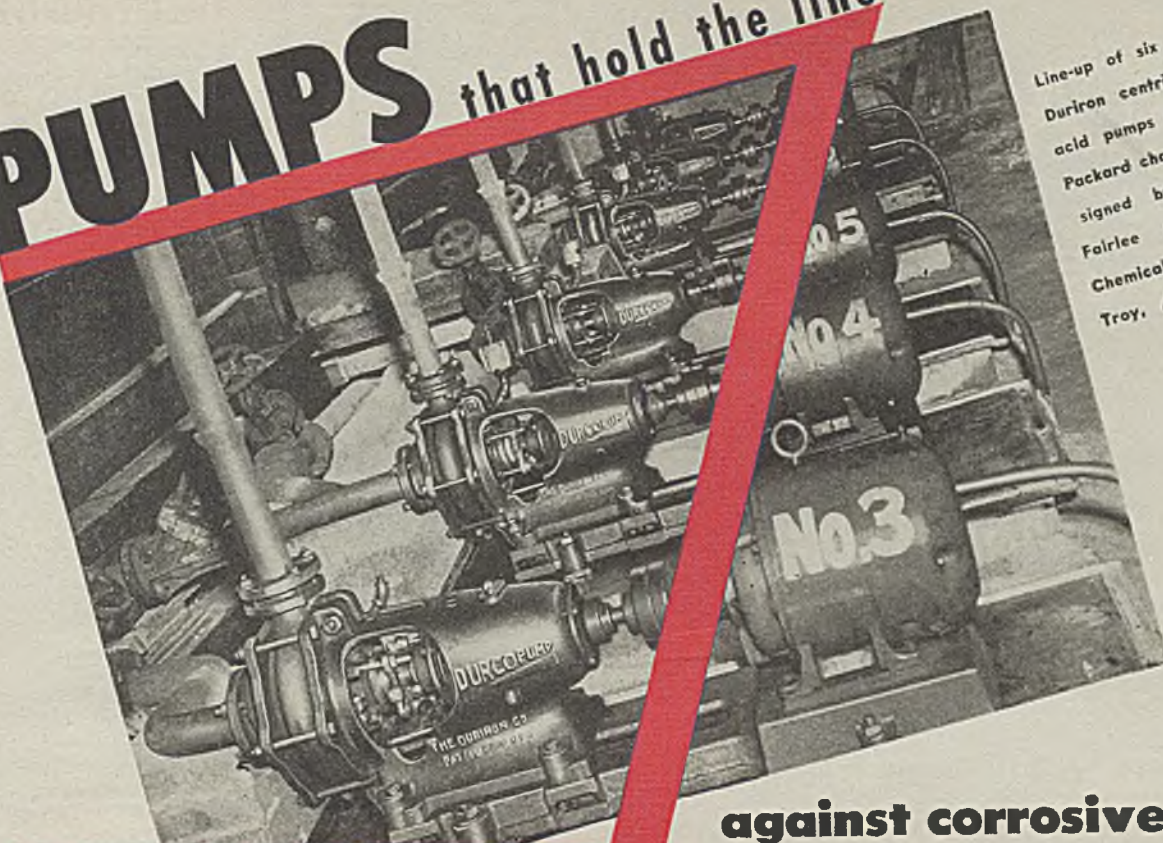
Collodions
Ethylene Glycol
Nitrocellulose Solutions

Ethylene Urethane
dl-Methionine

Printed in U.S.A.

PUMPS that hold the line

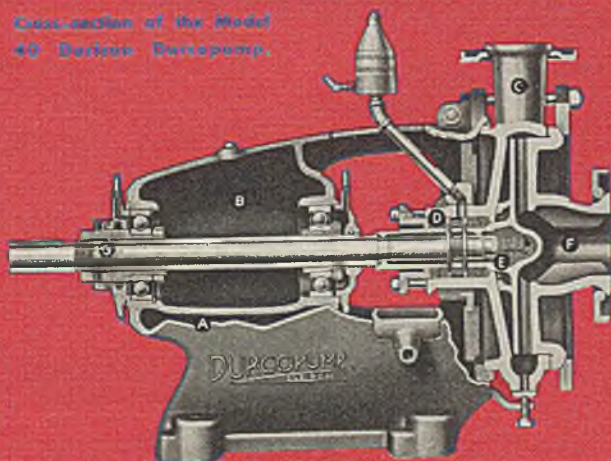
Line-up of six of the twelve Duriron centrifugal sulphuric acid pumps at new Mills-Packard chamber plant designed by Andrew M. Fairlee for Standard Chemical Company, Inc., Troy, Alabama.



against corrosive

H₂SO₄

Cross-section of the Model 40 Duriron Durcopump.



10% H₂SO₄ takes about 14,600 years to penetrate an inch of Duriron. A 35% solution takes 7,000 years longer and a 95% solution 24,000 years longer! While these figures are based on cold solutions, the figures for hot, agitated solutions are so little less as to be commercially unimportant. Duriron is regularly used at temperatures as high as 1200° F. in sulfuric acid concentrator equipment and for this service *has never had to be replaced because of corrosion*. The use of Duriron in pumps for Standard Chemical Company's H₂SO₄ chamber plant is a typical application in the fertilizer field, and common wherever sulfuric acid is handled.

The Model 40 Durcopump, illustrated here, features:

- Full ball-bearing construction
- Renewable shaft shrouds through stuffing box
- Deep stuffing boxes with lantern rings for grease or liquid seal
- Patented venting parts in impeller to relieve pressure on stuffing box
- Wet end parts made of any of the Durco alloys and *interchangeable*

The Model 40 series ranges in capacity to 2000 g.p.m., in head to 230 feet. A result of 25 years of experience and design development in high silicon iron pumps, this series contains the most efficient and practical acid handling pumps we have built.

For further details, ask for Bulletins 11 and 810.

THE DURIRON COMPANY, INC.
DAYTON 1, OHIO

DURCO ALLOYS

- Duriron and Durichlor—high-silicon irons
- Durimet—a special, sulfuric acid-resisting stainless steel
- Durco Stainless Steels—(Chrome-nickel series)

DURCO EQUIPMENT

Centrifugal Pumps
Valves

From all the above alloys, also Monel, Inconel, Nickel, Ni-Resist, Steel

Pipe and Fittings (Flanged and Bell and Spigot)
Exhaust Fans
Heat Exchangers
Steam Jets
Tank Outlets
Ejectors
Kettles

Duriron, Durichlor



NATIONAL CHEMICAL EXPOSITION

CHICAGO COLISEUM
SEPT. 10-14, 1946

BIGGER AND BETTER THAN EVER! Yes, the 1946 Exposition will definitely be the finest ever held. Many of the exhibits will reflect the results of the war, either in modifications resulting from changes in material sources, or innovations brought about by war research and development work.

"CHEMICAL TRAIL BLAZERS" — a feature attraction. An interesting and educational symposium of new ideas, new discoveries, new developments and new applications in industrial progress. The unique three-dimension method of presentation will highlight the Exposition. AMERICAN CHEMICAL SOCIETY MEETING will run concurrently, being scheduled for Sept. 9-13.

Yes, the 1946 National Chemical Exposition will be bigger and better than ever this year. *Plan* now to attend.

MAKE RESERVATIONS AT THESE COOPERATING HOTELS

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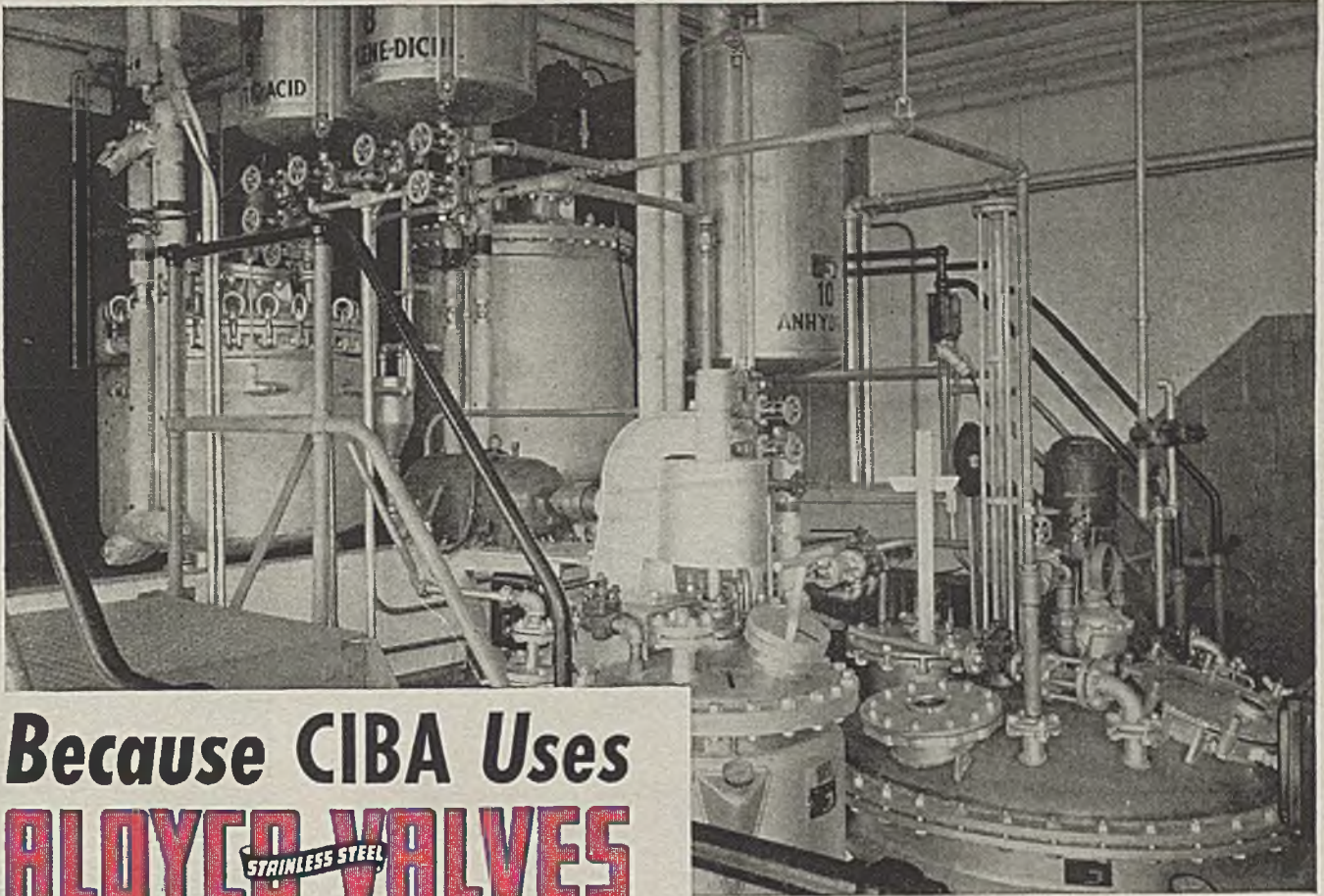
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Chemistry creates industrial progress

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Alus Corporation
American Cyanamid & Chemical Corporation
American Chemical Society
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American Heat Reclaiming Corp.
American Instrument Co.
American Pulverizer Co.
Anderson-Prichard Oil Corp.
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Barco Mfg. Co., Net Inc.
Barco Oil Company
Barnstead Still & Sterilizer Co., Inc.
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Buffonk Equipment Div.
The Bristol Company
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The Carpenter Steel Co.
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Commercial Solvents Corp.
Consolidated Prod. Co., Inc.
Continental Can Co.
The Container Company
Cornellus Product Company
Corning Glass Works
Croll-Reynolds Co.
Croll-Reynolds Engineering Co.
Crucible Steel Co. of America
Darco Corporation
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The W. J. Fitzpatrick Co., Inc.
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Glyco Products Co., Inc.
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The Nickolia Intra-Red Co.
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National Starch Products, Inc.
National Technical Lab.
New Jersey Mach. Corp.
The Ohio Chem. & Mfg. Co.
Orenite Chemical Company
The Pacific Northwest
The Permutit Company
Leonard Peterson & Co., Inc.
The Pfauzier Co.
Precision Scientific Company
Process Equipment Corp.
Productive Equipment Corp.
Pulverizing Machinery Co.
Putnam Publishing Co.
Radio Corp. of America
Raymond Pulverizer Division
Reichhold Chemical, Inc.
Resiste Pipe & Valve Company
Robbins & Myers, Inc.
Ross & Rawe, Inc.
Millon Roy Company
St. Regis Paper Company
E. H. Sargent & Co.
Schaar and Company
Claude B. Schenck Co.
Scientific Glass App. Co.
Sales Corp. of America
E. H. Sheldon & Co.
Simply Engineering Co.
Silver Steel Casting
Skelly Oil Company
A. D. Smith Corporation
Secony-Vacuum Oil Co., Inc.
L. Sonneborn Sons, Inc.
Spartan Manufacturing Co.
D. R. Sperry & Co.
Standard Oil Co. (Indiana)
Taylor Instrument Companies
Tech Laboratories
Tilbar, Inc.
Tel-Clear Machine Co.
Trimount Instrument Company
Union Carb. and Car. Corp.
United States Stoneware Co.
Universal Oil Products Co.
Valtical Corporation
Victor Chemical Works
Waikakee Foundry Company
The Weatherhead Company
W. M. Welch Mfg. Co.
W. Va. Pulp & Paper Co.
Wheeler Instruments Co.
Wilbert-Anderson
Winthrop Chemical Co., Inc.
Yale & Towne Mfg. Co.
J. A. Zurn Mfg. Co.

NO CONTAMINATION HERE

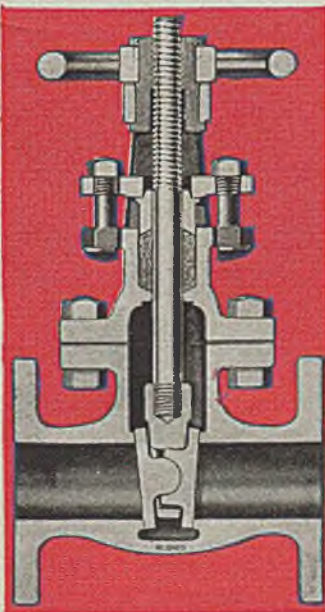


Because CIBA Uses **ALOYCO VALVES** STAINLESS STEEL

HORMONE and vitamin concentrates are precious! Batches, often worth \$5,000, must be protected against metallic contamination. Delicate processes must not be upset by valve failures. So Ciba Pharmaceutical Products, Inc., Summit, N. J., specifies Aloyco Stainless Steel Valves.

These valves are contamination-proof because they are made entirely of alloy. The uniform corrosion-resistance of these alloys is assured by carefully controlled

analyses. To provide easy, positive action, Aloyco Valves are accurately machined with super-finished seating surfaces. In addition, they are designed for quick disassembly—a necessity where valves must be inspected, cleaned, and sterilized; as in beverage, food and pharmaceutical plants. Long in service life, Aloyco Valves will merit what W. Bluntschli, Chief Engineer of Ciba, says of them, "We have found that the maintenance of these valves, and we have hundreds of them in different sizes in the departments mentioned, is practically nil under the corrosive mixtures of chemicals and solvents they handle."



ALOYCO DOUBLE DISC WEDGE Provides Positive Closure That Protects Ciba's Processes

Discs are free to rotate, non-fouling in any position. The flexibility of this design assures pressure tightness on both seats and affords easy repairs in user's own shop.

ALOYCO

STAINLESS STEEL VALVES AND FITTINGS

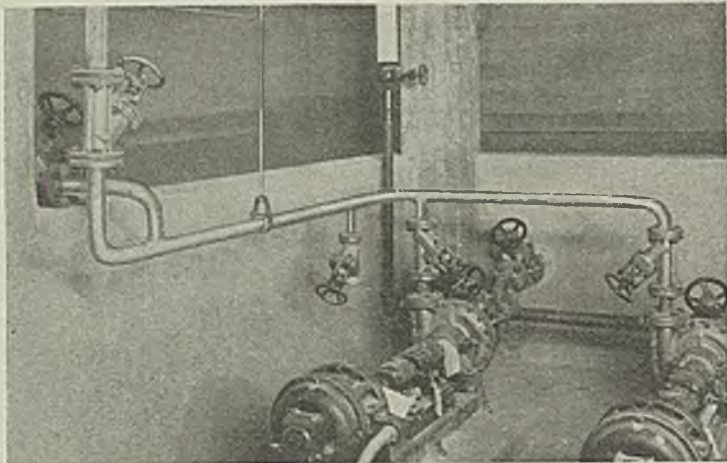
GATE, GLOBE, Y, CHECK, TANK, SAMPLING AND V-PORT VALVES
SCREWED, FLANGED AND WELDED FITTINGS

ALLOY STEEL PRODUCTS COMPANY, INC.

1301 WEST ELIZABETH AVE.

LINDEN, N. J.

only **LEAD** meets the "Acid Test"



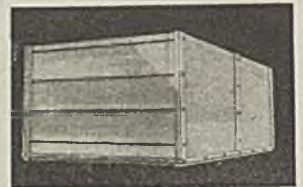
"RESISTO" Lead Alloy and Lead Lined Valves, Pumps, Piping, Fittings . . .
Manufactured and Installed

For reliable, Complete and Lasting protection against the evils of Corrosion, only Lead meets the "Acid Test". Wherever process Acids are used in Industry there is need for O. G. Kelley Service or Equipment. Whether it be lead-lined tanks, prefabricated lead items, or homogeneously bonded equipment, Kelley can supply it . . . built to your exact specifications and backed by the engineering skill and "know-how" of a generation of service to the process industries.

Many pieces of equipment that are now "stock items" started out by being problems for our engineering staff. *Your* problem may be one that we have already solved . . . but if not, you can be sure that we either know how it can be solved, or will devise means for doing so. That is our business . . . and our reputation. O. G. Kelley equipment meets the "Acid Test" of constant usage under the most difficult conditions.

**SEE OUR EXHIBIT AT BOOTHS NO. N36-37
CHICAGO CHEM SHOW**

We fabricate or reline tanks of all types—Lead, Wood, Steel . . . and of all sizes and shapes. Lead-burning done at your own plant or any of ours.



Lead Heating and Cooling Coils for all needs. From our scores of spacer block and coil support leg sizes we may well be able to supply the exact coil you need at standard cost



Lead Castings of any size, shape, quantity or composition are available. May be die cast, metal mold cast or sand cast. Hundreds of patterns and molds on hand.



All kinds and types of equipment homogeneously bonded where severe operating conditions of temperature, pressure, vacuum or vibration must be overcome.



**LEAD STEEL
WOOD**

O. G. KELLEY & CO.

fabricators of equipment for the process industries

**NEW YORK CITY
NEW YORK**

**95 Taylor Street
BOSTON 22, MASS.**

**JOHNSON CITY
TENNESSEE**

with 64 years' experience
making special chemicals



— B & A may have
the answer
to your problems



Over the past 64 years, Baker & Adamson has helped Industry solve scores of production problems by providing a wide range of fine chemicals "custom made" to the particular requirements of individual users.

Such experience can be invaluable to you, too, if your research, development or production program indicates a special chemical will be needed.

Whether you must have this material "made to order" in tons or pounds, you will find B & A's flexible manufacturing facilities well adapted to countless assignments . . . and your special chemical will be produced with the same skill, science and careful attention that has gained B & A the reputation for "setting the pace in chemical purity" wherever reagents and fine chemicals are used.

Remember—no matter what your needs, the Baker & Adamson Division of General Chemical Company has the men, methods, and materials to handle special chemical requirements swiftly, surely . . . and in strictest confidence.

Let us discuss your problem now so as to dovetail the delivery of your special chemical to the flow of your other production materials.



GENERAL CHEMICAL COMPANY BAKER & ADAMSON DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.

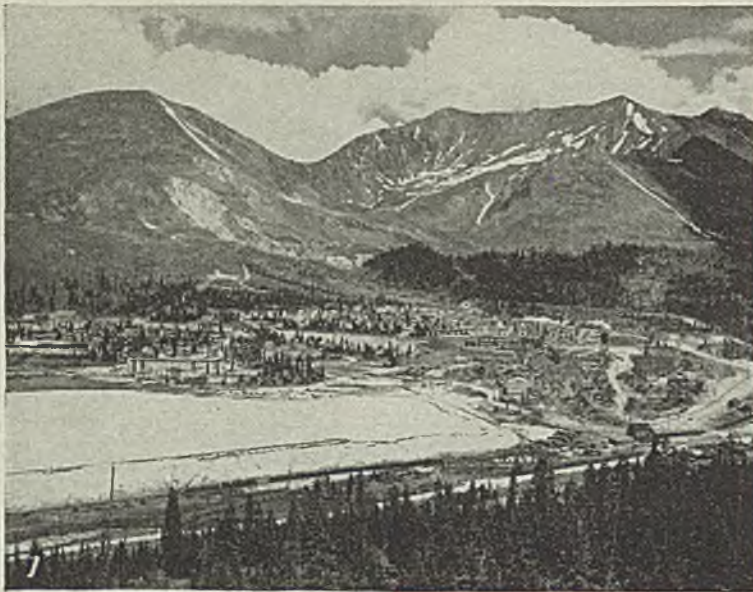
Sales and Technical Service Offices: Atlanta • Baltimore • Birmingham* • Boston • Bridgeport • Buffalo* • Charlotte* • Chicago* • Cleveland* • Denver • Detroit* • Houston • Kansas City • Los Angeles* • Minneapolis • New York • Philadelphia* • Pittsburgh* • Providence • St. Louis* • San Francisco* • Seattle • Uica • Wenatchee (Wash.) • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal* • Toronto* • Vancouver

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

* Complete stocks carried here.



Dependable

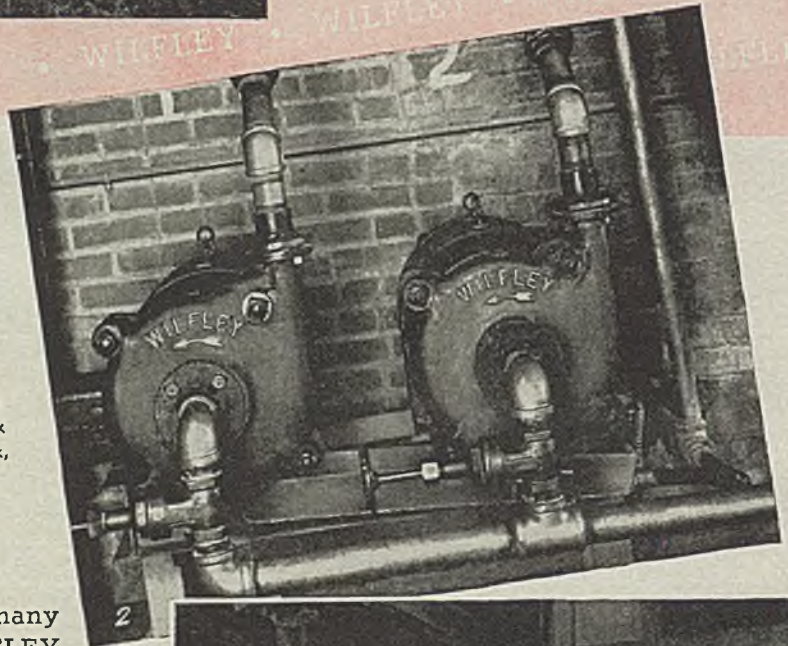
FULL TIME PRODUCTION AT

CLIMAX

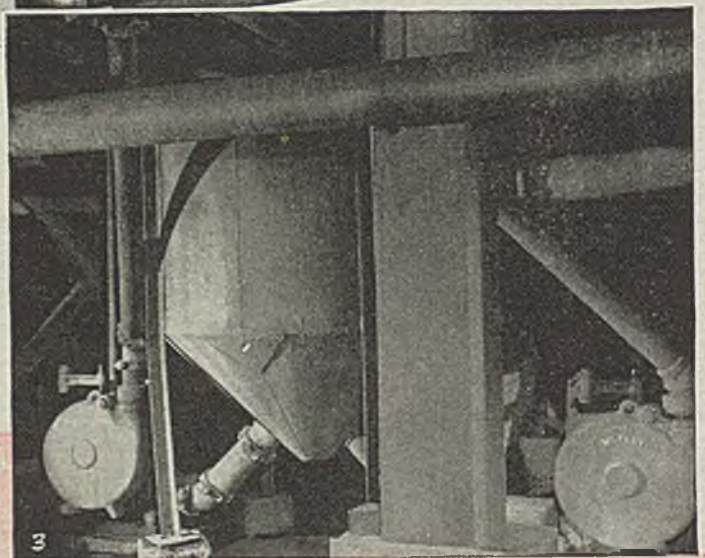
1 Plant and residential area of the Climax Molybdenum Co. Climax, Colorado.

2 WILFLEY Acid Pumps in the Langeloth Conversion plant of the Climax Molybdenum Company.

3 Two of the many WILFLEY Sand Pumps in the Climax Molybdenum Mill, Climax, Colorado.



In the great CLIMAX plants—and in many others throughout the world—WILFLEY pumps maintain an enviable reputation for continuous, trouble-free, high-efficiency performance. Exclusive principles of design and construction, plus individual engineering on every application, make this "the pump to buy" when true high efficiency is required in the handling of sands, slimes, slurries or acids. Write for complete details.



WILFLEY
centrifugal PUMPS

A. R. WILFLEY & SONS, Inc.
DENVER, COLORADO, U.S.A.

New York Office: 1775 Broadway, New York City



EVER WIDENING SERVICE

Ever drop a pebble into a pool—and watch the ripples spread in ever-growing circles?

That illustrates the growth of Stephens-Adamson. From a modest beginning some 45 years ago, this company has steadily widened its service to industry to become a leader in the bulk materials handling field.

Each of those years has seen S-A service meeting the growing needs of expanding industry. Each has seen the development of new and better handling methods and

new and improved conveyors and accessories.

Today, the goal of S-A engineers is the same as always: to help you get the handling system that will convey the *right* volume to the *right* place at the *lowest* cost per ton. To that end, S-A today is field-testing many new methods and equipment.

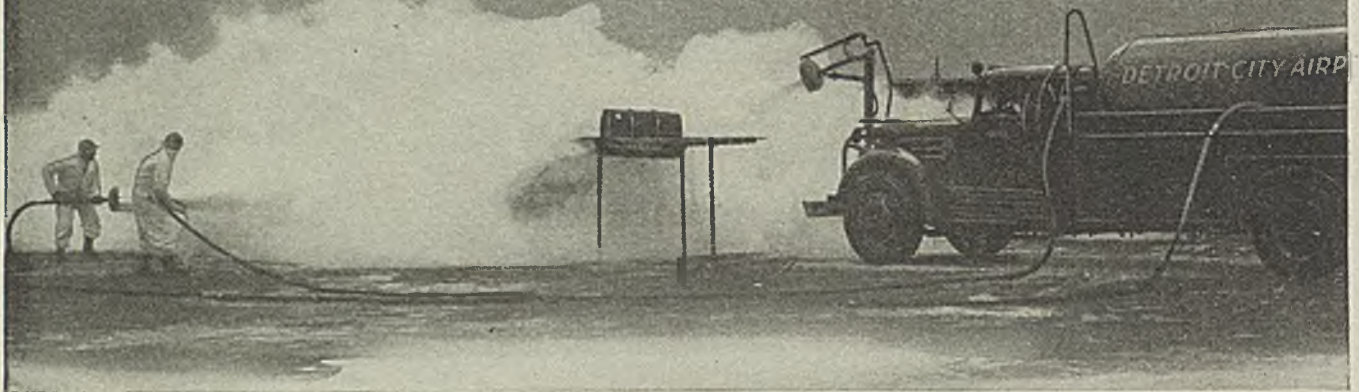
On your next problem in bulk material handling, talk to the man who can give you the benefits of this ever-widening service. Talk to an S-A engineer.



STEPHENS-S-ADAMSON
3 RIDGEWAY AVENUE, AURORA, ILLINOIS MFG. CO. LOS ANGELES, CALIF. • BELLEVILLE, ONT.

Designers and Manufacturers of All Types of
BULK MATERIAL HANDLING EQUIPMENT

Here's how **CARDOX**
has broadened the Scope
of CO₂ Fire Protection



Airport crash fires are among the most vicious of all fires to fight. Army and Navy experience proved that they call for equipment able to reach any part of the field quickly . . . with enough of the right extinguishing medium to deal effectively with the largest fires likely to be encountered.

The ability of the Cardox Airport Fire Truck to overwhelm vicious crash fires fast, is one of many examples of the broadened scope of CO₂ fire protection made possible by Cardox methods of application and control.

These methods, which are utilized in all Cardox Fire Fighting Equipment, are made possible by the distinctive Cardox system of control and engineered application of carbon dioxide stored at 0° F. and relatively low pressure in a single storage unit containing from ¼ ton to 125 tons. As a result, enough of this dry inert, non-damaging gas is made available to handle even large fires and leave an ample reserve for new emergencies.

As a result of these unique Cardox developments, low pressure liquid carbon dioxide can be applied with equal facility in pounds or tons . . . making it entirely practical, for example, to use this fast-acting extinguishing medium: (1) To protect banks of large transformers outdoors, (2) To provide tons

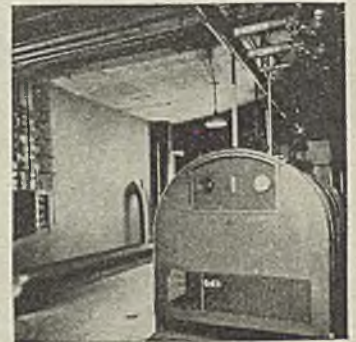
of Cardox CO₂ on a high speed truck to guard widely scattered hazards, (3) To provide a single system capable of protecting multiple hazards throughout large plants, (4) To equip factories, hangars, etc. with a portable unit with sufficient capacity to deal with relatively large fires when seconds pay dividends!

Write today for details on how Cardox's broadened application of carbon dioxide can best be utilized to increase the protection of your specific operation. Ask for Bulletin 1786

CARDOX CORPORATION
BELL BUILDING • CHICAGO 1, ILLINOIS

District Offices in New York • Philadelphia
Washington • Pittsburgh • Cleveland • Detroit
Cincinnati • Houston • San Francisco
Los Angeles • San Diego

Typical Examples of
Cardox Fire Fighting Equipment



- (1) Cardox Fixed Systems. Provide 500 pounds to 125 tons of liquid carbon dioxide.
- (2) Cardox Fire Trucks. Tons of CO₂ on wheels for application through hose line or standpipe systems.
- (3) Cardox Airport Fire Truck. Uses mass attack to overwhelm vicious crash fires fast.
- (4) Cardox Transitan. Portable unit with a capacity of 750 pounds of carbon dioxide. Now available in certain parts of the country in hand propelled, and motorized models.

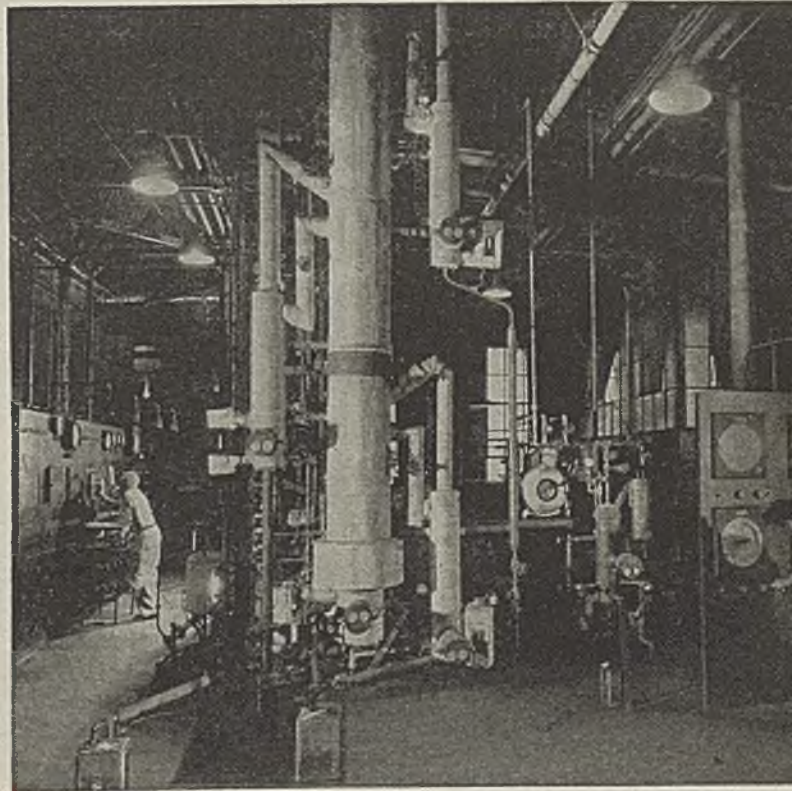
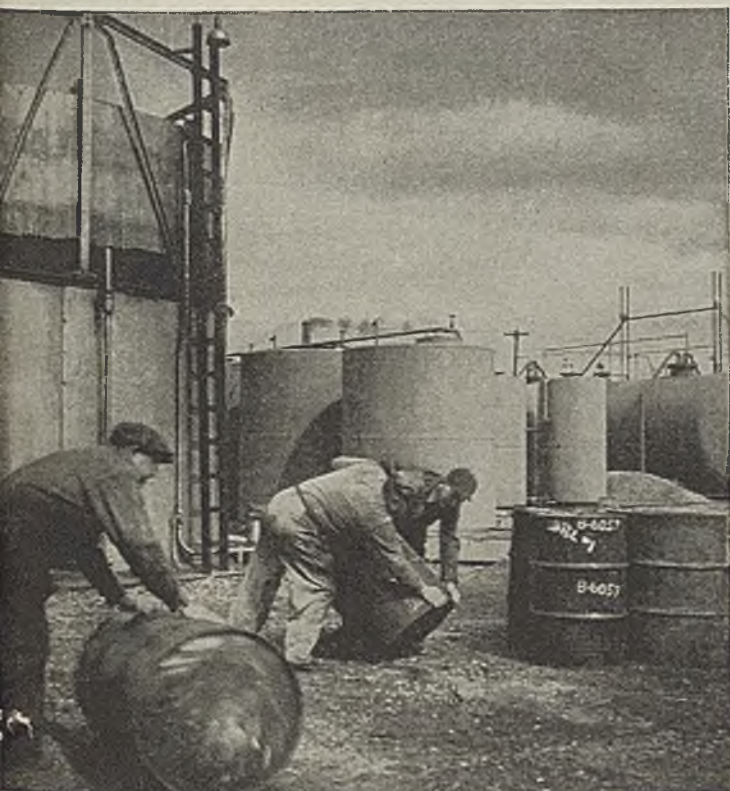


Joe- Did you see this Kellogg ad in the petroleum papers? The technique seems just what we've been looking for in developing that new process of ours.
Jim

"Will decarbonizing improve the economic picture of our refinery when we install Fluid cat-cracking?"

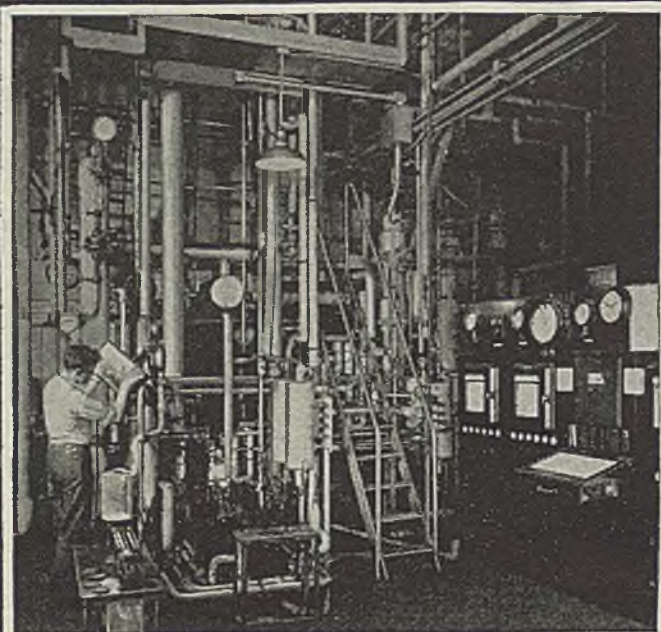
Refiners across the country must repeatedly find positive answers to such questions as this, on which depend major decisions. To provide sound, accurate answers, Kellogg years ago set up a system which has

paid off for refiners. To understand its thoroughness ... and why it has received such wide acceptance ... it is only necessary to read through the following step-by-step sequence.



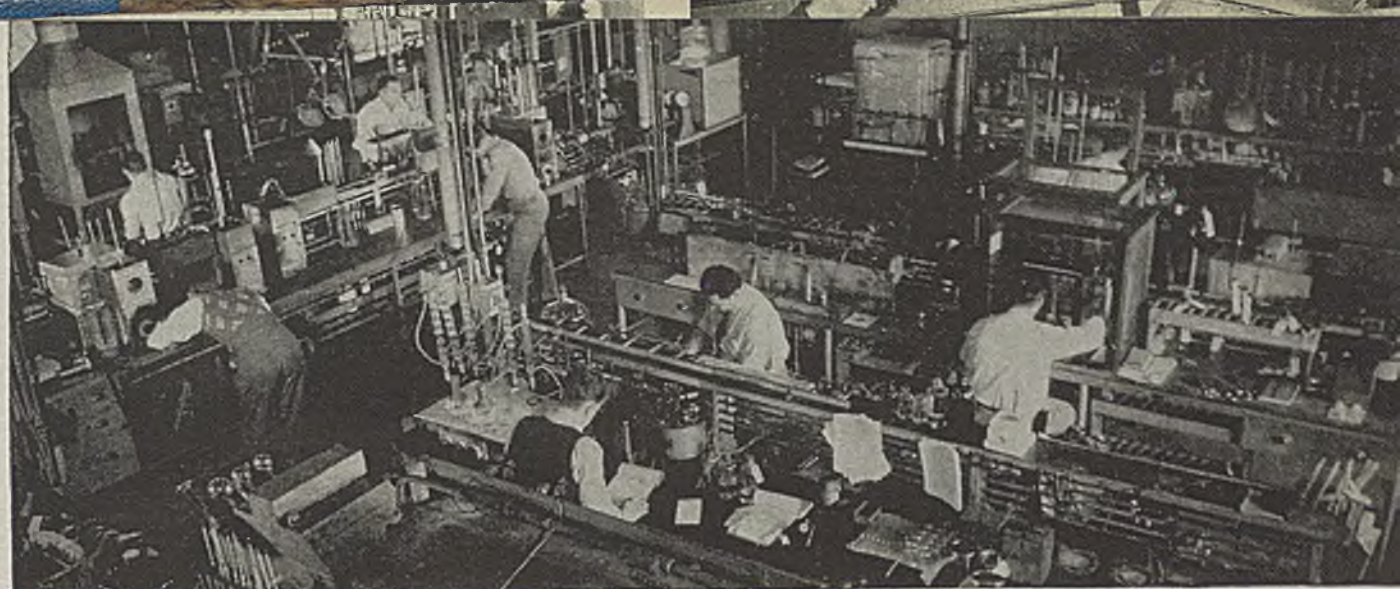
1 FIRST STEP ... the Kellogg yard ... arrival of samples of the refiner's present crude, plus samples of available crudes that he may run in the future. For the changing chemistry and economics of crude supply must be considered. In our unique pilot plant refinery, every foreseeable variable of feed, continuous operation, and end products will be explored.

2 TOPPING STARTS the duplication of actual refinery practice, by fractionating the sample crudes into gases, distillates, and reduced crudes. With this operation, the highly accurate recording of quantitative and qualitative analyses of the fractions begins ... the first of the voluminous data needed for final calculations is obtained.



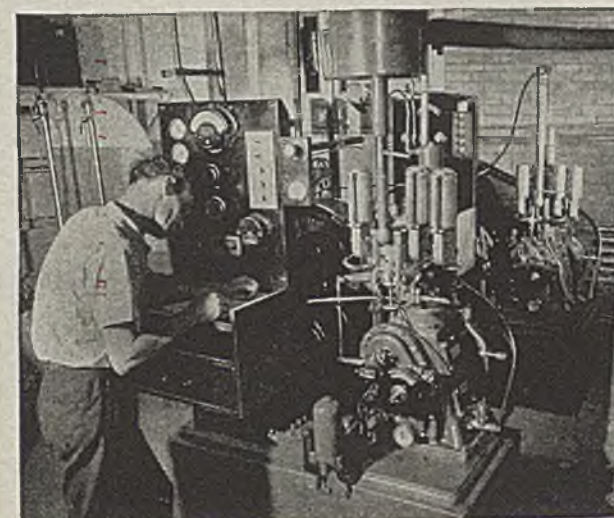
3 REDUCED CRUDE TREATMENT comes next. The effect of this propane decarbonizing operation upon the economics of cat-cracking is the subject of the investigation. Into the pilot go reduced crudes from the topping unit. Operations are varied to produce bottoms as low as 3½% on the crudes. Propane ratios, temperatures, throughputs, are also varied, and are tabulated to provide a graph of all runs.

4 TRUE YIELD DATA come from this cat-cracker of most advanced "Fluid" design. It is fed a mixture of decarbonized oils and gas oils from the topping unit. Catalysts, velocities, bed depths, are all varied to yield the desired gasoline quality standards, determine the most economical conversion rates, etc. For comparison, *reduced crudes* are also run directly, to obtain a contrasting pattern of yields, quality, and operational costs.



5 QUALITATIVE ANALYSES of feeds and products from all pilot runs are continuously performed in the Analytical Laboratory. Here, physical and chemical properties and other pertinent factors are assessed and

carefully charted. When combined with utility statistics, operating conditions, and volume of yields from the pilots themselves, these data form a thoroughly sound basis for the final analysis by process engineers.



6 MOTOR FUEL COMPONENTS are engine tested. Operating as an adjunct to the Analytical Laboratory, test engines measure octane rating and lead susceptibility of gasolines. Gaseous components are analyzed in the Mass Spectrometer. Catalyst structure is continuously studied in X-Ray diffraction equipment. The comprehensive findings obtained from such modern analytical instruments form an important part of the complete report of the Analytical Laboratory.



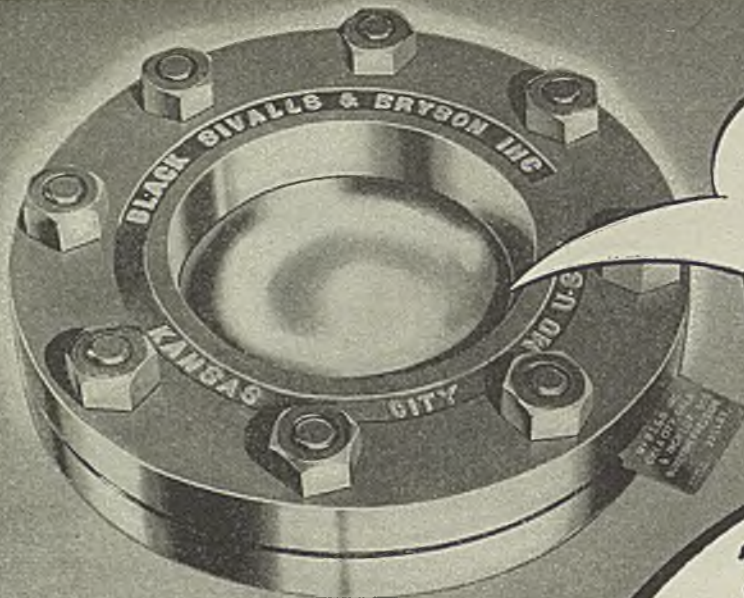
7 HERE THE FACTS ARE TABULATED. And then, in the Process Design and Economics group, the complete data of the refiner's proposed and present refinery operations are weighed, with reference to specialized local costs—labor, utilities, transportation—and the specialized price structure for products in the proposed areas, both as of today and the foreseeable future. From this weighing of data comes a dependable, documented recommendation on which action can be safely taken.

The technique outlined on these pages is regularly applied by Kellogg to answering the questions of its customers seeking to determine whether earning power of a proposed operation is favorable. Once this all-important factor is established, the data are at hand for designing the customer's individual plant . . . and for constructing it with every assurance that it will operate as predicted, from initial run throughout its planned future.



THE M. W. KELLOGG COMPANY
Engineers and Economists to the Petroleum Industry

New York, N. Y. • Jersey City, N. J. • Los Angeles, Calif. • Tulsa, Okla. • Houston, Texas • London EC2, Eng.



**I AM A
SAFETY
HEAD**

My Job Is--
PROTECTION

I stand watch over those pressure vessels that are full of energy and power . . . waiting to "go places." My job is to protect your plant, your equipment and your employees from explosions as a result of over-pressure. That's why the largest industrial plants in the country now use B.S.&B. SAFETY HEADS on all kinds of pressure vessels.

I Protect the
"WORK HORSES" TOO!

You may have SAFETY HEADS on chemical reaction equipment in your plant—but do not overlook the "work horses" . . . refrigeration and air conditioning equipment needs protection . . . compressed air lines are a constant danger point . . . hot water tanks are packed with energy. There are special types of B.S.&B. SAFETY HEADS for every kind of "work horse" in your plant and we'll be glad to tell you about them.

... WRITE FOR CATALOG

BLACK, SIVALLS & BRYSON, Inc.

- SALES OFFICES-- 24th FLOOR POWER AND LIGHT BUILDING, KANSAS CITY 6, MO.
- PLANT-- 7500 EAST 12th STREET, KANSAS CITY 3, MISSOURI



A MODERN . . . AND PROVED . . . PROTECTION AGAINST CORROSION

STOP CORROSION LOSSES

Fedelco LIQUID PLASTIC COATING

● You can . . . on numerous installations throughout your plant . . . with Fedelco Liquid Plastic Coating. It's a remarkable surfacing material composed of the most inert thermoplastic resins, designed to effectively combat corrosion year after year under the toughest conditions.

Developed by Fedelco Engineers in 1939 especially to meet the challenge of corrosion, the amazing features of Fedelco Liquid Plastic Coating . . . resistance to mineral acids and alkalis or their salts, dielectric qualities, opposition to vapor permeability and non-contaminating features . . . provide practically permanent protection from corrosion.

Fedelco Liquid Plastic Coating is unaffected by the sun's rays. It is tough . . . yet flexible enough to contract and expand under

cold and heat without cracking. It is abrasion resistant. It will not chip. It will not ignite when thoroughly dry.

Fedelco Liquid Plastic Coating adheres to metal, wood or concrete. Surfaces require minimum cleaning. Just remove surface greases and scale. Impermeability of the coating is completed . . . through evaporation of solvents . . . in the presence of heat, air and moisture.

In developing this remarkable new corrosion-prevention coating, Fedelco Engineers have made a thorough study of your corrosion problems. Let them discuss it with you. They can quickly explain how completely . . . how easily . . . how economically your corrosion problems can be solved with Fedelco Liquid Plastic Coating. It's not a "substitute" for paint. It's a modern and proved protection against corrosion.

Setting The Pace
In Plastic Coating
To Conquer
Chemical Corrosion

FEDERAL ELECTRIC COMPANY Inc.

PLASTIC DIVISION

225 North Michigan Avenue

CHICAGO, ILL.

914 South Wabash

405 Velasco Street
HOUSTON, TEXAS

2114 Main Street
DALLAS, TEXAS

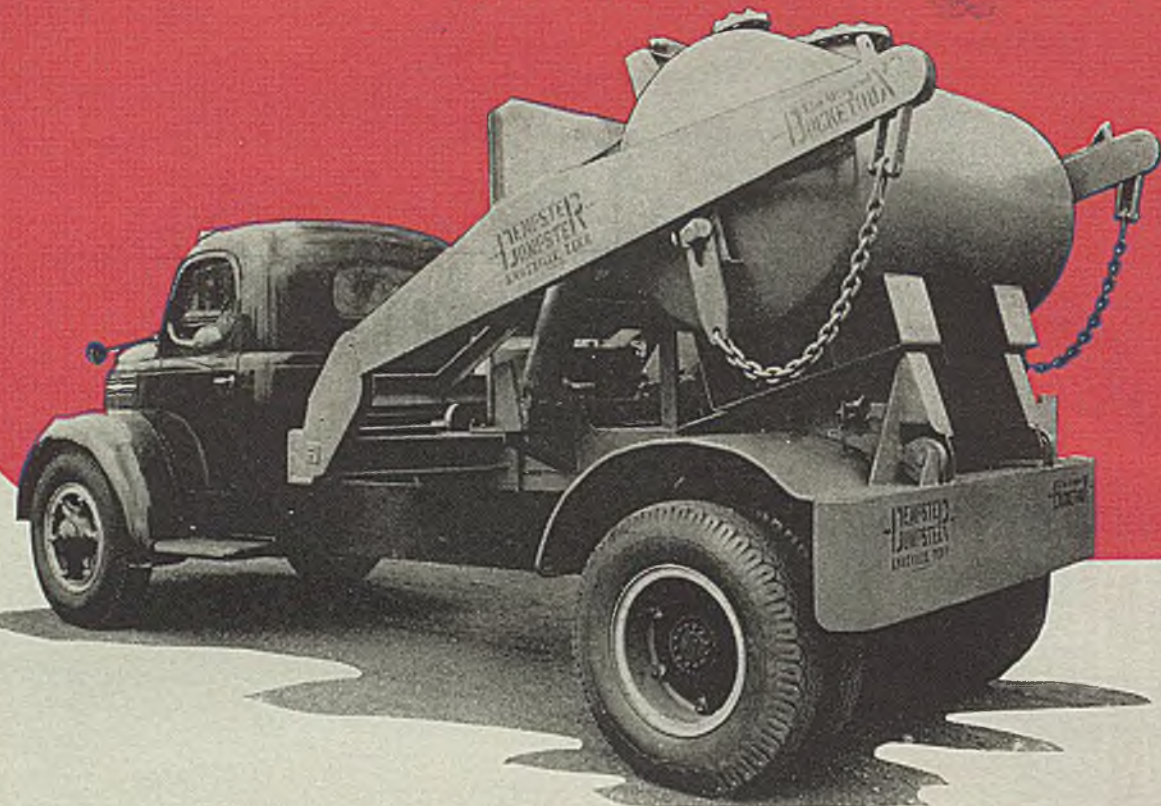
JENNINGS, LA.

310 Thompson Bldg.
TULSA, OKLA.

730 St. Charles Street
NEW ORLEANS, LA.



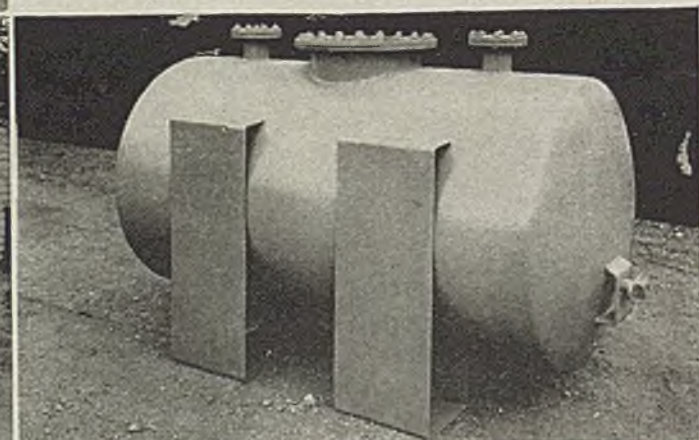
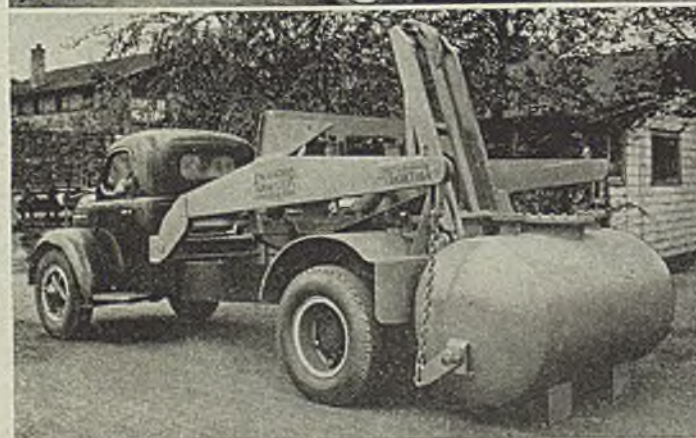
To Cost-Minded



TANKS FOR GASES AND LIQUIDS

Dempster-Dumpster service is unlimited. Here you find it handling 500 gallon rubber lined acid tanks. Its next job at this plant may be hauling a 10 yd. oval top body loaded with trash or rubbish. Next, perhaps, a 4 yd. tilt type body loaded with a different material, etc.

Shown above is a loaded tank in carrying position. At left, tank is hoisted for placing in carrying position or for unloading on platform or ground. Below, close-up showing self-supporting stand and lifting pins. Other similar tanks are available for gases, air, and various liquids.

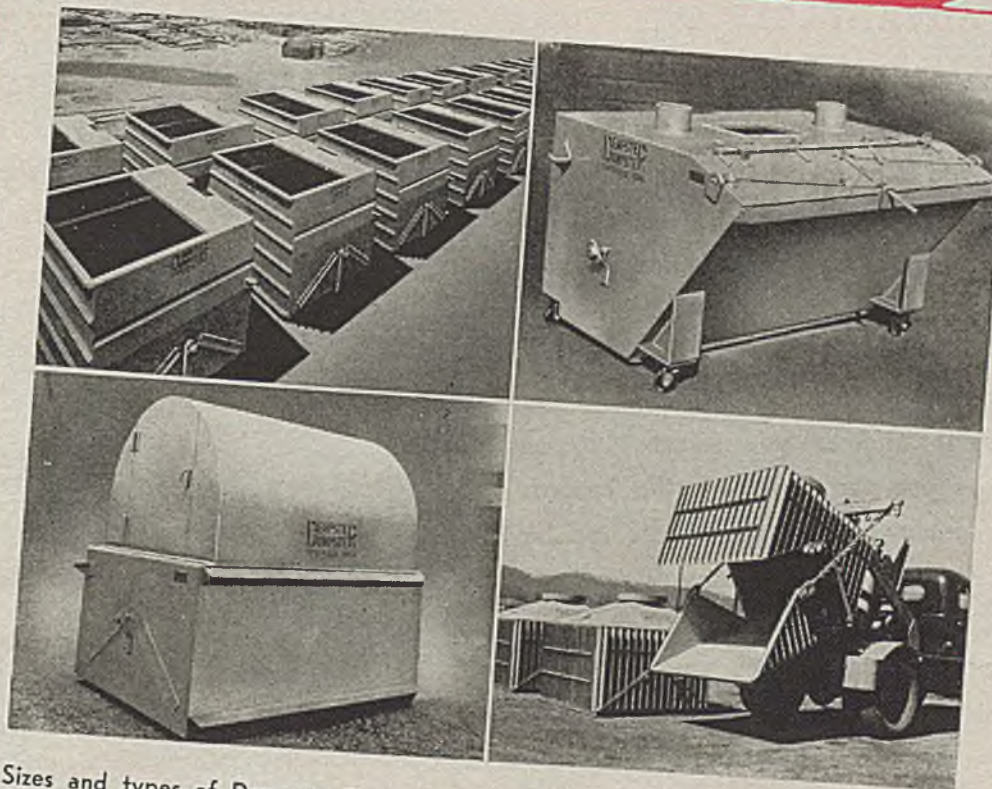


Materials-Handling Executives

The rapid pace at which leading industrial firms have adopted the Dempster-Dumpster system of materials handling by truck is due strictly to its ability to reduce costs.

The Dempster-Dumpster system, fundamentally, comprises one truck equipped with a Dempster-Dumpster hoisting unit which serves any number of detachable bodies. In many installations this system has eliminated the investment and up-keep of four to eight trucks. In every case, reduced costs have been a positive assurance, even before installation. Hoisting units range from 1½ to 8½ ton

capacities. Bodies from 1½ to 20 cu. yd. capacities in an unlimited variety of designs for handling all types of materials from dust to liquids, including acids . . . heavy, rough or finished materials . . . or light, bulky materials. And, regardless of the different types of bodies you may need in your plant, one truck hoisting unit handles all bodies. Duplicated handling of materials is eliminated because bodies are placed at convenient points for final loading. Loaded bodies are picked up at intervals as bodies are loaded. Pick-up of bodies, placing in carrying position, dumping and replacing of empties, are all under finger-tip, hydraulic control in driver's seat.



Sizes and types of Dempster-Dumpster bodies are limited only by the requirements of a particular firm. In photos above, top left, is a few of forty 6 cu. yd. pressed steel, bottom-dumping bodies in a large plant and serviced by only two truck units. Top right, a tilt type body with large hose connections through which a finely ground material is loaded. Below left, an oval top, bottom-dumping trash and rubbish body. Below right, a body used for receiving hot furnace materials up to 1500 degrees fahrenheit.

Doubtless none of the bodies shown in this ad will fit your particular need, but remember there are Dempster-Dumpster bodies that will. DEMPSTER BROTHERS Inc., KNOXVILLE 17, TENN. U. S. A.

★
**DEMPSTER
DUMPSTER**
TRADE MARK REG.



This 4-pen Bailey Pyrotron makes the same number of continuous records as are made by four single pen recorders and it takes only one-fourth as much panel space.

ADVANTAGES OF MULTI-PEN RECORDERS

When you specify Bailey Multi-Pen Pyrotron Recorders and Controllers you simplify the comparison of related records, reduce the number of charts to be handled, and simplify panel layouts.

CONTINUOUS RECORDS

Regardless of whether you select four-pen Pyrotrons or one-pen Pyrotrons the records are truly continuous. Each pen is actuated by a separate system which responds instantly to temperature changes. There is no switching from one point to another. Each pen draws a continuous ink record in a distinctive color.

MULTI-CONTROLLERS

Bailey Pyrotron Recorder-Controllers record and control one or two temperatures. Air operated, electronic, or on-off electric controls may be supplied.

UNUSUAL FEATURES OF THE BAILEY PYROTRON ELECTRONIC RESISTANCE THERMOMETER

1. Resists vibration and shock.
2. Needs no careful leveling.
3. Motor drive provides abundant power for operation of recording pen, controller, alarms and signals.
4. Simple a-c measuring bridge needs no battery.
5. Sturdy electronic units keep the bridge in continuous balance and replace the usual galvanometer and its attendant mechanism for step by step balancing.
6. Interchangeability of packaged units simplifies replacement.

For details on this unusual Electronic Resistance Thermometer, which indicates, records and controls temperatures between -100°F . and 1200°F . ask for Bulletin 230-A.

P-8

BAILEY METER COMPANY

1054 IVANHOE ROAD

CLEVELAND 10, OHIO

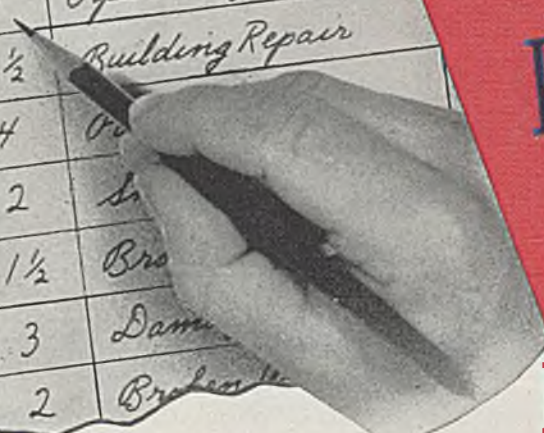
Controls for Processing

TEMPERATURE
PRESSURE
% OXYGEN
% COMBUSTIBLES

FLOW
LEVEL
DENSITY
RATIO

OPERATING STATEMENT

Dept.	Hours Lost	Reason for Shutdown
31	3	Material Shortage
36	2	Machine Repair
37	5	Pipe Fitting Failure
40	3½	Building Repair
45	4	...
46	2	...
50	1½	Bro...
53	3	Dam...
55	2	Broken...



LOST PRODUCTION TIME

that **LADISH**
Forged Steel Fittings
would have prevented!

Your best protection against shutdown losses from premature piping failures is the added strength and soundness of Ladish Forged Steel Fittings.

Their greater toughness to resist shocks, strains, stresses and erosion... their finer grain structure... and absence of concealed defects... result from the high impact pressures available only in the drop forging process.

Exact metallurgical controls and rigid inspection of physical dimensions... inherent in Ladish Controlled Quality... further assure ultimate economy through years of trouble-free operation.

Write for your Ladish Forged Steel Fittings Catalog No. II.



TO MARK PROGRESS

Controlled Quality


FITTINGS DIVISION

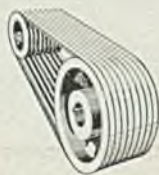
LADISH DROP FORGE CO.

C U D A H Y • W I S C O N S I N (MILWAUKEE SUBURB)

District Offices: NEW YORK • BUFFALO • PITTSBURGH • CLEVELAND • CHICAGO • ST. LOUIS • HOUSTON • NEW ORLEANS • LOS ANGELES

TRANSMISSIONEER... WHO'S HE?

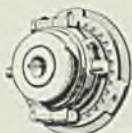
He's a graduate of a Dodge factory course, qualified by intensive training and a broad practical experience to give you the latest answers to problems in efficient mechanical transmission of power—in your plant or as applied to your product. 



The Transmissioneer is backed by a broad line of Dodge bearings, sheaves, pulleys, clutches and other drive components. He is qualified by training and experience to select elements which make *the right drive for the job*.



Typical of the engineering advancement which marks Dodge products is the new Taperlock sheave, which has the simplest, surest mechanism ever devised for fastening wheels to shafts. For information about Taperlock—and other new developments in the mechanical transmission of power, call the Transmissioneer—your local Dodge distributor. Most power drive requirements can be supplied direct from the distributor's stock.



Look in the classified telephone directory under "Power Transmission Equipment" for your Transmissioneer's name and number. Call him for advice—without obligation.

DODGE MANUFACTURING CORPORATION, MISHAWAKA, INDIANA



DODGE

MISHAWAKA



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THE SYMBOL THAT
CAME TO LIFE

257 factory graduate Transmissioneers wear this sign of a nation-wide personal service that helps you put all your power into the job.

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FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY,
ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

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for cement, lime or allied products



We are pleased to announce that Vulcan is now set up to design, construct and equip COMPLETE PLANTS for the manufacture of cement, lime and other allied products. This enables you to centralize all responsibility in one thoroughly dependable organization.

The enlarged scope of Vulcan service is made possible by noteworthy additions to our technical staff and expanded manu-

facturing facilities. It climaxes Vulcan's half-century of leadership in the manufacture of Rotary Kilns, Coolers, Dryers, Retorts and other important equipment in this field.

Vulcan's long experience plus unsurpassed foundry, fabricating and machining facilities are available, also, for the expansion or modernization of existing plants. Write today for specific information.



Vulcan Iron Works

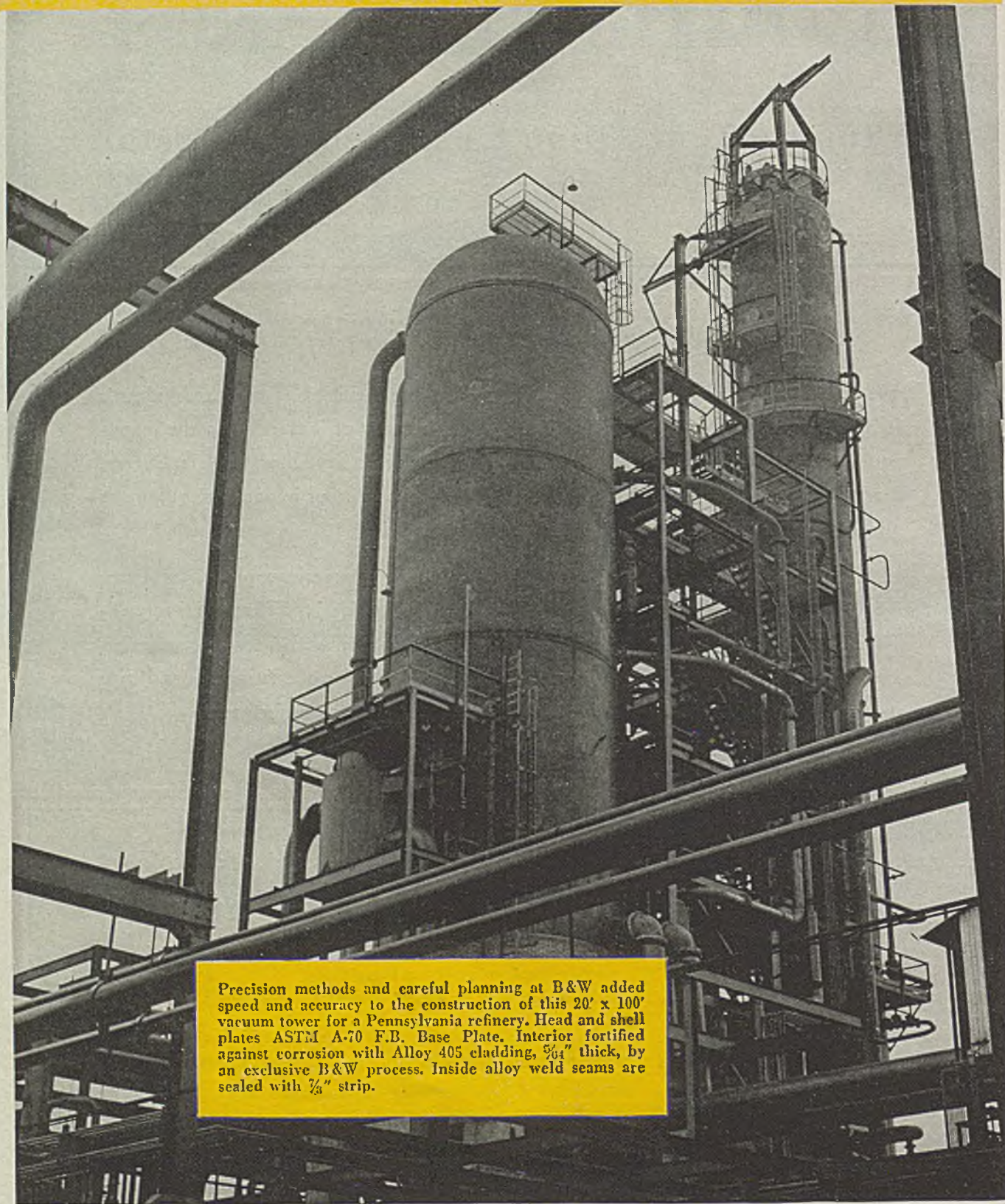
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Cable Address: "Vulworks, Wilkes-Barre".

Branch Offices: New York, Chicago, Washington, D. C.

Rotary Kilns, Coolers and Dryers • Rotary Retorts, Calciners, Etc. • Improved Vertical Lime Kilns
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Diesel-Electric Locomotives • Electric Locomotives and Larrys

HEAD-WORK in B&W shops –



Precision methods and careful planning at B&W added speed and accuracy to the construction of this 20' x 100' vacuum tower for a Pennsylvania refinery. Head and shell plates ASTM A-70 F.B. Base Plate. Interior fortified against corrosion with Alloy 405 cladding, $\frac{5}{16}$ " thick, by an exclusive B&W process. Inside alloy weld seams are sealed with $\frac{1}{8}$ " strip.

HEAD START in the field

Using their heads in making a head, B&W engineers saved time and money for the refinery that ordered the huge alloy-clad catalyst reactor illustrated on the opposite page. Its fabrication demonstrates the kind of thought behind every pressure vessel B&W builds.

The twelve "orange-peel" segments of the hemispherical head could have been piled on freight cars and welded together at the refinery. But instead, the segments were completely assembled in the B&W plant to assure accurate fit. All but two final welds on the head were completed in the B&W shop, where facilities for doing this work were more favorable than in the field.

When the tower sections arrived at the refinery, construction went fast because field welds were few . . . and B&W supervised these. *The extra precautions taken during fabrication in the B&W plant more than paid for themselves in the erection work eliminated on location.*

Do you have an unusual pressure vessel problem? Or a routine one you merely want handled with care? In experience, facilities, ideas, B&W is a good place to come for help.



Shell plates for top section of tower were shipped in parts as shown above, for field erection.



Segments of the hemispherical head were drawn together and shop-welded into two sections at the B&W plant.



Only four welds were required to assemble the two sections of the tower head in the field.

3-72 T



Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories . . . Process Equipment.

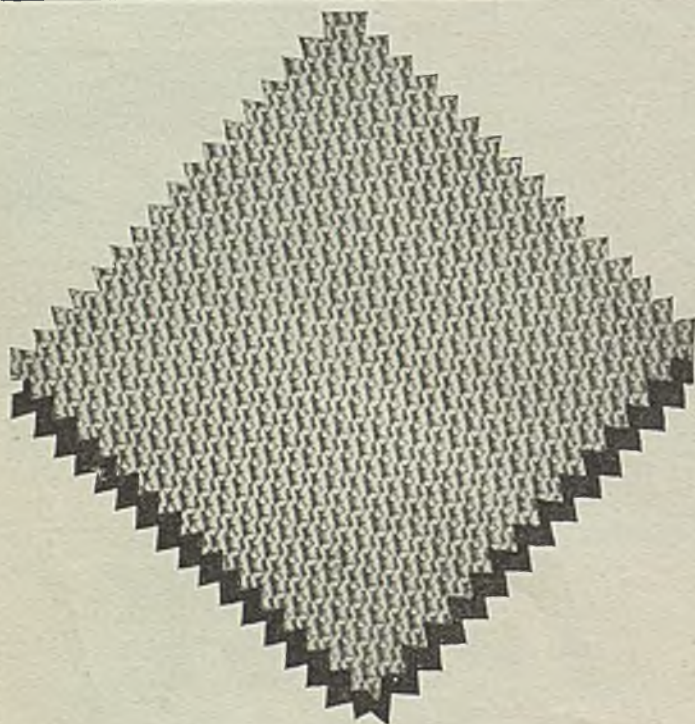
BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
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your filter problem?

1. *Need for a fabric with high resistance to mineral acid or alkaline solutions.*
2. *Need for a fabric with a smooth surface for ease in cake discharge.*
3. *Need for a fabric that is unaffected by moisture, or does not support bacteria and fungi growths.*



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"Vinyon"*

FABRICS

A range of "Vinyon" Fabrics is available, one of which may be just suited for your particular application. Although subject to certain heat limitations, these fabrics have been the answer to many difficult filtration problems in the chemical industry.

For longer life, higher efficiency and ultimate economy, you can count on "Vinyon."

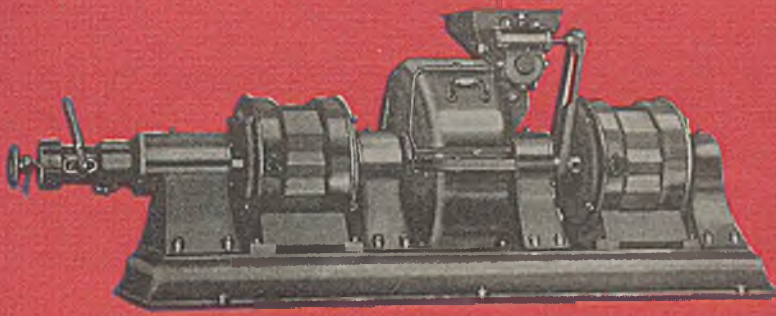
When writing be sure to tell us all the information regarding your filtration process.

*Registered Trade-mark — C. C. C.

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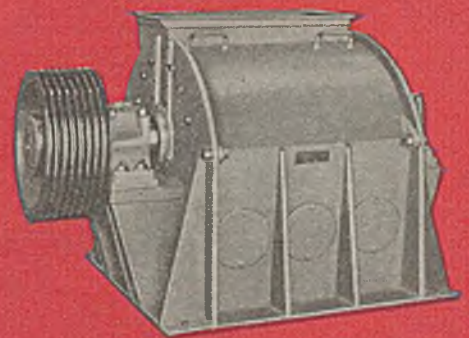
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SIZE REDUCTION

There are many different types of size reduction machines. But, there is only ONE type which will perform your size reduction jobs BEST.

Let Sprout-Waldron's eighty years of experience in solving all kinds of size reduction problems work for you . . . bring your problem to Sprout-Waldron and get the benefits of wide experience with Attrition or Disc Mills, Knife Cutters, Roller Mills, Burr Stone Mills, Cone and Sawtooth Crushers. Remember, Sprout-Waldron's earnest desire is to recommend only the best machine for your application.



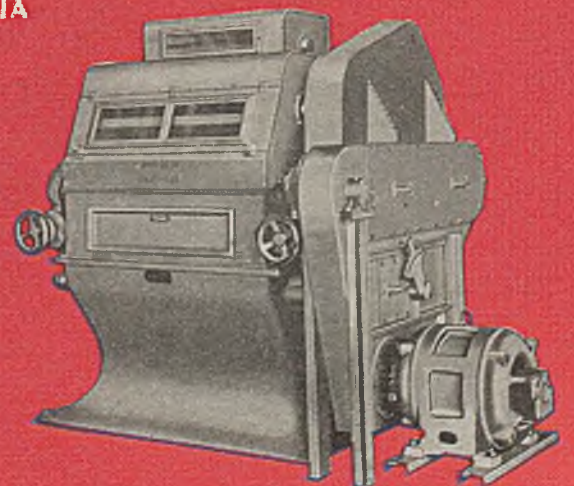
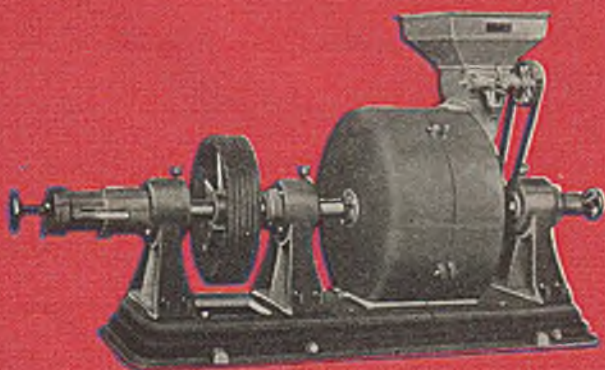
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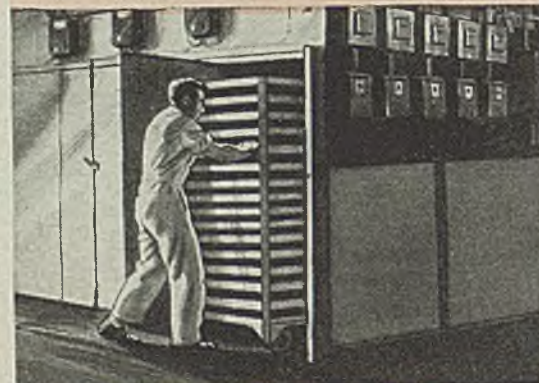




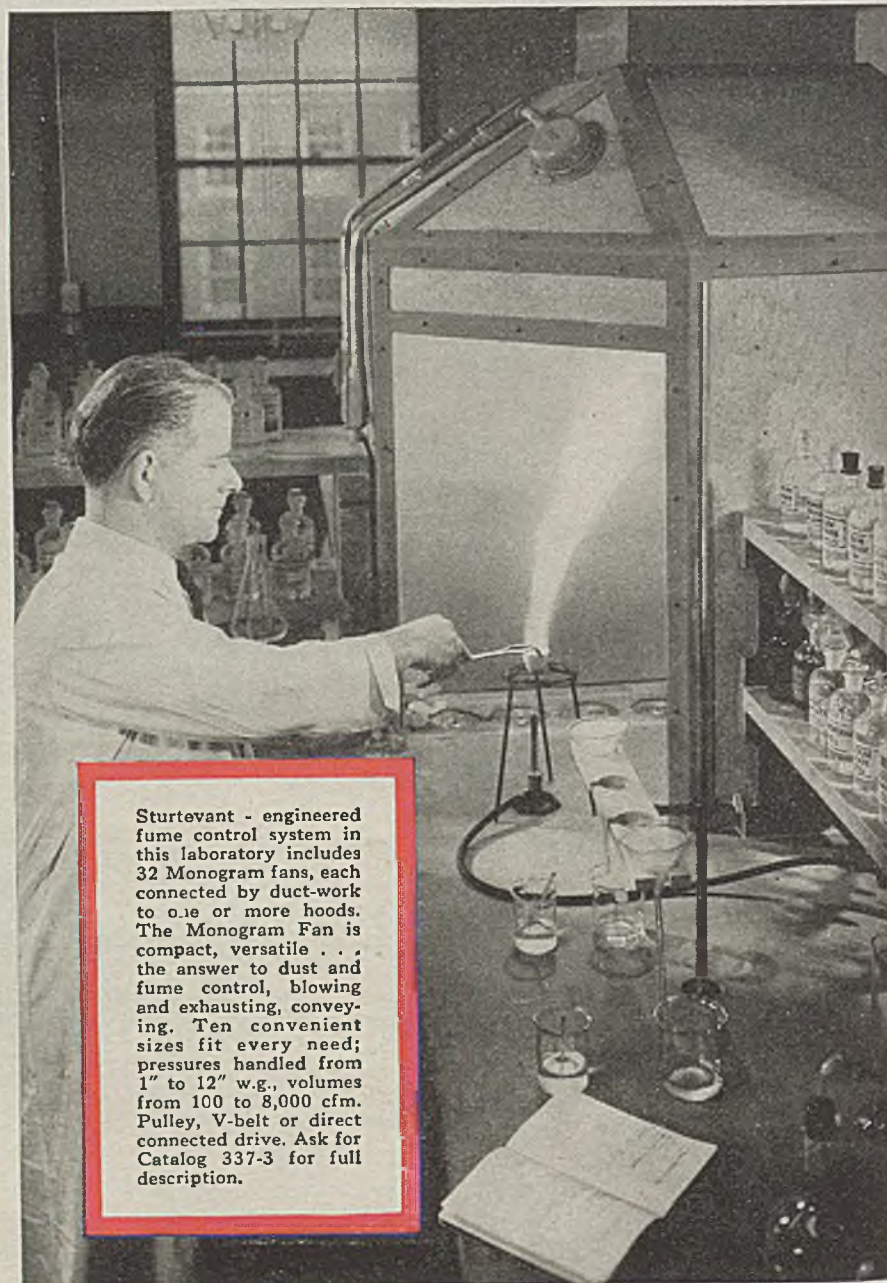
How to de-odorize with a Sturtevant



BETTER WORKING CONDITIONS. Fine chemical dusts used to be a problem here. *Inside*, they were an annoyance and a danger to employees; *outside*, a nuisance to neighbors. A Sturtevant-engineered air conditioning system was the answer. During the summer, it cools the entire building, promoting employee comfort and efficiency; in winter, it takes over the entire plant heating job. Installation is typical of many in the chemical field.



IMPROVING PRODUCTION WITH AIR. Sturtevant Reversing-flow dryer designed for this pharmaceutical plant is used to dry chemicals in process. Five dryers like that shown above dry a total of 12,800 pounds of drugs at a time . . . 50% faster than machines they replaced. Product is more uniform, too, due to patented Sturtevant design which supplies every part of the dryer with the same amount of air at exactly-controlled temperatures at all times.



Sturtevant - engineered fume control system in this laboratory includes 32 Monogram fans, each connected by duct-work to one or more hoods. The Monogram Fan is compact, versatile . . . the answer to dust and fume control, blowing and exhausting, conveying. Ten convenient sizes fit every need; pressures handled from 1" to 12" w.g., volumes from 100 to 8,000 cfm. Pulley, V-belt or direct connected drive. Ask for Catalog 337-3 for full description.

your Chemical Lab Fume Control System

You can improve working conditions, step up production, and cut costs with the help of "Air at Work" . . .

There are any number of "smells" which are offensive to human nostrils—and a great majority of them are the unwelcome by-products of the modern chemical laboratory. That's why, in one Chemical plant after another, you'll find Sturtevant fume control systems on the job—drawing off odors, toxic fumes and gases *at the source* before they can interfere with employee efficiency, health and morale.

The fume control system which Sturtevant engineered for the prominent chemical laboratory shown at the left is typical. And there are many other ways in which Sturtevant "Engineered Air" is helping the chemical industry to improve production and cut costs—in drying processes, in protecting product quality through correct air conditioning, in conveying, air cleaning and improved ventilation. A Sturtevant engineer is always available to study your particular air handling requirements. For further information, get in touch with the nearest Sturtevant Branch Office, or write: B. F. STURTEVANT COMPANY, *Division of Westinghouse Electric*, Hyde Park, Boston 36, Mass.

NOW—One Source for all your air handling needs!

As a Division of Westinghouse Electric, Sturtevant is the *only* manufacturing source that offers all three types of equipment . . . air cleaning, air conditioning and air handling. That means a wide range of equipment to meet every need . . . unified responsibility for every component of the system . . . impartial engineering help in assembling a system tailored to your exact needs .



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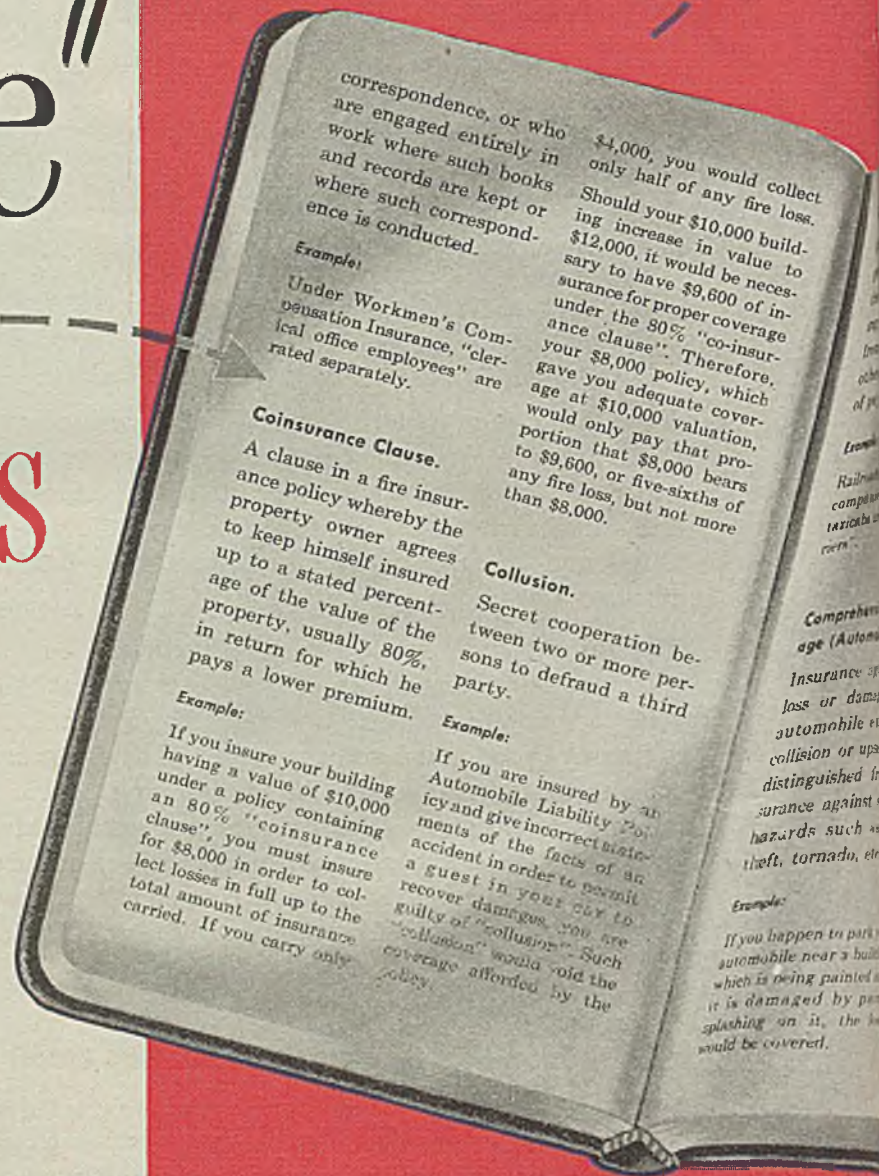
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Understandable



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You CAN Understand Insurance

You will begin to understand insurance as soon as you know the meanings of insurance terms.

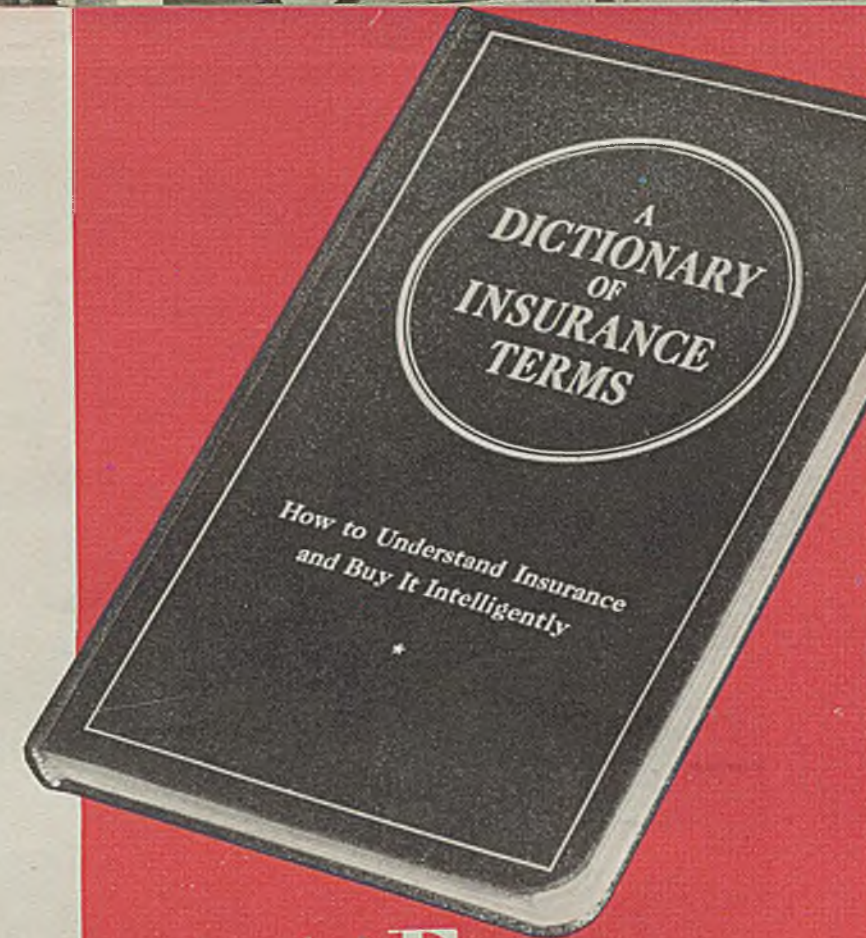
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● APAC, used as exterior siding on this huge administration building, combines up-to-the-minute design with maximum durability. Design and Construction by The Austin Company.

Whether your plans include remodeling or new construction, here are 3 compelling reasons why K&M "Century" APAC sheet material is the *right* material to use.

1. APAC IS VERSATILE

Furnished in 4' x 8' sheets $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{3}{8}$ " thick, APAC is easily adaptable to outside sheathing, office panelling, partitions, elevator shaft casings, stock rooms and storage bins... in fact APAC has as many uses as a building has surfaces.

2. APAC IS PRACTICAL

Compounded of asbestos and portland cement, APAC is completely fire-resistant, rot-proof, vermin-proof and termite-proof. It makes a neat-looking job and will never deteriorate. Time only toughens it.

3. APAC IS ECONOMICAL

First cost is low, and APAC is so easy to cut, handle and apply that it lowers the cost of construction. Once it's on, APAC lasts indefinitely, without maintenance or protective painting.

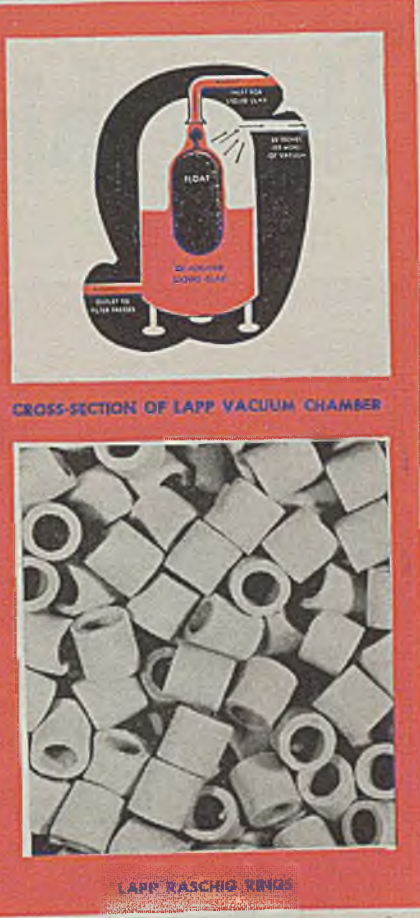
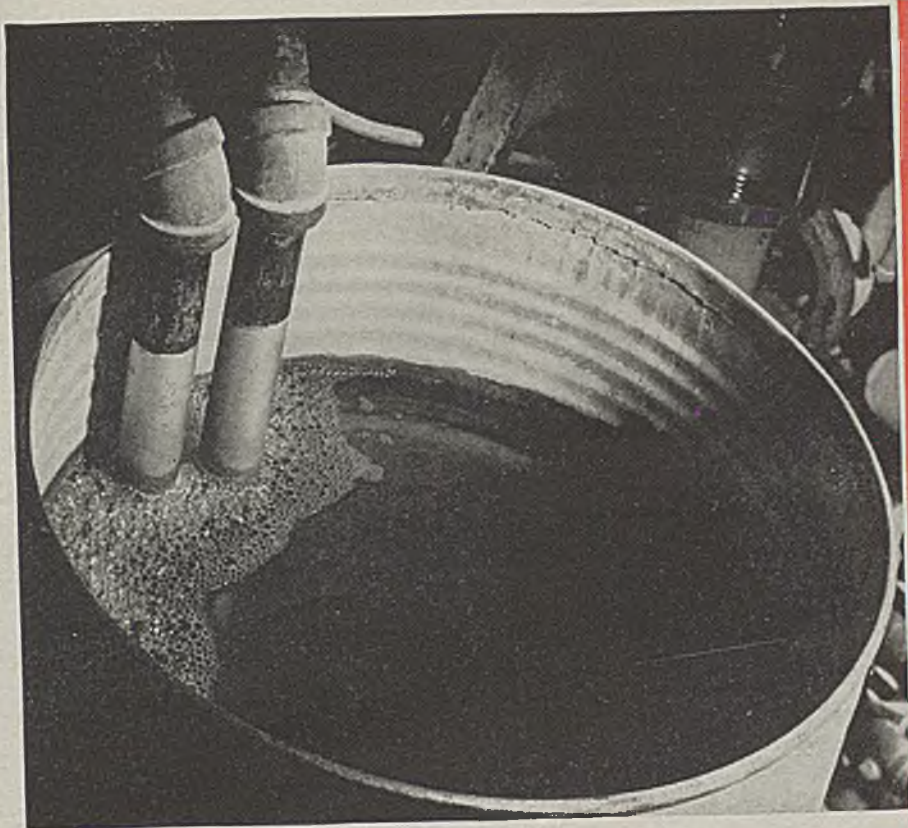
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If there's anything else you want to know about this remarkable building board, we'll be glad to give full details. Just call or send us a card.

*Nature made Asbestos...
Keasbey & Mattison has been making it serve mankind since 1873.*



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Why you can be sure of higher

CORROSION-RESISTANCE, positive NON-ABSORPTION

with **LAPP CHEMICAL PORCELAIN**

**2 THE SECRET OF EXTRA STRENGTH,
GENUINE NON-POROSITY IS THE
LAPP VACUUM PROCESS**

• Various makes of ceramics may look alike. Characteristic specifications may fail to reveal any differences. But LAPP Chemical Porcelain

LABORATORY QUALITY IN PLANT PRODUCTION WITH

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Chemical Porcelain

is different from ordinary ceramics. LAPP Chemical Porcelain offers you all the "natural" advantages of ceramics *developed to their highest degree*. Complete corrosion resistance to all acids (except HF) positive non-absorption, added mechanical strength and purity are *plus* advantages of LAPP Chemical Porcelain. These are made possible by its *extra* dense, homogeneous, *thoroughly* vitrified body. Producing that body depends largely on the LAPP Vacuum Process. LAPP Chemical Porcelain is made from liquid clay slip which passes through this vacuum chamber. Here all air, in bubbles and in solution, is boiled out. Subsequent operations are performed without incurring voids, laminations, or blebs.

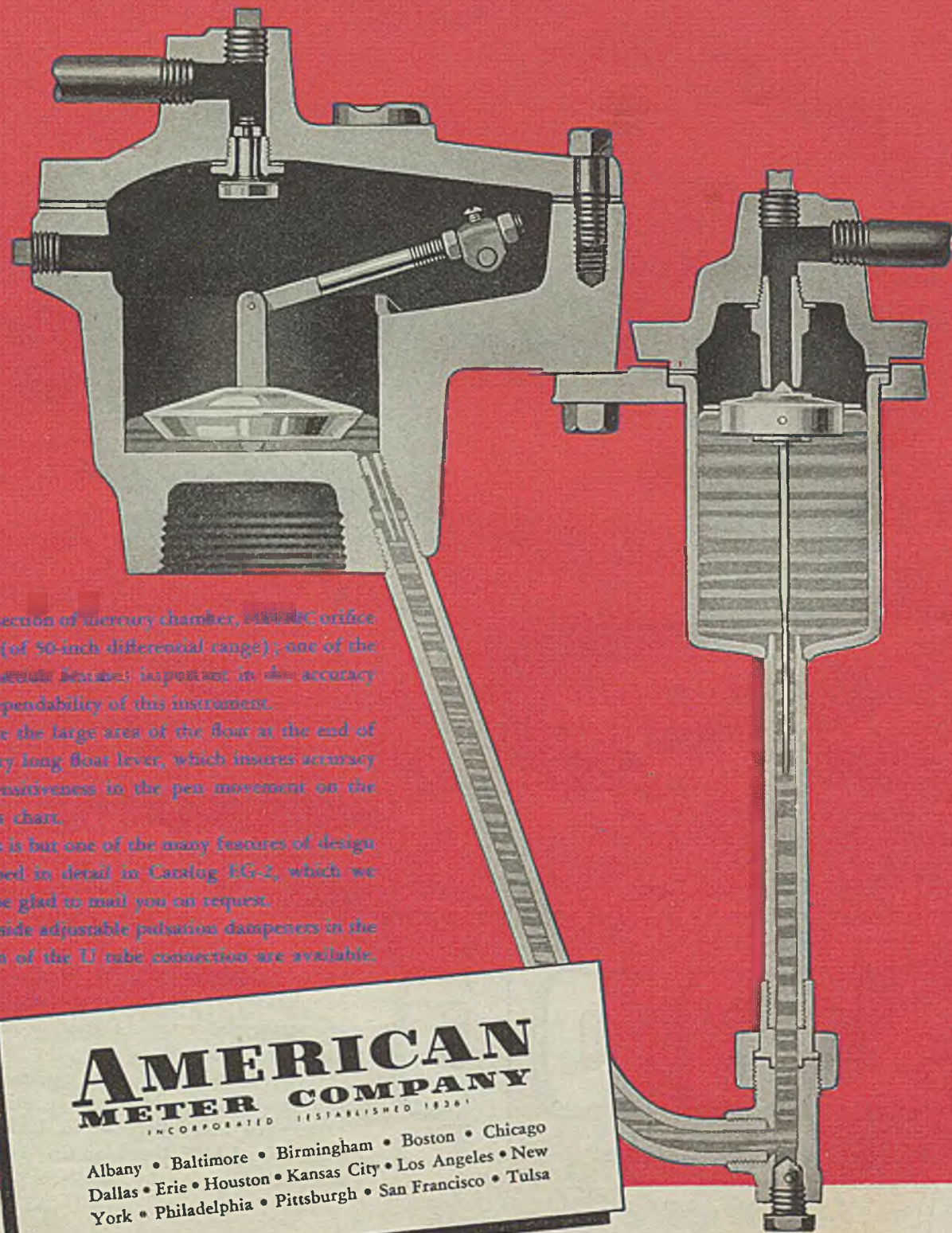
If you've had trouble with ceramics on a problem ceramics should solve—it will pay you to experience the difference in LAPP Chemical Porcelain. LAPP Insulator Co., Inc., Chemical Porcelain Division, Le Roy, N. Y.

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These high pressures take

the measure of a meter



Cross-section of mercury chamber, METRIC orifice meter (of 50-inch differential range); one of the construction features important in the accuracy and dependability of this instrument.

Note the large area of the float at the end of the very long float lever, which insures accuracy and sensitiveness in the pen movement on the meter's chart.

This is but one of the many features of design described in detail in Catalog EG-2, which we shall be glad to mail you on request.

Outside adjustable vibration dampeners in the bottom of the U tube connection are available.

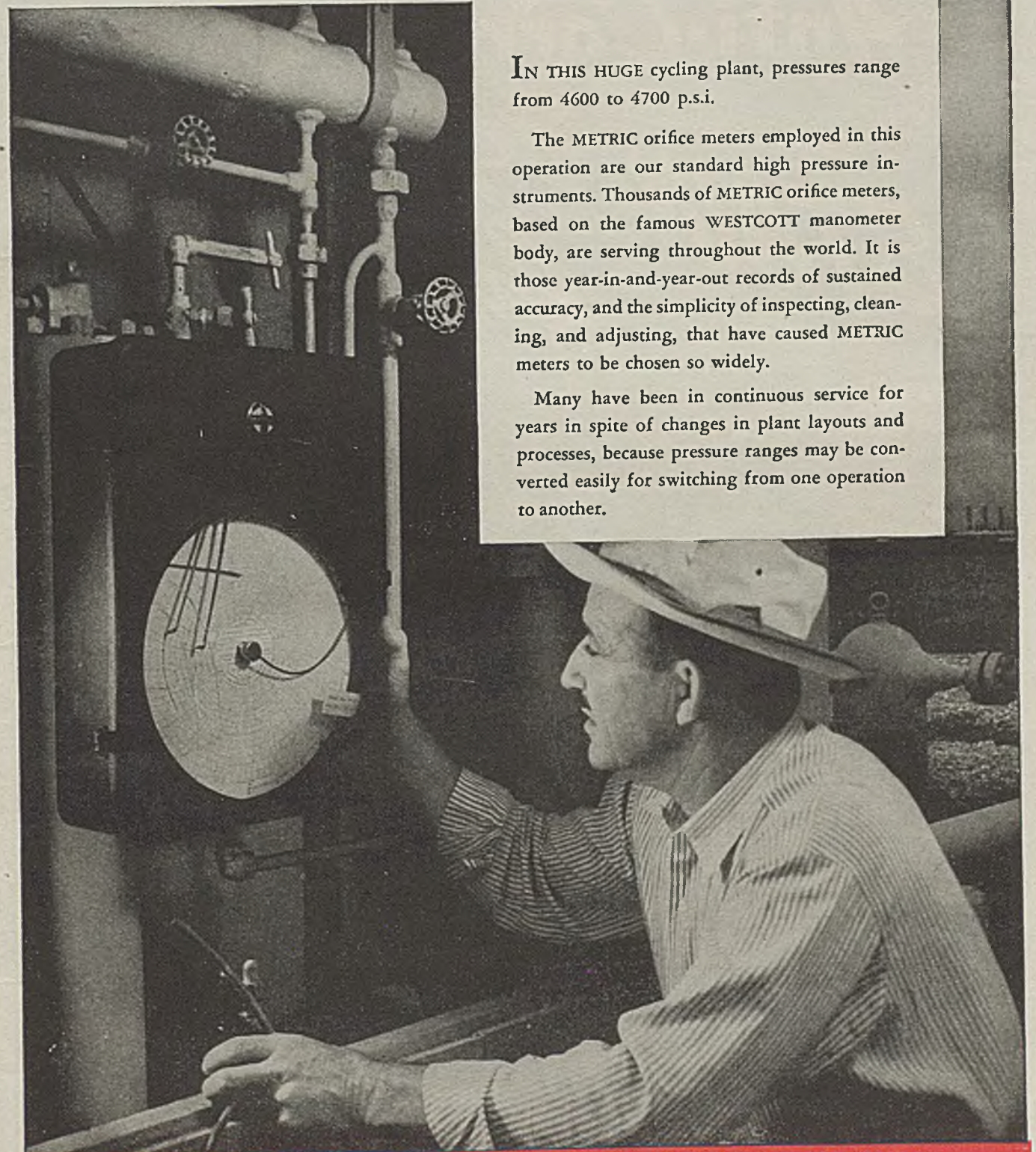
**AMERICAN
METER COMPANY**
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Albany • Baltimore • Birmingham • Boston • Chicago
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York • Philadelphia • Pittsburgh • San Francisco • Tulsa

IN THIS HUGE cycling plant, pressures range from 4600 to 4700 p.s.i.

The METRIC orifice meters employed in this operation are our standard high pressure instruments. Thousands of METRIC orifice meters, based on the famous WESTCOTT manometer body, are serving throughout the world. It is those year-in-and-year-out records of sustained accuracy, and the simplicity of inspecting, cleaning, and adjusting, that have caused METRIC meters to be chosen so widely.

Many have been in continuous service for years in spite of changes in plant layouts and processes, because pressure ranges may be converted easily for switching from one operation to another.



METRIC orifice meter on input line of the Erath Cycling Plant, Erath, La., operated by the Texas Company under utilization agreement with other producers in the field. This is one of many standard METRIC orifice meters employed in the plant.



Anti-Corrosive STAINLESS STEEL *fastenings*

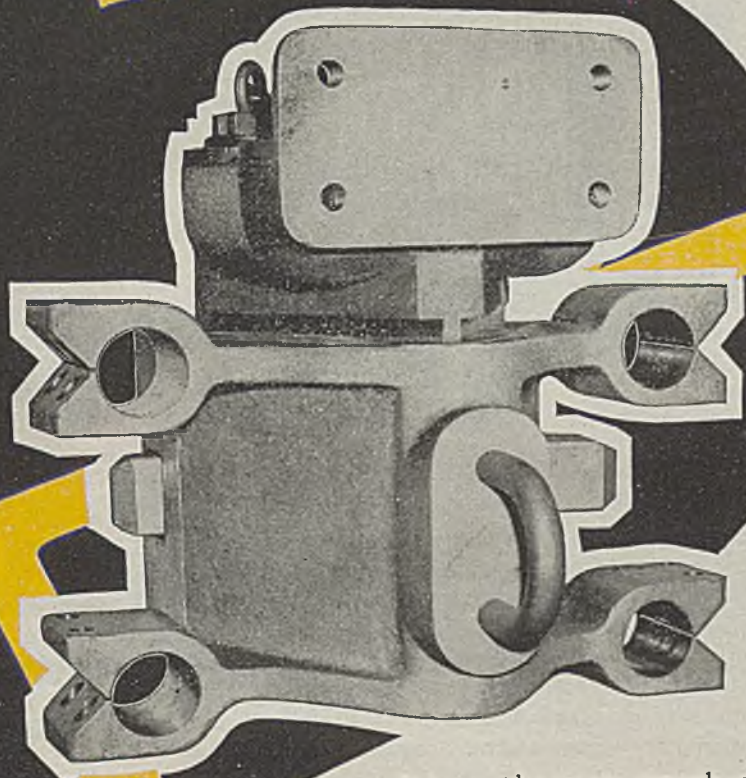
This is a small corner of our stock room, and these Stainless Steel nuts represent a small segment of our stock fastenings. We're pioneers in the manufacturing of Stainless Steel Fastenings—we've been in business since 1927. In that time, we've learned a lot—and our knowledge, our experience, can be helpful to you. The large stock we have on hand enables us, in most cases, to fill your requirements at once. If you require any special sizes, any special grade of Stainless—we're set up to produce promptly, according to your specifications. Nuts, bolts, wood screws, machine screws, cotter pins, rivets, nails, pipe and pipe fittings—all in long-lasting, corrosion resisting Stainless Steel.

Write for our latest catalog and stocklist; or, if you wish, we'll be glad to quote you, without obligation, on your Stainless Steel Fastening needs. Anti-Corrosive Metal Products Co., Inc., 51 River Road, Castleton, N. Y.

Anti-Corrosive Metal Products Co. Inc.
CASTLETON-ON-HUDSON NEW YORK

FOR HIGHER CONDUCTIVITY...

**EQUIP YOUR ELECTRIC
FURNACES WITH N•B•M
Electrode HOLDERS**



To provide maximum service and efficiency, your electrode holders should combine:

- High electrical and thermal conductivity
- Great structural strength.

Strength is important to assure a tight grip. The greatest resistance in the entire circuit occurs between the holder and electrode. Ill-fitting, oxidized holders may waste up to 500 KW.

The special copper alloy we have perfected for N-B-M Electrode Holders has an extremely dense, non-porous grain.

This provides greater strength—clamps electrodes in a vise-like grip that assures the best possible contact. By combining maximum gripping strength and conductivity, this well-balanced formula reduces resistance, saves you power.

To insure absolute pressure-tightness, all water-cooled castings are carefully tested under 50 to 75 pounds hydrostatic pressure.

For longer life and more efficient performance under the most rigorous conditions, specify

**N•B•M ELECTRODE
HOLDER ASSEMBLY
WITH NOSE AND WEDGE**

N•B•M *Electrode* HOLDERS



NATIONAL BEARING

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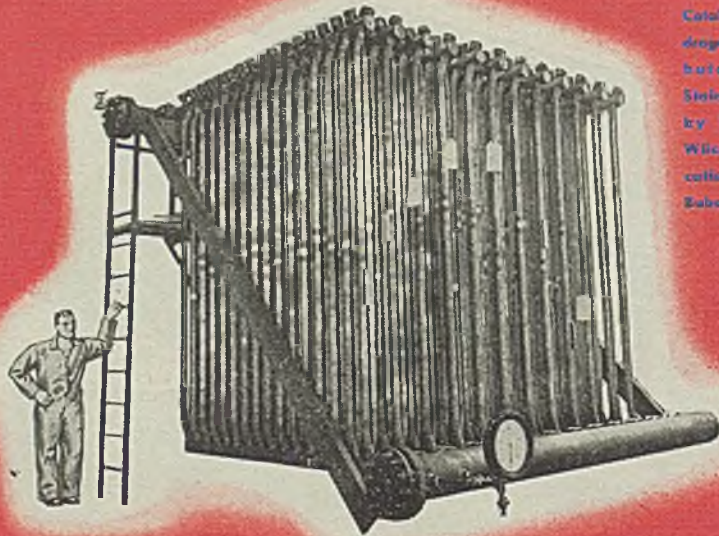
When Tough Jobs Call for STAINLESS STEEL TUBING

... there's a B&W alloy to meet your needs

ALL THESE AND MORE

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- Croloy 12-3W
- Croloy 16
- Croloy 18
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- Croloy 18-8Ti
- Croloy 18-8Cb
- Croloy 16-13-3
- Croloy 18-13-3
- Croloy 25-20

Physical properties, application and fabricating data; and other pertinent information on B&W Croloy Stainless Steel Tubing are contained in Technical Bulletin No. 1-A. Would you like a copy?



Catalyst case for dehydrogenation unit in a butadiene plant—Stainless Steel Tubes by The Babcock & Wilcox Tube Co. Fabrication of unit by the Babcock and Wilcox Co.

When it comes to finding tubes that will stand up against strong corrosive attacks and inordinately severe temperature and/or pressure conditions in refineries, synthetic rubber processes and chemical plants, you can count on B&W to supply the right alloy for the job. In the wide range of Croloy Stainless Steel Tubes made by B&W, there are analyses—many of them available from no other source—that make possible a close match between tubing properties and any combination of corrosion, oxidation and heat resistance, and creep strength your services may require.

These Stainless Croloys have enabled many users to lick tough tube problems in oil cracking, hydrogenation, reforming, polymerization, alkylation, gas cracking and other refining operations. In many different chemical processes, too, they are giving highly satisfactory and economical service.

Time and experience in a wide variety of operating conditions have fully confirmed the time-saving and cost-cutting advantages of using Croloy Stainless Steel Tubing wherever conditions are extremely severe and tubing economy is a vital consideration. So when you have a tough tube problem, call on Croloy and let B&W engineers give you the benefit of their long, intimate experience in successfully matching tubes to jobs.

TA-1313

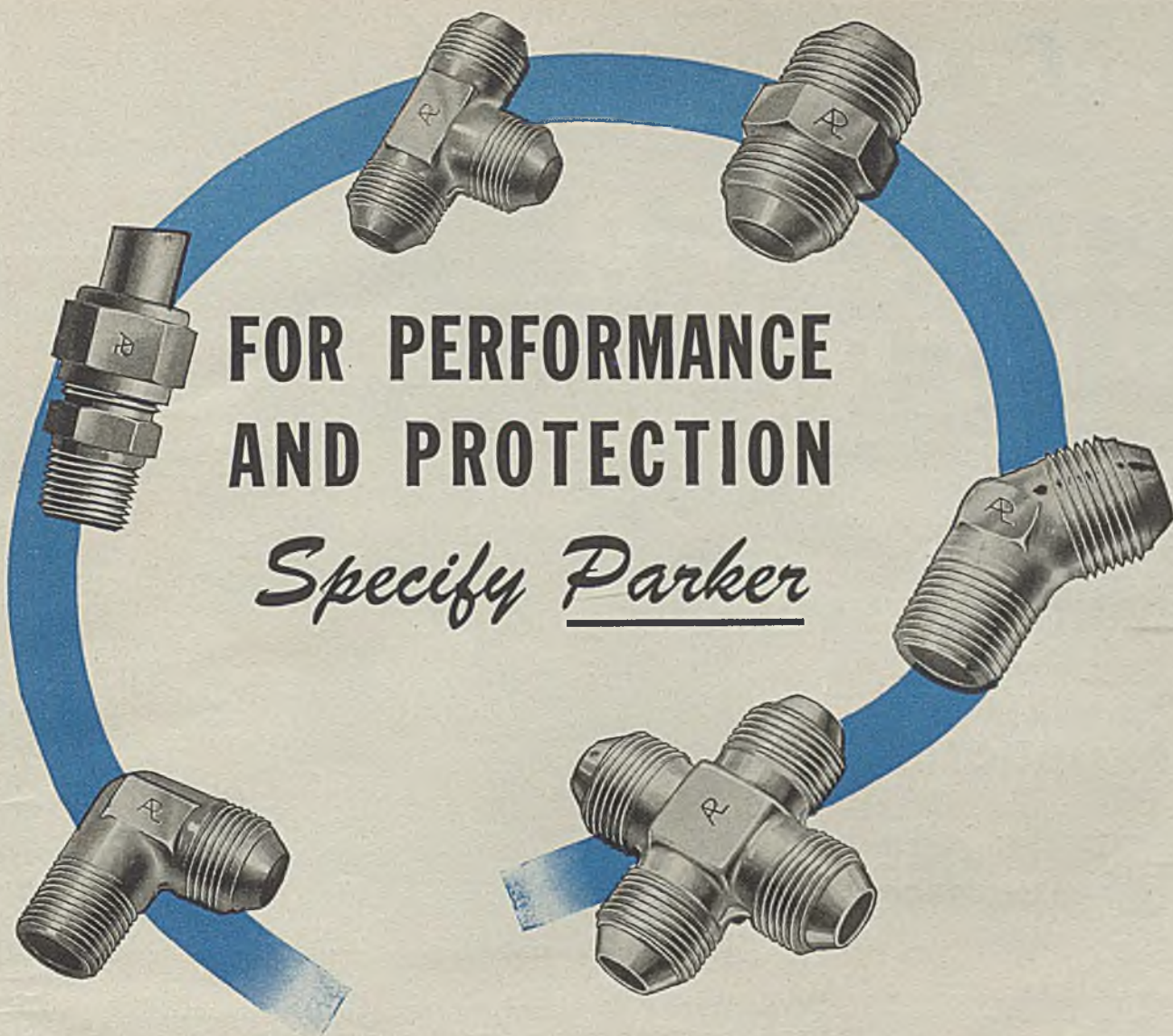


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Water-Tube Boilers, for Stationary Power Plants, for Marine Service • Water-Cooled Furnaces • Superheaters • Economizers • Air Heaters • Pulverized-Coal Equipment • Chain-Grate Stokers • Oil, Gas and Multi-fuel Burners • Refractories • Process Equipment.





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Specify Parker

Parker tube couplings are pressure-tight—leak-proof—vibration-protected.

That's the result of more than twenty years' experience in engineering Fluid Power systems. Typical of the *practical* results this "know-how" brings to you is the famous Parker Triple Coupling. Its exclusive patented design insures dependable, trouble-free operation. So efficient and economical is its operation that its basic principle was standardized for Army-Navy use on aircraft and ordnance.

If the type of tube coupling you need isn't shown here—ask us for it. The Parker line is

complete. It includes a wide variety of types—in steel, brass, stainless or aluminum—and in sizes from $\frac{1}{8}$ " to $1\frac{1}{2}$ ", standard or heavy weight. Complete stocks are available in our warehouses—or from your jobber. Just say "Parker". You'll get prompt delivery—and new freedom from pressure joint trouble.



Do you have your copy of our new catalog
It gives complete data on all Parker Triple Couplings. Yours for the asking—from your jobber—or write direct to the Parker Appliance Company, 17325 Euclid Avenue, Cleveland 12, Ohio.

THE PARKER APPLIANCE CO. CLEVELAND • LOS ANGELES



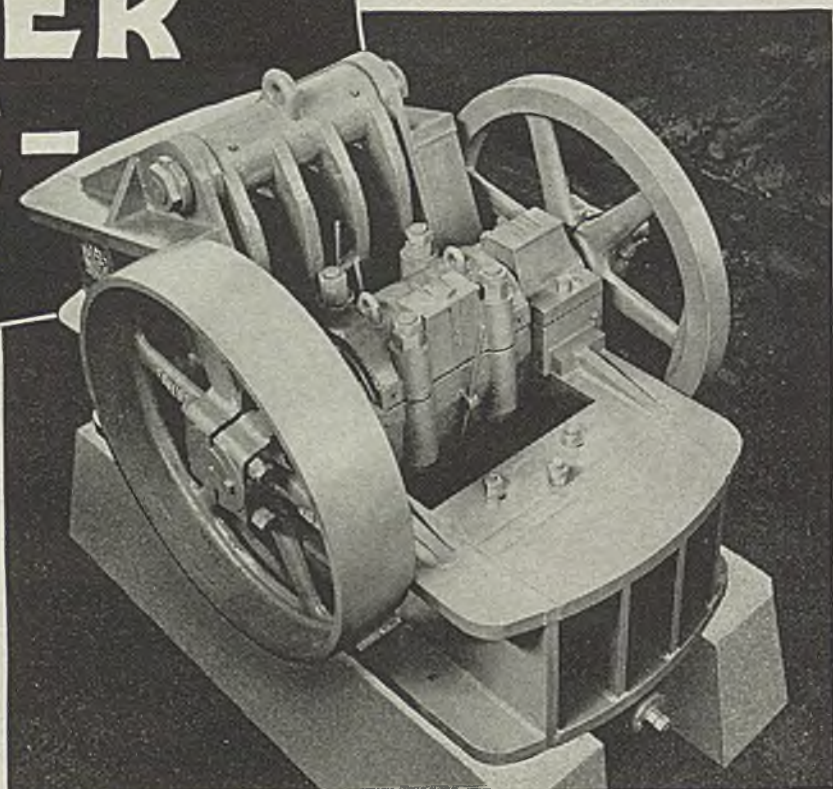
FLUID POWER PRODUCTS FOR ALL INDUSTRY

WHAT YOU WANT IN A CRUSHER IS HERE—

• **BRUTE STRENGTH**

• **MAXIMUM
PRODUCTION**

• **RIGHT SIZE
OF PRODUCT**



WE BUILD

Jaw, Gyratory and
Reduction Crushers
Crushing Rolls
Grinding, Ball, Tube
and Rod Mills
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Coolers and Dryers
Grizzlies and Feeders
Classifiers
Samplers and Jigs
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Crucibles
Forehearths
Casting Machines
Complete Milling and
Smelting Plants

Traylor Type H Jaw Crushers have superior strength and are built to stand up under hard use day after day.

Into Type H Crushers go the more than ten years of technical skill and practical experience, of our engineers, which assures the best design for continuous and maximum production.

The special features, built into this crusher to reduce wear and save on power, promote economy of maintenance and operation, and also result in the highest efficiency in capacity and size of product.

Here are just a few of its salient features:—All-welded steel frame—Cast Steel Swing Jaw and Pitman—Improved Swing Jaw Suspension—Non-Choking curved Jaw plates of Manganese Steel.

The Type H Crusher is built in fifteen sizes—from 8" x 12" to 56" x 72"—covering practically every requirement.

For complete details write for Bulletin #2105 or ask our representative to call at your convenience.

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HAMMOND GLOBE ROOF PRESSURE TANKS*

(low pressure to 15 p.s.i. and to 40,000 barrels capacity)



**tall...short...
FAT...SLIM...**

**to fit any space limitation or ground condition
...they are the most economical tanks for low
pressure storage of volatile liquids which
boil under normal atmospheric conditions.**

Simplicity exemplified is the design and construction of Hammond Globe Roof Pressure Tanks. The roof is self supporting and requires no internal support or bracing. The external ring angle, easily seen in the photograph, together with an internal angle at the top of the shell form a ring girder which prevents the tension forces in the roof plates from pulling the top of the shell plates inward. The bottom of the tank is flat and diagonal ties are provided to balance the upward force in the shell and the downward pressure on the tank bottom.

The flat bottom permits installation on ordinary tank foundations. The factor of safety is greater than required by the A. P. I. Code. The straight shell and flat bottom simplify the calibration and minimize the possibility of error, thus increasing the accuracy of gauging.

Day in and day out the substantial number of Hammond Globe Roof Pressure Tanks, owned and operated by major and independent companies, are demonstrating the efficiency of their design and construction. The tank illustrated paid for itself in three months. Its capacity is 10,000 barrels, operates at a gage pressure of 7½ pounds and is used to store Natural Gasolene. For pressure storage upwards of 15 pounds and to more than 100 p.s.i., Hammond designs and erects Spheres and Bullets to meet specific requirements.

¹Comparative records of losses of the same product stored in this tank and in other containers of conventional types operating at much lower pressures, indicated that savings during three months of summer storage more than paid for the additional cost of this container over one of the cone-roof type having the same storage capacity.

*PATENTS PENDING

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IRON WORKS**
Warren, Pa.

NEW YORK • BOSTON • PITTSBURGH • AKRON • DETROIT
CLEVELAND • CINCINNATI • RICHMOND • CHICAGO

HAMMOND designs, fabricates and erects tanks of all types for liquid and dry storage . . . above or below ground . . . high or low pressure . . . cone roof . . . HAMMOND SPHERE . . . floating roof . . . VAPOR-LIFT . . . spheroid . . . GLOBE ROOF PRESSURE . . . gas holder . . . also stainless and stainless-clad vessels of all types and designs for the petro-chemical industries.

From the catalog of Barrett Basic Chemicals

NAPHTHALENE

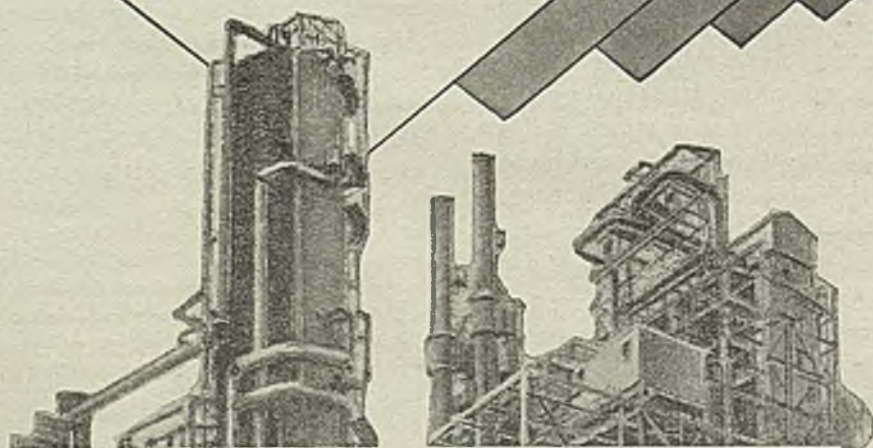
Separated and refined from coal-tar distillates.

Available in various forms ranging from brown lower melting to higher melting pure white crystalline types.

Used in preservation of hides, moth preventive, and in soil insecticides, as raw material for manufacture of organic chemicals and dyes, for alpha and beta naphthols and sulfonated derivatives. For chlorinated naphthalene, waxes, synthetic tanning agents, pharmaceuticals and plasticizers.

Description and Applications

Crude	74°C minimum melting point. Shipped in tank cars. 78°C minimum melting point. Shipped in light wood barrels and tank cars.
Refined	79.4°C minimum melting point. Shipped in bags, light wood barrels and tank cars.



THE BARRETT DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

In Canada: The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Qua.



Check with
"Pittsburgh" for
Activated Carbon

We need an
Adsorbent "tailored"
for this job



ACTIVATED carbon, most versatile of adsorbents, has demonstrated its wide usefulness in solving problems of deodorization, decolorization, fractionation, gas purification, solvent recovery, catalysis, air conditioning and drug and organic chemical isolation, in gas or liquid phase.

For most applications standard or "ready made" grades of Activated Carbon manufactured by Pittsburgh Coke & Chemical Company are entirely satisfactory. Occasionally, however, special conditions may require an adsorbent made to your exact specifications. For such applications *Pittsburgh* Activated Carbon can be "tailored" to fit the need.

Wide experience in the field of adsorption qualifies our technical staff to render intelligent cooperation. Quantity manufacturing facilities, additionally, make *Pittsburgh* a dependable source of supply.

Your inquiries are invited.

Other "Pittsburgh" Coke and Chemical Products

Activated Carbon • Benzol-Motor, Nitration, Pure
• Coke Oven Gas • Creosote • Cresol, Meta Para
• Cresol, Ortho • Naphtha, Heavy Solvent • Naphthalene • Oleum (Fuming Sulphuric Acid) • Phenol
• Picoline-Alpha, Beta and Gamma • Pitch-Briquetting, Roofing, Waterproofing • Pyridine-Medicinal and Industrial • Sodium Cyanide • Sodium Thiocyanate • Sulphate of Ammonia • Sulphuric Acid—60° and 66° Tar Acid Oils • Tar Bases, Crude • Tar-Crude and Road-Toluol-Nitration and Commercial Grades • Xylol—10°, 5° and 3°.

also

Neville Coke • Emerald Coal • Pig Iron • Green Bag Cements • Concrete Pipe • Sterling Old Range Iron Ore • Limestone Products

INQUIRIES INVITED



Pittsburgh Coke & Chemical Company

Grant Building

Pittsburgh, Pennsylvania



*John Barrymore
and Mary Astor
"DON JUAN"
August 6, 1926*

TWENTY YEARS AGO

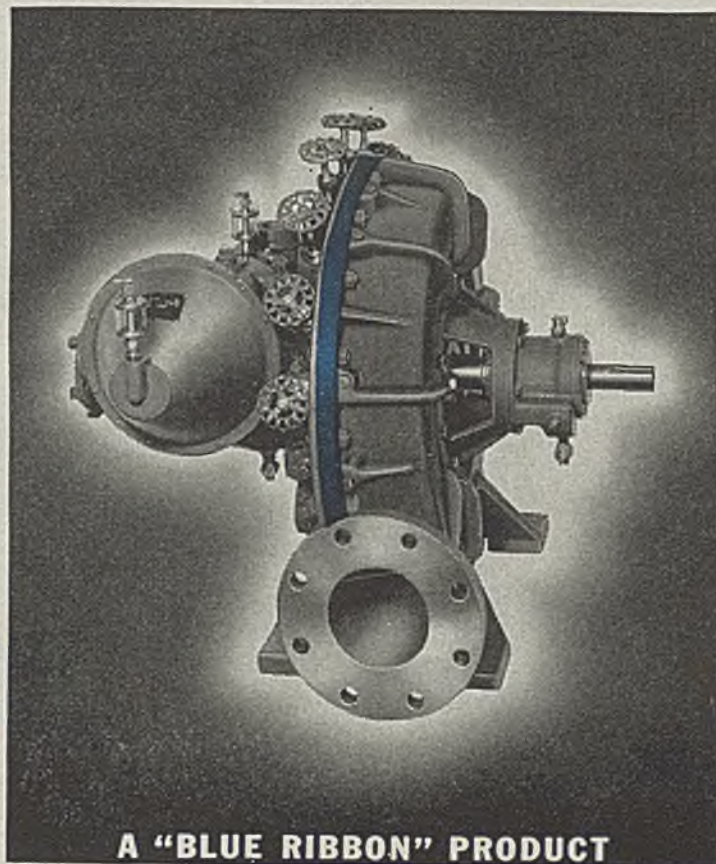
the movies learned to talk

THEN Broadway saw a dramatic presentation by Warner Brothers, using a synchronized system for high-quality sound developed by Bell Telephone Laboratories and produced by Western Electric. Epochal for the motion picture industry, the occasion was only one of many landmarks set up by the Bell System along the stream of communication development.



BELL TELEPHONE LABORATORIES

EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE



A "BLUE RIBBON" PRODUCT

THEY CALL 'EM JEEPS

BECAUSE THEY'RE SMALL, BUT POWERFUL, AND GO ANYWHERE

For a small, tough, hard-working turbine that will go anywhere and do all you expect of it . . . get a Coppus "Blue Ribbon" Steam Turbine.

Coppus Steam Turbines come in six frame sizes from 150 HP down to fractional—so you can match more closely your job requirements. Each smaller size is priced correspondingly less, so by selecting "horsepower" instead of "elephant power" you save on investment and installation cost.

Many well-known manufacturers install Coppus "Blue Ribbon" Steam Turbines on original equipment. They know Coppus quality will protect the reputation of their own products. The Coppus Turbine is also being used

on many U. S. Destroyer Escorts, all Casablanca class aircraft carriers and 90% of all Landing Ship Docks.

Like all Coppus "Blue Ribbon" products (blowers, ventilators, gas burners, etc.), the Coppus Steam Turbine is a precision-made product, with accuracy controlled by Johansson size blocks. Every turbine is dynamometer-tested before shipment.

More than 85% of all orders since 1937 have been repeat orders.

Write for Bulletin 135-9. Coppus Engineering Corporation, 458 Park Avenue, Worcester 2, Mass. Sales offices in THOMAS' REGISTER. Other Coppus "Blue Ribbon" Products in SWEET'S, CHEMICAL ENGINEERING CATALOG, REFINERY CATALOG.

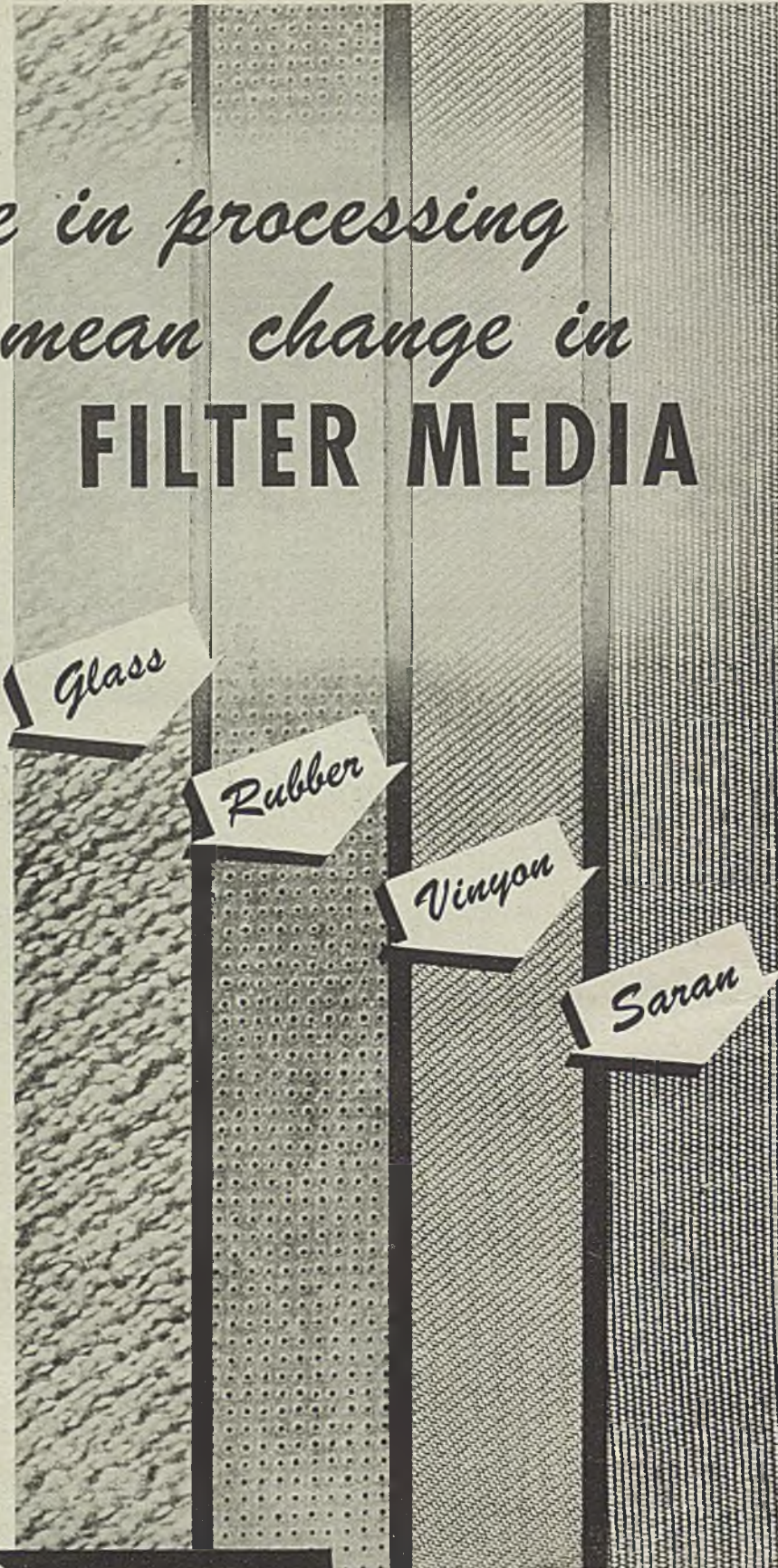


Change in processing may mean change in **FILTER MEDIA**

SHOULD IT BE ...

As operating conditions change, the proper medium for economical filtration may change. Hot acid, cold caustic and varying percentages of solids all demand different **FILTER MEDIA**. If you are considering making any changes in your present processing, why not submit the new filtration problem to us?

We have a wide selection of industrial **FILTER MEDIA** and need only detailed information on your individual filtration problem to recommend the proper **FILTER MEDIA** for your jobs.

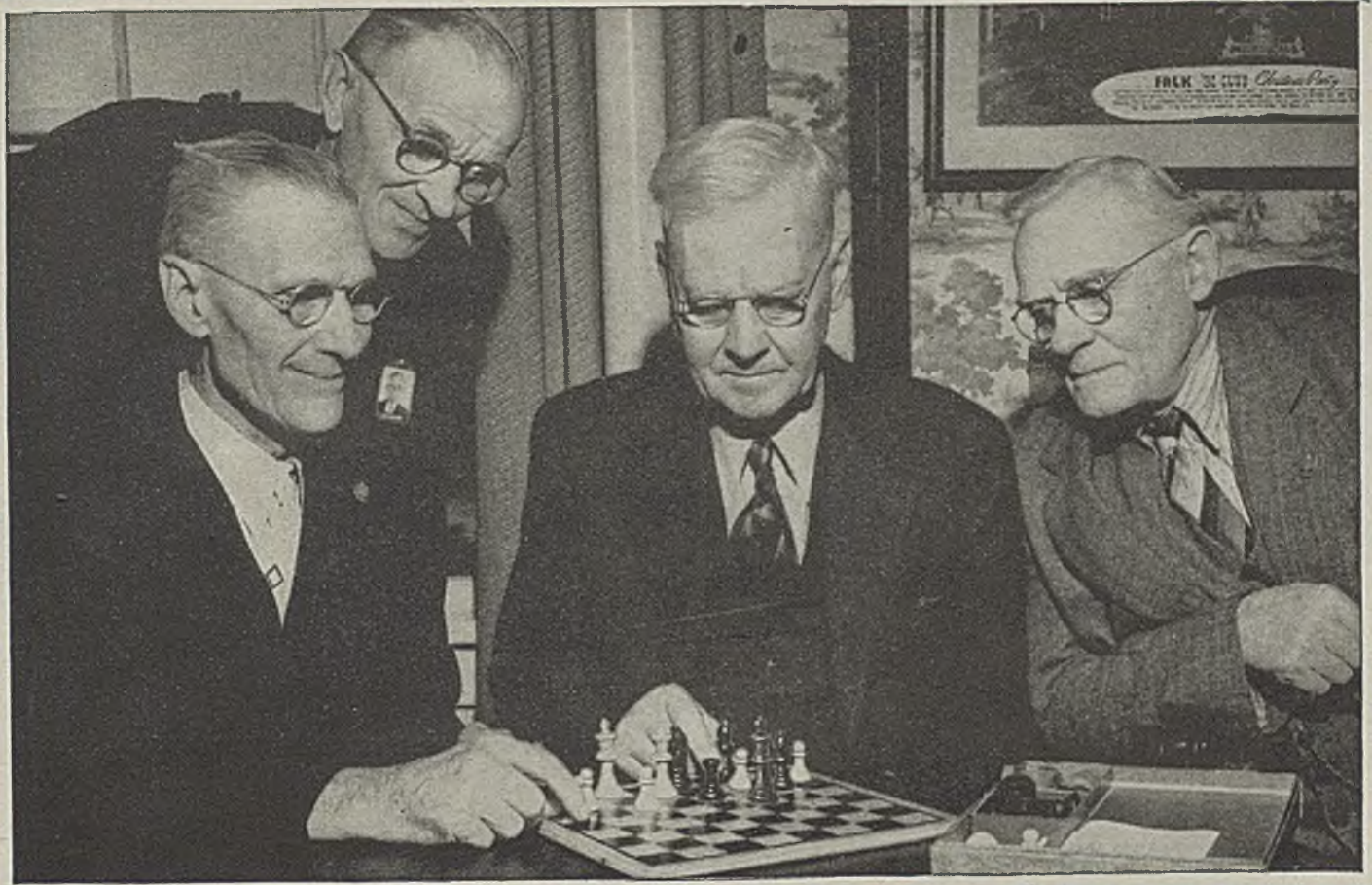


Filter Media Corporation

SPECIALISTS IN FILTER CLOTH FOR INDUSTRIAL FILTRATION

HAMDEN 14, CONNECTICUT

CHICAGO • SALT LAKE CITY



The world's most exclusive club

... Retired Members of the Falk Organization
Who Meet Once a Week at The Falk Plant

There are only forty-eight of them. They are not as young as they used to be. They are all retired from active work—but their interest, their loyalty, their morale is undiminished.

They have their own rooms in the Falk plant where they meet once a week, have lunch, talk, play games. They wander through the shops and visit their old cronies who are still active. Some come under their own power; some are brought from and returned to their

homes by company cars. One of them served Falk for nearly fifty years, and now Falk serves him and all the others.

This Club is indicative of a state of mind that exists at Falk . . . a state of mind that permeates every section of the business—management, engineering, and production.

The same genuine interest is shown by the whole organization through the suggestions

made, through constantly improved techniques, through the ingenuity indicated in developing new designs, and through the high degree of production efficiency maintained.

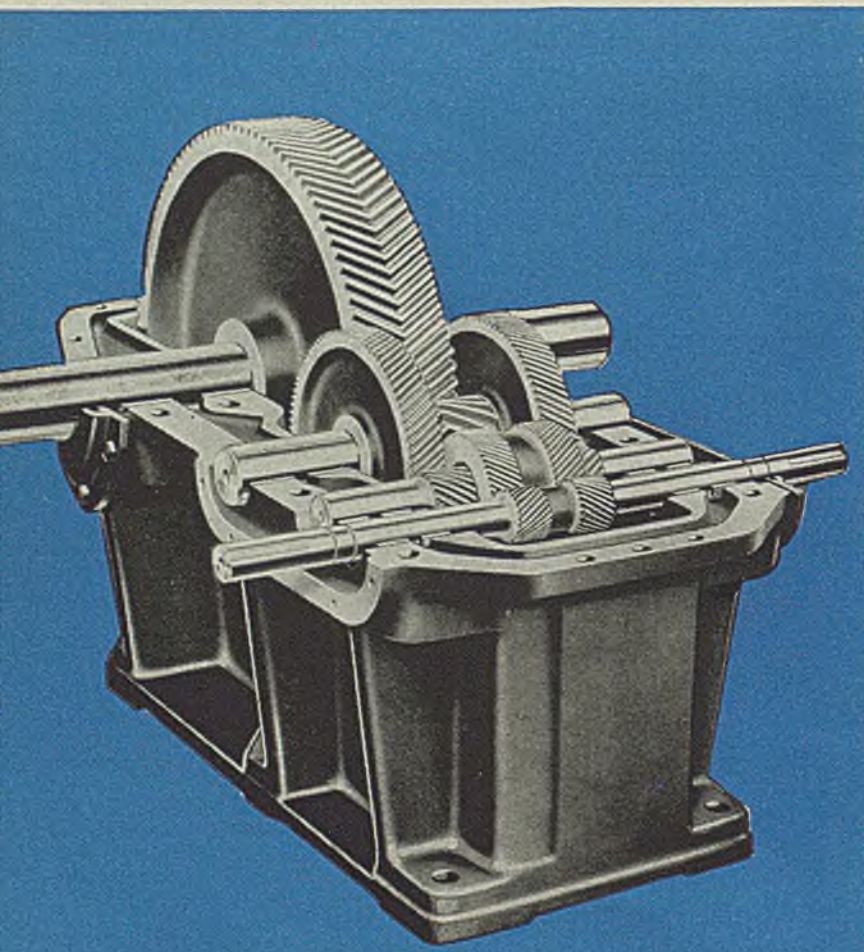
That Falk's interest in its people is returned in full measure by the whole organization has a very tangible value to present and potential purchasers of Falk products. It is one of the reasons why Falk is a good name in industry and why it always pays to consult Falk.



FALK . . . A GOOD NAME IN INDUSTRY

FALK Speed Reducer Design Embodies...

- ★ **STRENGTH...**
- ★ **RIGIDITY...**
- ★ **COMPACTNESS...**
- ★ **SIMPLICITY**-----



FALK parallel shaft, herringbone geared speed reducer. Ratios: single reduction, 2.2:1 to 10:1; double reduction, 11.5:1 to 70.2:1; triple reduction, 80:1 to 300:1.

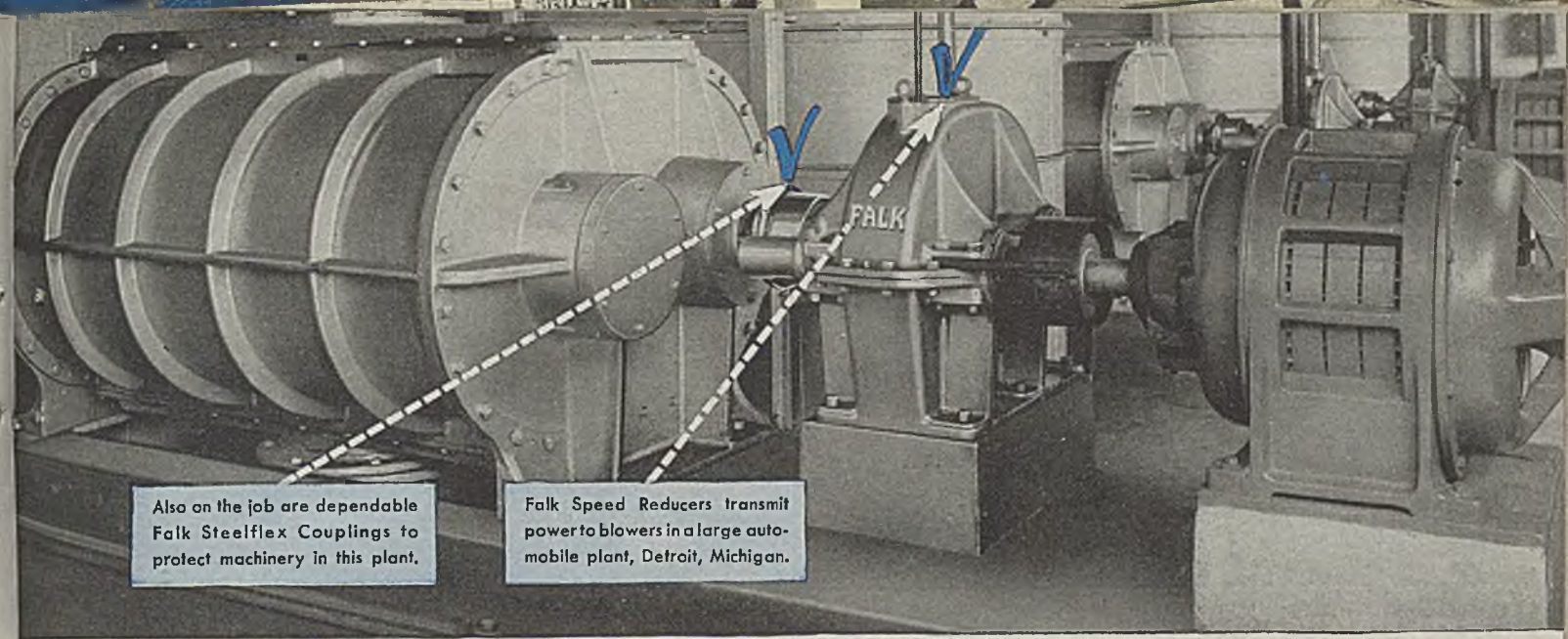
YEARS of experience in gear research and manufacture and in gear reduction machinery dictate the design of Falk Speed Reducers. Experience gives the "know-how" that determines the materials, the special Falk techniques and machinery that make gears, shafts and housings strong and rigid for extremely long life on a wide variety of applications. Experience taught how to design simply, to provide a speed reducer to fit a job with continuous high efficiency in a comparatively small, compact housing.

Falk Speed Reducers are designed with a symmetrical arrangement that assures balanced performance . . . double ended shafts double the life of gears . . . Falk precision made herringbone and single helical gears attest highly efficient performance. A patented system of lubrication and interchangeability of parts assure long life.

In all, Falk Speed Reducer design gives you maximum efficiency, dependability and long life in a wide range of units to meet any requirement you may have.

THE FALK CORPORATION MILWAUKEE 8 WISCONSIN

For over fifty years precision manufacturers of Speed Reducers . . . Motoreducers . . . Flexible Couplings . . . Herringbone and Single Helical Gears . . . Heavy Gear Drives . . . Marine Turbine and Diesel Gear Drives and Clutches . . . Steel Casings . . . Contract Welding and Machine Work. District Offices, Representatives, or Distributors in principal cities.



Also on the job are dependable Falk Steelflex Couplings to protect machinery in this plant.

Falk Speed Reducers transmit power to blowers in a large automobile plant, Detroit, Michigan.

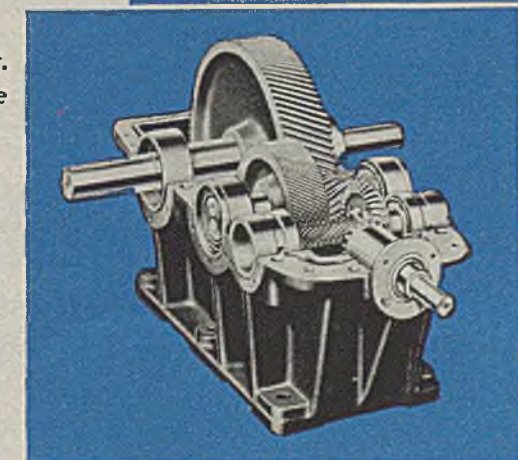
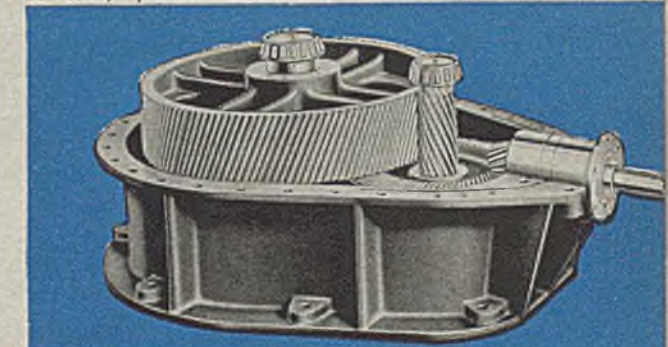
Plus Accurately Cut FALK Herringbone Gears

Falk Right Angle Speed Reducers are available in a wide range of types and sizes. Sizes range from 0.13 h.p. to 2000 h.p., with gear ratios from 1.5:1 to 515:1. All ratings conform to AGMA Standards; all Falk Speed Reducers have a 100% excess capacity and minimum efficiencies from 97% to 98½% depending upon the reduction.

Shown above is one of many applications where Falk Speed Reducers give day in and day out dependability. Some typical Falk Speed Reducers and their gear ratios are shown at right: a right angle unit with vertical low-speed shaft, and a right angle unit with horizontal low-speed shaft. On the opposite page is shown a parallel-shaft, herringbone geared speed reducer.

There is a Falk Speed Reducer to meet your requirement. Write for complete detailed information on the Falk line of Speed Reducers.

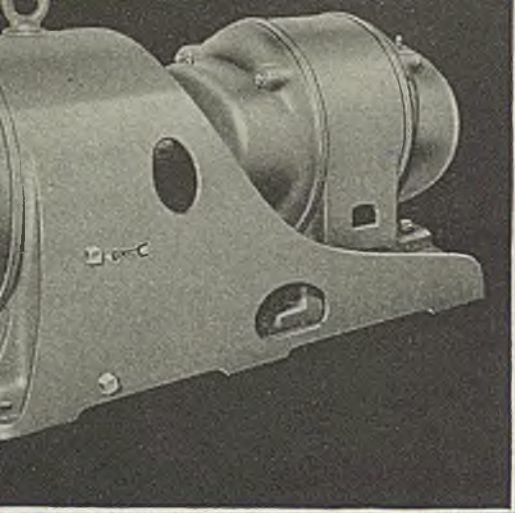
Falk right angle speed reducer with vertical low speed shaft. Available in single reduction units, 1.5:1 to 5.28:1; double reduction, 5.7:1 to 43.5:1; triple reduction, 52.1:1 to 430:1.



Falk right angle speed reducer. Available in single reduction units, 1.5:1 to 5.28:1; double reduction, 5.7:1 to 52.1:1; triple reduction, 56:1 to 515:1.

FALK

... A GOOD NAME IN INDUSTRY



Speed reducers are available in a number of models and sizes and ratings, with single, double, and triple reduction gear sets. Illustrations show, above, double all-motor type DU, and, at right, double vertical all-motor type DZX. Both are available in the same horsepower range.

Falk is the only manufacturer of the all-motor type of speed reducer. This type permits use of any make of motor in both horizontal and vertical models.



Speed Reducers to Suit with Falk All-Motor Units

A major feature of Falk All-Motor units is their interchangeability. It is possible to interchange motors or units, in the plant, on a few minutes' time.

In any speed reducer unit you can use any make, speed, or type of motor within the rating of the unit. This important feature permits the selection of a motor to suit the individual preferences of the user. Motors and units are easily, quickly interchanged in the plant. Fewer spare motors on hand are necessary. Falk All-Motor units are compact, self-contained unit drives available in both horizontal or vertical models ranging from 1 to 75 h.p. Single or triple-reduction gears give an output range from 1 to 500 r.p.m.

See Bulletin 3100, which gives details and specifications, performance tables for all Falk Motoreducers for any service, and load classification tables for common applications.

**ANY
SIZE...SERVICE...
HORSEPOWER...
SPEED...TYPE...
MOTOR**



THE FALK CORPORATION MILWAUKEE 8 WISCONSIN

For over fifty years precision manufacturers of Speed Reducers . . . Motoreducers . . . Flexible Couplings . . . Herringbone and Single Helical Gears . . . Heavy Gear Drives . . . Marine Turbine and Diesel Gear Drives and Clutches . . . Steel Castings . . . Contract Welding and Machine Work.—District Offices, Representatives, or Distributors in principal cities.

FALK

... A GOOD NAME IN INDUSTRY

NEW KIDDE PORTABLE (model 2½)
packs **MORE** fire-fighting punch...
weighs **LESS!**



New unit holds 2½
pounds of carbon
dioxide, compared
to 2 pounds for
old model . . .

**CAPACITY
INCREASED
25%!**

New model weighs
only 8¾ pounds
compared to 11
pounds for old
model . . .

**WEIGHT
REDUCED
21.5%!**

-ANOTHER KIDDE "FIRE-FIGHTING FIRST"

The fast fire-killing action of carbon dioxide . . . the simple, time-proved advantages of trigger control . . . are now incorporated in a *new* portable extinguisher—the Kidde Model 2½.

Replacing the popular Model 2, this new portable packs 25% *more* fire-fighting power—yet weighs 2¼ pounds less, is easier to handle. The Model 2½ is ideal for smothering small fires in flammable liquids or electrical equipment. Use it in laboratories and other small-hazard areas. No special training needed to operate—just aim at the fire and pull the trigger!

Write today for the full facts on the Model 2½.

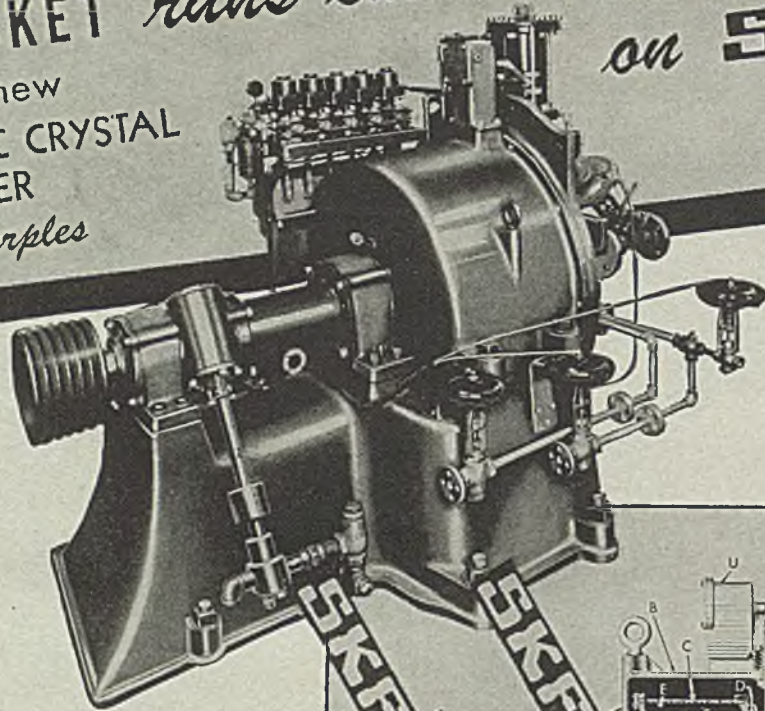
Walter Kidde & Company, Inc., 828 Main Street, Belleville 9, New Jersey



The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

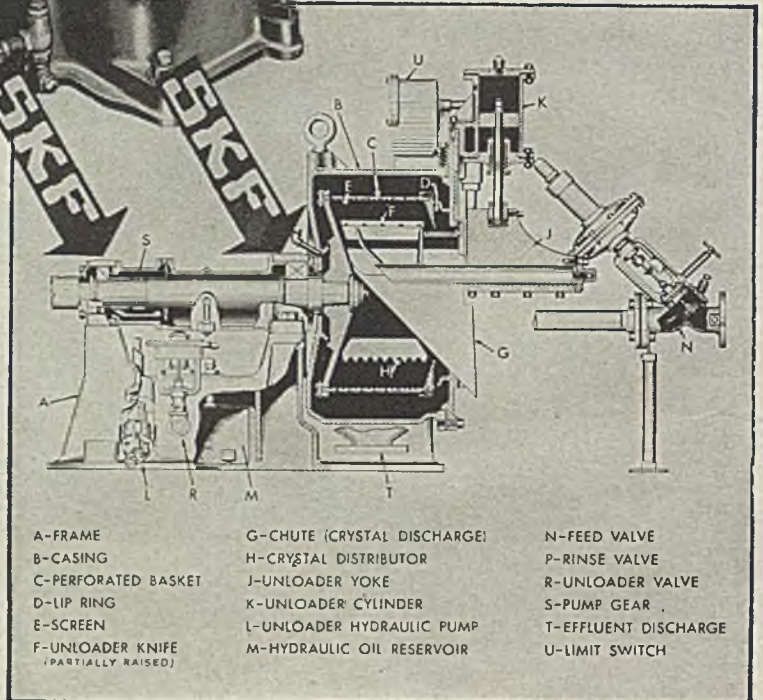
Kidde—

THE BASKET *runs smoothly* AT 1800 RPM
of this new
AUTOMATIC CRYSTAL
DRYER
by Sharples
on **SKF!**



● Built by The Sharples Corp., this Crystal Dryer is equipped with a 20" basket turning at 1800 r.p.m.

Where SKF Bearings are located on this Sharples Automatic Crystal Dryer is where dependable performance is assured. Both main bearings are non-binding self-aligning SKF, the spherical roller bearing on the work end taking the cantilever load that's tentatively out-of-balance until evened by the distributor. Their rolling alignment permits the utilization of their full capacity under heavy radial and thrust loads. And their only requirement for a long life of smooth, steady running is proper lubrication. More proof that SKF puts the right bearing in the right place. 6101



SKF INDUSTRIES, INC., PHILA. 34, PA.



COOPER and stainless steel are twins!



Cooper's intensive study of stainless steel castings has been "on the record" since the earliest days of commercial use of stainless steel. In the past quarter of a century, progressive developments in casting techniques, metallurgical controls and advanced methods of inspection have made possible our growth to the largest exclusive stainless steel foundry in the country.

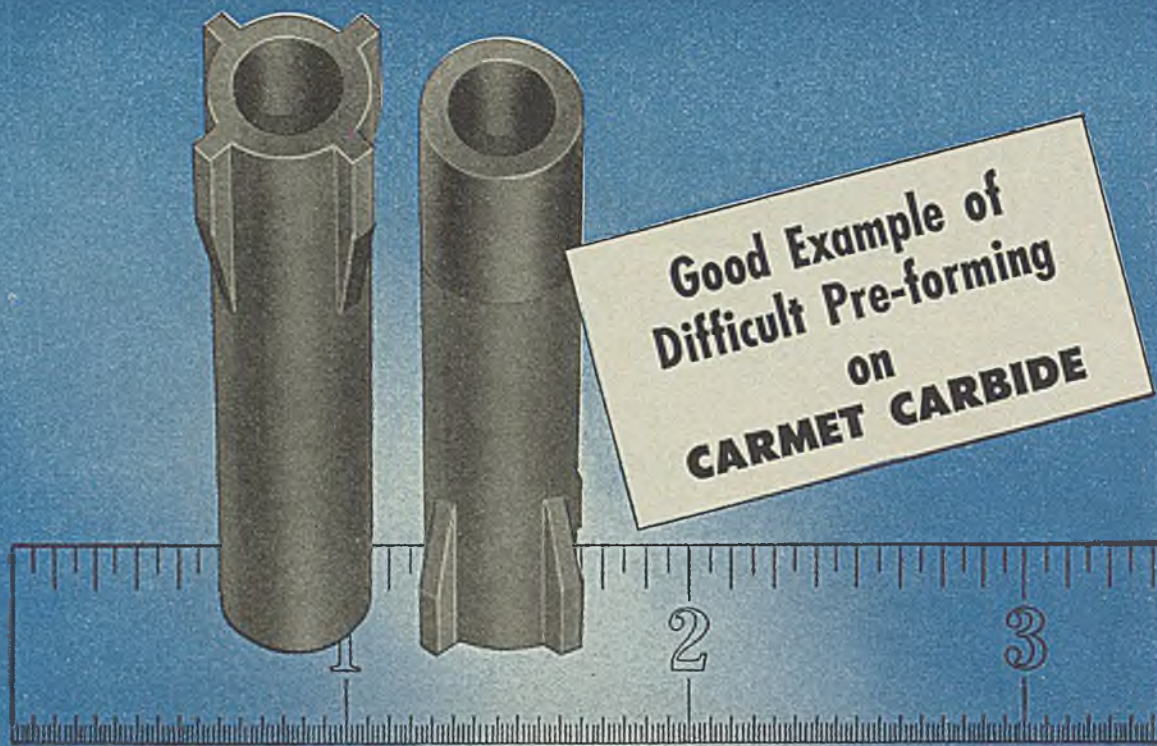
As a result, Cooper now offers the purchasers of stainless steel castings new methods and continued improvements in machine molding, sand control, heat treatment and centrifugal casting.

And we're still growing . . . developing every phase of the business so that you may continue to be assured of the best in stainless steel castings and the best advice on their application.

THE COOPER ALLOY FOUNDRY CO.

170 Bloy Street
Hillside, New Jersey





For Extreme Wear Resistance

LET US MAKE IT FROM

CARMET



Don't think of Carmet as just a complete line of cutting tools and blanks. We specialize in the pre-forming of sintered carbides to solve parts problems of almost any size, shape or description—and we can supply these parts to you either "as formed" or finish-ground. • Let us go to bat for you on applications for the tremendous wear-resistance of Carmet Carbides—call for an Allegheny Ludlum Tool Engineer today!



Allegheny Ludlum Steel Corporation

CARBIDE ALLOYS DIVISION, Ferndale (Detroit) Michigan

W&D 575

Unrestricted full flow All ways



SCREWED



SPUR GEAR OPERATED



ROUND PORT



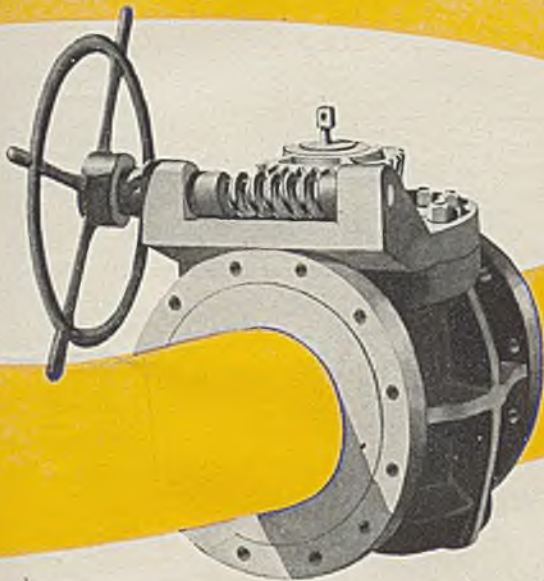
FLANGED



WORM GEAR OPERATED



THREE WAY

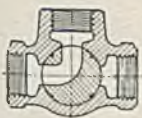


WHETHER you have a valve application that calls for single or multi-port construction...screwed or flanged connection...wrench or gear operation—you can always count on Q.C.f. Lubricated Plug Valves to deliver the optimum in unrestricted, full flow service.

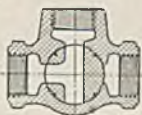
Every Q.C.f. Lubricated Plug Valve is designed for maximum operating speed and efficiency, with a well-proportioned full-pipe valve area. There are no pockets to permit lodging of foreign matter or material in suspension. Straight-through flow avoids the abrasion that shortens service life. Again, seating surfaces are tightly sealed away-from-flow in the open position preventing wear.

Q.C.f. Lubricated Plug Valves are ideally suited for the efficient handling of all types of processing and industrial plant ladings, and are available in semi-steel, bronze, and other metals. If you are not already aware of the advantages and economies of Q.C.f. Valve installations, write for Catalogue 3-(CM)-or call in the Q.C.f. sales representative nearest you.

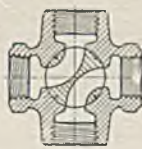
REPRESENTATIVES IN PRINCIPAL CITIES



THREE WAY
TWO PORT



THREE WAY
THREE PORT



FOUR WAY

Q.C.f. LUBRICATED PLUG VALVES

AMERICAN CAR AND FOUNDRY COMPANY

Valve Department; 30 Church Street, New York 8, New York

2 GREAT NAMES

IN WIRE CLOTH

combined to give you
better service

WISSCO

In 1857 employees at the Clinton Plant invented the first power loom for the weaving of wire cloth. Today Wickwire Spencer is still a leader in the production of woven wire products.

CALWICO

The California Wire Cloth Corporation traces its beginning to 1859. Since then it has become the largest producer of high quality woven wire products on the Pacific Coast.

By the merging of the Wickwire Spencer Steel and the California Wire Cloth Corporation (as divisions of the Colorado Fuel and Iron Corporation) the facilities and experience of two great woven wire producers are combined for nationwide service.

Wickwire Spencer Steel Division is ideally equipped to handle volume production of wire cloth used by manufacturers of original equipment—most of whom are located East of the Rockies. The California Wire Cloth Corporation has developed industrial screens for nearly every industry in the Western States—many of them peculiar to that region.

Common to both companies is the precision fabrication of wire cloth in a dozen different weaves—for screening, filtering, separating, grinding, cleaning and procession. All commonly used metals are made into types of wire cloth to give long service under chemical action, corrosion, abrasion, moisture or high temperature.

Our engineers are available to help solve your wire cloth problems. Just write to the nearest office.



FREE BOOK ON WIRE CLOTH

These profusely illustrated catalogs are filled with valuable technical information regarding proper selection and usage of wire cloth. Write to nearest headquarters for your copy.

WISSCO *Wire Cloth* **CALWICO**

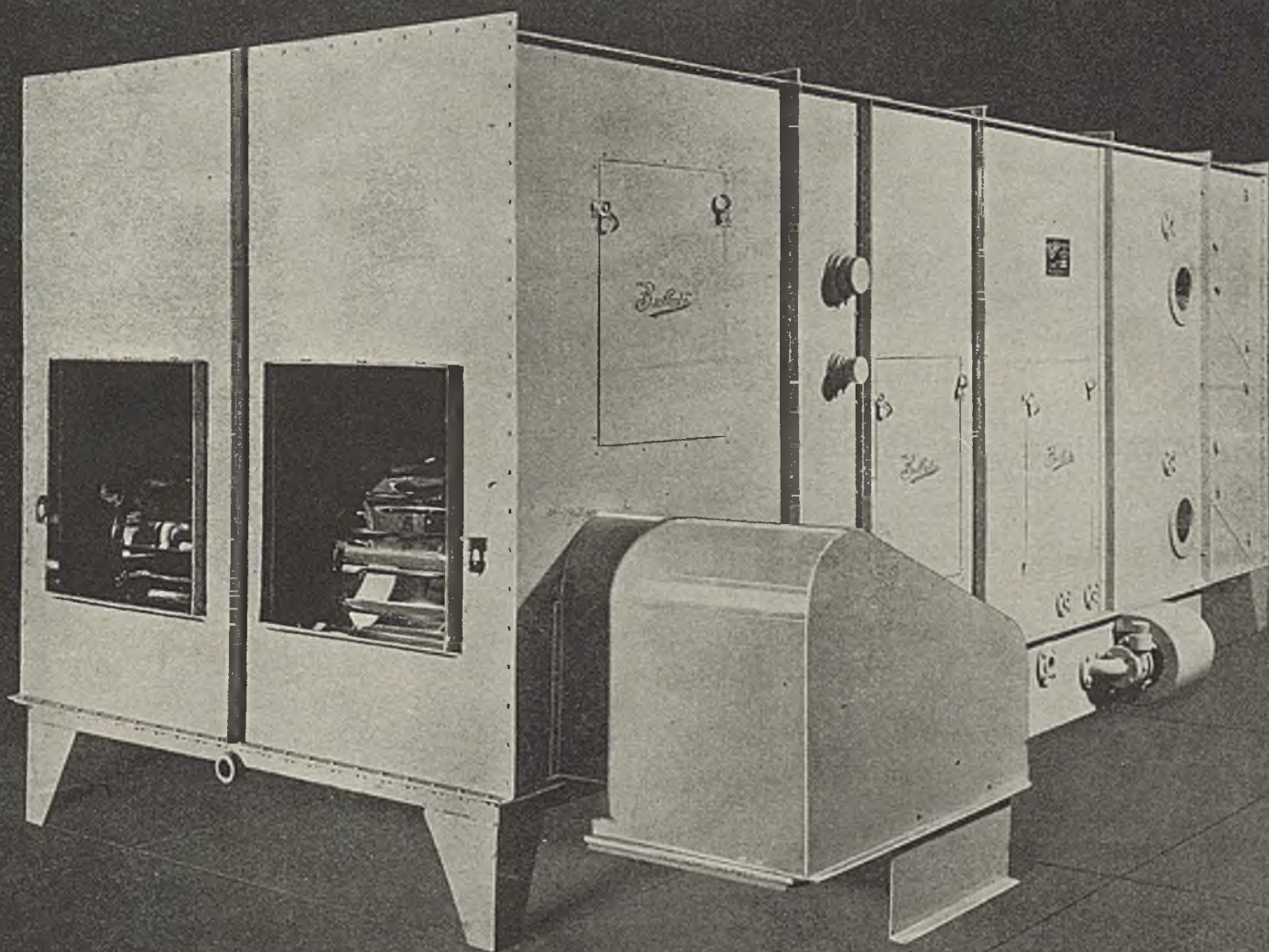
East of the Rockies it's **WISSCO**
WICKWIRE SPENCER STEEL DIVISION
STERLING ST., CLINTON, MASS.



On the Pacific Coast it's **CALWICO**
THE CALIFORNIA WIRE CLOTH CORP.
1001 22ND AVE., OAKLAND, CAL.

Comfortable, Clean Air

AT LOW COST!



Buffalo

Complete Facts on economical, trouble-free air conditioning — plus dust removal — are in this bulletin No. 3457. Send for your copy!

Wet Glass Cell Air Washers Do Double Duty

Not only removing practically all traces of dust from your plant air, but providing healthful, comfortable air conditioning, Buffalo Wet Glass Cell Air Washers operate at remarkably low cost. Fan and pump are your only power requirements, and electrical hookup need not be expensive. Maintenance is simple. Too, you have a wide choice of capacities to handle any part of your plant.

BUFFALO FORGE COMPANY

501 Broadway, Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Buffalo

WET GLASS CELL AIR WASHERS

Let **POWELL** guide
to assured,

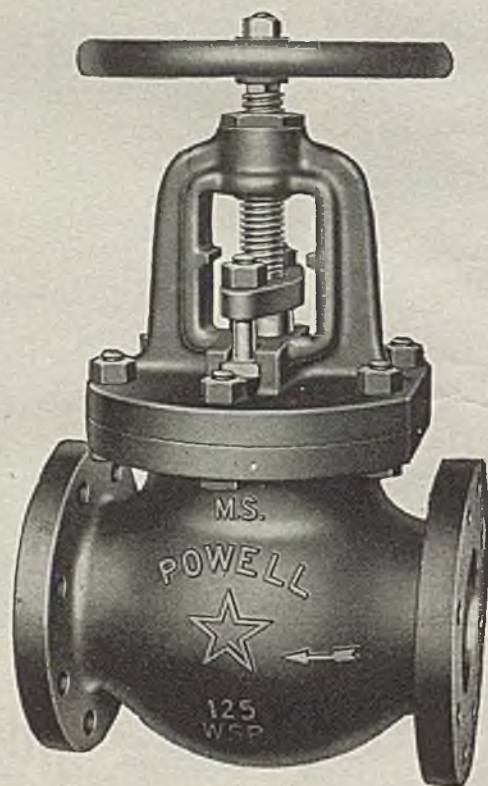
Through the ages, men on land and sea have been guided to their destination by the *North Star*. It is easy to find because it is almost in line with the two stars on the right end of the "Big Dipper."

Many years ago Powell patented the famous "Star" Regrinding Globe Valve. Today, the *Powell Star*, backed by 100 years of accumulated technical knowledge and manufacturing skills, is serving Industry as a guide to assured, unfailing flow control. The Complete Powell Line includes valves for every known industrial service and as new demands arise Powell Engineers will design valves to meet them.

Catalogs gladly furnished on request. Kindly specify whether you are interested in Bronze, Iron, Cast Steel, or Corrosion Resistant Valves.

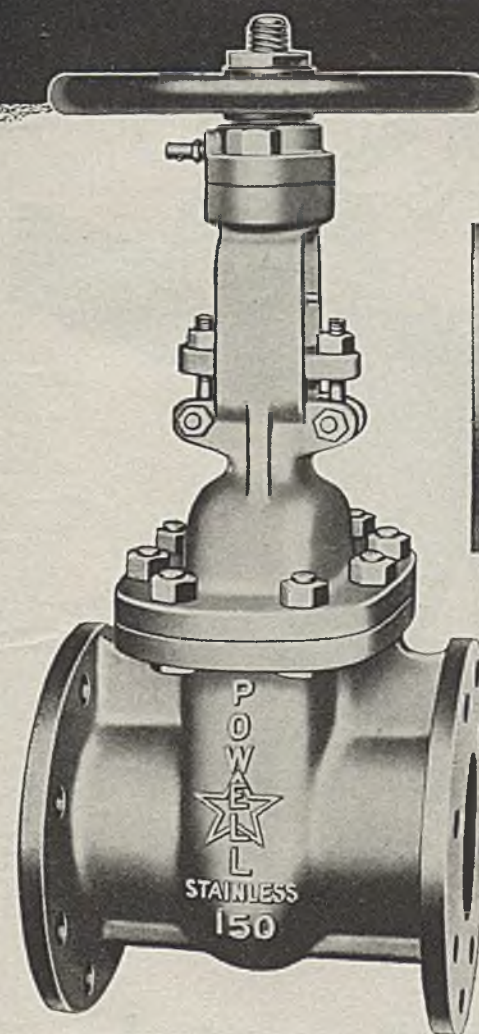
The Wm. Powell Co.
Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

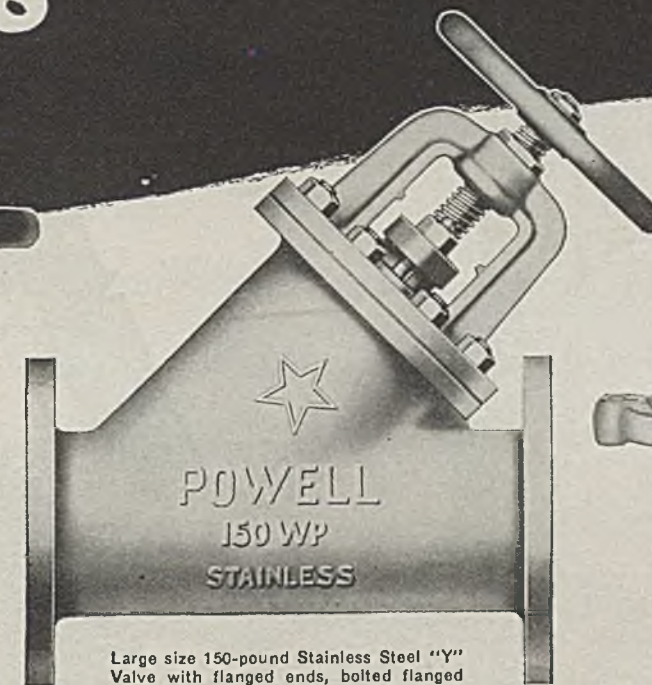


Large Iron Body Bronze Mounted Globe Valve for 125 pounds W. S. P. Has outside screw rising stem, bolted flanged yoke, and regrindable, renewable bronze seat and disc. Also made in All Iron for process lines.

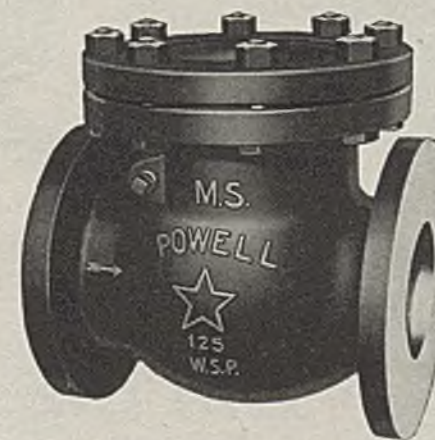
your way
unfailing flow control



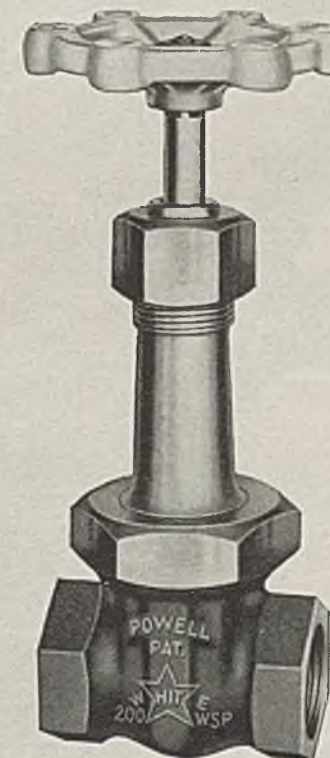
Standard 150-pound Stainless Steel Gate Valve with flanged ends, bolted flanged yoke-bonnet, outside screw rising stem and taper wedge solid disc. Sizes 2 1/2" to 8", inclusive.



Large size 150-pound Stainless Steel "Y" Valve with flanged ends, bolted flanged yoke-bonnet and outside screw rising stem. Sizes 2 1/2" to 12", inclusive.



125-pound Iron Body Bronze Mounted Swing Check Valve with bolted flanged cap and regrindable, renewable bronze seat and disc. Also made in All Iron.



200-pound Bronze "White Star" Gate Valve with inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel-bronze disc.

POWELL

VALVES



**The biggest mistakes
are often made
at the start**

The biggest mistakes are often made at the start

A small point, overlooked or insufficiently considered at the start of a project, can accumulate a lot of trouble. In process engineering and plant designing especially, it is often extremely difficult, time-consuming —and costly—to correct mistakes after construction is under way. . . .

We sincerely believe that the assistance of Badger's staff—composed of experts with long experience in process design, mechanical engineering, procurement and erection—constitutes valuable insurance in avoiding at the start pitfalls which beset the path of concerns undertaking the installation of a new process or the building of a new plant.

E. B. Badger & SONS CO.
Established 1841
BOSTON 14 • New York • San Francisco • London

PROCESS ENGINEERS AND CONSTRUCTORS
FOR THE CHEMICAL, PETRO-CHEMICAL
AND PETROLEUM INDUSTRIES

WATCHING WASHINGTON

R. S. McBRIDE, Editorial Consultant • D. D. HOGATE, Chief of McGraw-Hill Washington Bureau • J. V. HIGHTOWER, Washington Correspondent

Congress asked to establish supervisory agency over rubber industry with six principal functions . . . Price controls removed from a wide range of chemical equipment . . . Office of Technical Services set up in Department of Commerce . . . Government earmarks large amount to stimulate research work . . . Research under government auspices raises new patent problems . . . Ample supplies of ammonia promised through reopening of government plants . . . Federal Power Commission studies controls for industrial use of natural gas . . . New draft calls threaten engineering personnel . . . Research pushed on application of atomic energy . . . Forecast for fertilizer chemicals

A NATIONAL RUBBER PLAN

INDICATIONS are that the rubber industry will continue to function indefinitely in the long shadow of Washington. In a unanimous final report to OWMR Director Steelman the Inter-Agency Policy Committee on Rubber casts an eye at the lowering international skies and urges legislation that will (1) establish a permanent national rubber supervisory body and (2) assure continued use of a certain percentage of synthetic rubber in annual total rubber consumption.

Calling for a "continuous, coherent national rubber policy," the committee asks that Congress establish a supervisory agency having six principal functions: To coordinate activities of all government agencies concerned with rubber keep the national rubber position under continuous review, recommend legislation if the use of synthetic should fall below "security" requirements, supervise government-sponsored research programs, represent rubber's interests in any National Science Foundation that may be set up, and look after government-owned synthetic rubber plants held in standby. Recommended for membership in the supervisory body are high officials of each government agency having an interest in rubber, with an "independent" chairman to be appointed for a term of years.

PROPS FOR SYNTHETIC

IN AN earlier report the Inter-Agency Committee urged that a third of our annual rubber consumption, excepting specialty rubbers, consist of general-purpose synthetic. It also recommended the maintenance in operation or standby condition of 600,000 tons per year of government-owned general-purpose capacity not acquired by private industry. In its final report the committee

discusses various possible means of reaching and preserving these "security" levels. Cautious opinion is expressed that a combination of subsidy and product specification is the most practicable means—if and when government support proves necessary.

Just who would get a subsidy for synthetic rubber is unspecified. It might go, says the committee, to the rubber manufacturers or the users. The government might buy synthetic at prices giving fair profits to manufacturers and then resell at prices competitive with natural rubber. Continued federal regulation of the percentage of synthetic rubber in products is attractive to the committee, which admits, however, that enforcement may prove difficult.

Examined and rejected on grounds that they conflict with existing trade agreements, discourage research or violate principles of private enterprise are such alternatives as tariffs, import quotas, excise taxes or products containing natural rubber, and government monopoly of natural rubber imports.

MONOPOLY MERRY-GO-ROUND

CONGRESSIONAL committees and the Justice Department are again after the monopolists. Recent hearings, including a survey of the chemical field, before the Senate Small Business Committee have led its chairman, James E. Murray, to complain that the Justice Department doesn't have more funds than it has. The Small Business Committee of the House is expected to conduct hearings on monopolistic tendencies, during the congressional recess, with particular reference to effects of governmental policies on war-time concentration of industrial enterprise.

Justice's Anti-Trust Division, now directing over 100 investigations, says it is scrutin-

izing the concentration of industries occurring since 1939. Handy to Mr. Berge's men is a little volume, "Economic Concentration and World War II," prepared at the request of the Senate Small Business Committee by the late Smaller War Plants Corp. Presenting the study to the Senate in June, Chairman Murray said he was seriously disturbed over the figures. The section on chemicals and allied products bristles with charts, graphs and tables showing that ". . . the major effects of the war upon the structure of the chemicals industry were (1) a rise in the percentage importance of the large firms, and (2) a tremendous increase in the productive capacity held by the big companies." In offering this display of statistics the booklet has little to say of the numerous conditions and reasons why the larger companies had to meet the major share of expansion requirements during the war.

CHEMICAL EQUIPMENT FREED

SUSPENSION on July 26, by OPA of price controls over a wide range of industrial machinery and equipment was intended, in effect, to eliminate controls over the entire field of chemical processing equipment. OPA officials made this statement early in August in reply to questions about the status of chemical equipment not specifically mentioned in Amendment 33 to Supplementary Order 129. The items specified under the title "chemical process machinery," they declared, were listed merely to indicate to manufacturers the broad types of equipment decontrolled. However, where there is uncertainty, officials advise manufacturer to write to OPA for an interpretation.

OTHER EQUIPMENT STATUS

INCLUDED in the long list for which price controls are suspended, is much equipment not classed as chemical but more or less related to the chemical processing industries. Among them are air conditioning equipment, air and other gas compressors, conveyors and conveying systems, crushers, grinders, pulverizers, dust collecting equipment, industrial fans and blowers, gas generators, heat exchange equipment, pumps, screening machinery, water conditioners. Also machinery for ceramics, paint and varnish, petroleum refining, pharmaceuticals, pulp and paper, rubber and rubber products. In some instances these items are qualified as to capacity and type. Further price decontrols

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CLEVELAND Worm Gear Speed Reducers

are contemplated but officials in the Machinery Branch of OPA are reluctant to disclose plans declaring they wish to discuss them with the newly established price control board.

OFFICE OF TECHNICAL SERVICES

NEWLY established in the Department of Commerce is Office of Technical Services. That new agency combines the work of Office of the Publication Board, Technical Industrial Intelligence Branch, National Inventors Council, and Production Research and Development Division.

The new Office will have at least four major divisions:

1. Invention and Engineering Division will handle the patent projects formerly in National Inventors Council and related new activities. There is some talk that much of the patent work of the Alien Property Custodian may ultimately land here.

2. Industrial Research and Development Division takes over the residual activities of Office of Production Research and Development. It also will be the contracting office with \$1,000,000 for aiding and stimulating investigations.

3. Library and Reports Division will take over the work which has been managed by OPB.

4. Technical Industrial Intelligence Division is the direct successor of TIIB which in turn succeeded TIIC, CIOS, and the other investigative groups abroad.

In general administrative charge of OTS is John C. Green who has been in charge of several of these agencies under Secretary Henry Wallace. The chief of Library and Reports Division is to be Jerrold Orne and the chief of IRDD is Ely C. Hutchinson. The headquarters of all of these activities continue in the Commerce Department building in Washington.

RESEARCH AID PLANNED

CONGRESS appropriated a million and a half dollars for the Department of Commerce to use on contracts as a stimulant in research undertakings. This new policy for peacetime resembles the contract aid given during wartime on OSRD and OPRD investigations. Of the new money two-thirds will be disbursed at the Commerce Department's new Industrial Research and Development Division and one-third will be spent by the National Bureau of Standards.

IRDD is just now organizing the plans by which it will discuss with would-be spenders its contracts for joint undertakings. To qualify for this kind of government aid, a proposal must be for a project in which there is a reasonable probability that it will foster and promote the national welfare and that it will: (1) Advance the technological productivity of the nation; (2) create new enterprise; (3) create new em-

ployment; (4) be of wide public consequence and benefit." "But projects may not be undertaken: (1) If they are within the field of budget responsibility of another government agency; (2) if they may be equally accomplished to the same ends by private enterprise."

It is emphasized that only technologic or applied investigations will be discussed. Fundamental research is left for consideration of National Science Foundation, if and when established. Furthermore, these investigations will not extend to social and economic investigations. They must relate to the application of physical or biologic science and usually they will be exclusively of an experimental nature either in the laboratory or in the field.

NEW PATENT PROBLEMS

GOVERNMENT participation in research has created a number of new patent problems that remains unsolved. More of these are expected under the new IRDD research contract program. Under those contracts it is definitely expected that there will be commercial exploitation of results obtained, but that the government will retain the right to "the usual irrevocable, non-exclusive, royalty-free license" to use the inventions for any government purposes. There is a disposition to require also that an inventor gaining a patent from such contract work agree to license it for development under terms acceptable to the government. Thus the government hopes to control any monopoly tendencies which might otherwise grow out of government finance work.

Already other controversies are being met in cases where government investigators are seeking private profit by licensing patents which have resulted from wartime investigations. Where these investigations have been aided by the government but done in institutional or corporation laboratories, there seems little doubt as to the rights of the individuals and companies involved. But quite a different problem is met in the case of inventors working on salaries in government laboratories which do not have a fixed patent policy.

Some firms wishing to use the results of such work intend to test the rights of these government employees who demand license fees, especially in one or two cases where public health questions are involved. It is expected that some serious court cases will be needed to establish legal rights because of the widely varied policy of official administrators, most of whom seek to dodge the issue as long as possible.

AMMONIA PROGRAM BOOMS

ALL ten of the government-financed ammonia synthesis plants built for war purposes will shortly be operating to make up the world deficiency of ammonia for fer-

tilizers. The talk is that all will operate at capacity. The facts will probably not bear out that proposal for some months to come, despite wishes and optimistic statements.

Title to three of these plants has passed from Ordnance via War Assets Administration to others. Tennessee Valley Authority long ago took over its plant at Muscle Shoals. Buckeye Ordnance Works at South Point, Ohio, was sold for \$12,500,000 to Solvay Process Co. Dixie Ordnance Works at Sterlington, La., has been sold to its wartime operator, Commercial Solvents Corp., for approximately \$5,500,000.

Three other Ordnance plants are under long-term lease to private enterprise, each lease containing an option to buy. Jayhawk Ordnance is now operated by Spencer Chemical Co.; Ozark Ordnance is operated by Lion Chemical Co.; the Lake Charles ammonia plant built by Mathieson Alkali at a cost of about \$14,000,000 is now to be operated by Hercules Powder Co. All six under lease or ownership of commercial and government firms are primarily engaged in making ammonium nitrate principally for domestic fertilizer use. That which goes abroad will be sold by the operators to the governmental agencies handling export.

Reactivation of the other four ammonia plants to operate for the government account is under way. At the first of August final decision had not been made as to all operators of these plants at Morgantown, West Henderson, Cactus Arsenal of Texas, and Missouri Ordnance Works. But it was expected that some experienced firms would be engaged to make ammonium nitrate, most or all of which will be sent abroad to the armies of occupation or through other governmental agencies. At the insistence of American firms interested, the general decision appears to be to require such export for the entire output of these works. Thus the government operations and government bookkeeping will not place the output of these emergency projects in competition with private enterprise. The only governmental competitor will be Tennessee Valley Authority which continues to produce daily at capacity about 400 tons of ammonium nitrate.

METHANOL PROBLEM GROWS

SALE, lease, and contract operation of ammonia plants is preventing prompt development of some of the wartime capacity for methanol manufacture. At least three of the companies which have taken over plants want to convert at least one-third, and perhaps more, of their installations from ammonia synthesis to the making of methanol. This can be done with simple and not-too-costly changes in equipment.

Shortage of antifreeze this fall seems inevitable. Some talk suggests that millions of cars will freeze up this winter because



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they can not get alcohol, methanol, or glycol. Certainly prospective supplies are far below anticipated market requirements. But these facts have not been enough to persuade the Ordnance Department or WAA to facilitate changeover. The Department of Agriculture's continuing demands for ammonia for fertilizers have drowned out the relatively feeble warnings as to antifreeze troubles.

When a real shortage becomes evident it will be too late to do much about it. Meanwhile, Civilian Production Administration is trying to arrange to have more alcohol made but naturally has difficulty in getting grain assignments for that purpose. One possible means for relief seems to be a quick shift at Morgantown and a partial shift at Sterlington, from ammonia to methanol. Only those two plants have any substantial capacity technically ready for the changeover.

TARIFF CUTS DELAYED

LONG before now President Truman and the State Department had expected to be busy cutting tariff rates under the trade agreement policy which was used so successfully by Secretary Hull to slash import duties. That whole program has been delayed by a series of events which have not been understood in industry, and probably not really well understood even by some of the participants in Washington.

No tariff cuts affecting the British empire could be considered until Congress had granted approval on the British loan. That approval did not come until July. At that time any change in duties which might be embarrassing at the November elections could not be considered by an election-conscious Administration. Postponement until after November polling was necessary. Then came international complications further to delay the program.

The original plan was for the United States to have an extended trade conference to discuss elimination of trade barriers. A call went out for such a meeting of about 15 nations to be held in New York. Other nations objected, on the nominal ground that this was a United Nations project and should not be handled by such hand-picked conference to which many were not invited. The United States withdrew its invitations and agreed to meet at the larger trade conference which has been called to meet under United Nations sponsorship in London beginning October 15.

Washington now knows that the results of the London conference can not be digested and reconciled with State Department plans until after the first of 1947. But the State Department expects to have a group working on the task of negotiating new agreements which are expected to cut by 50 percent present duties on a majority

of imports. In this connection it must be remembered that commodities which have already been cut from their statutory rate by 50 percent are again subject to a similar percentage reduction by Presidential action.

MORE POWER FOR FPC?

AS THE last of a series of Federal Power Commission hearings on natural gas ended August 1 it seemed to some observers that one of the commission's aims is to gather ammunition for a move to extend its authority in the natural gas field. FPC will go over the voluminous testimony this summer and prepare its report for submission to Congress, along with whatever recommendations for new legislation the commission may wish.

Disturbing to gas interests is the prospect that FPC will seek authority to control sales from interstate pipelines direct to industrial consumers. They point out that, armed with such power, FPC would then have jurisdiction over all gas from an interstate line, thus holding a position where it could dictate the usage to which all such gas could be put. Obviously, this would have a vital influence on direct industrial users, and would in effect enable the commission to determine whether a plant is to utilize interstate natural gas or a competing fuel.

FPC spokesmen have expressed concern over the rapidly increasing use of natural gas, as well as the possibility that interstate gas might in some instances be sold directly to industries in such volumes as to endanger the supplies of consumers served by local distributors. Witnesses at the hearings often were pressed for their views as to the probable future increase in the industrial demand for natural gas as fuel and as a chemical raw material.

MOLASSES WANTED

SOON after the new contract for Cuban sugar, molasses and alcohol was signed in Havana on July 16, agencies in Washington were looking for additional molasses in order to enable the nine idle fermentation alcohol plants on the Gulf and East Coasts to resume operation. The plants had already received and consumed their portion of the 115 million gallons of molasses to be delivered during 1946 under the contract. With Rubber Reserve now seeking from 30 to 50 million gallons of alcohol for conversion into butadiene, and the dry ice famine still unrelieved, need for production from the plants has become acute.

Early in August, several moves, spearheaded by CPA, were under way to secure an additional 15 to 20 million gallons of molasses. Commodity Credit Corp. was asking the Cubans to make available at once 15 million gallons more under a clause in the contract requiring the Cuban Sugar Institute to increase the contracted minimum of 115

million if possible. CPA considers that Cuba could well make available some 20 million gallons which the Cubans want to convert into beverage alcohol for export. Incidentally, CPA insists that it will continue enforcement of L-353, the order prohibiting use of imported cane spirits made from molasses. Late in July the International Emergency Food Council was concluding a survey to determine what volume of molasses previously allocated to foreign countries would not be required by them. At the same time CPA was exploring the practicability of using surplus potatoes for fermentation.

PRIORITIES FOR ALCOHOL

CIVILIAN Production Administration extends a helping hand to manufacturers willing to increase production of synthetic methyl, ethyl and normal butyl alcohols made from non-food raw materials. A few weeks ago CPA, by amending Schedule 1 to Priorities Regulation 28, made rating assistance available to secure capital equipment for production of these alcohols. It had been previously ascertained that construction would be undertaken if priorities were given. CPA officials say that requirements are almost triple the production of all types of alcohols.

NEW DRAFT CALLS

BEGINNING in September there will be new draft calls through Selective Service, which will take most able-bodied non father eligibles from 19 to 29 years of age, inclusive. Deferment for occupational reasons will be granted in only very few cases. Those who have assisted in keeping engineering and scientific personnel for the more important tasks of research and operation during the war period now feel that it will be more difficult than ever to do this.

ARMY NEEDS ESTIMATED

STATEMENTS from Army officers to National Research Council indicate approximately the following situation affecting present technically-trained persons. About 225,000 inductions by draft will probably be needed between September and April. It may require as many as 700,000 men called to achieve this smaller net gain. Only about 92,000 draft eligible persons remain in the non-father age group of 19 to 34. Of these, 60,000 are in the Merchant Marine and are thus regarded as veterans. The remaining eligibles, numbering 32,000, will practically all be required in September, for which the quota has been set at 25,000.

The only exemption which seems reasonably certain is for 500 graduate students and a very limited number of key members of faculties teaching where the training of G. I.'s would suffer if they were inducted.

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Industrial operation and research-laboratory engagement will no longer get much consideration. There is authority to grant such deferments, but little disposition to do so.

DEFERMENT HOPES RISE

AFTER a generally accepted decision to make absolutely no occupational deferments under the new Selective Service law a sudden change in Washington attitude developed. Close observers credit John Steelman with having given a practical turn to different matters with sufficient force to override the arbitrary "take everybody" policy first adopted by General Hershey.

The revised memorandum to local boards does not give the full story of expected deferments. Actual practice later in the future will probably recognize at least four sorts of occupational deferment: (1) Teachers of physical science and engineering needed to train ex-GI's; (2) research assistants at college and graduate students of exceptional importance, probably under a selective program of OSRD (about 500); (3) vitally needed scientists and engineers in research, development, design, and operation (probably as many as 10,000); (4) skilled technicians, like instrument makers and operators of delicate machinery, who are virtually irreplaceable without years of training (probably 2,000 in number).

ATOM POWER BEING PUSHED

HASTENING industrial research on the application of atomic energy to the propulsion of aircraft is the aim of the Army Air Forces, which has arranged with several plane manufacturers to have their engineers and scientists examine the possibilities. Also, the Navy is putting brains to work on ship movement via the atom. Meanwhile, slow but steady progress is being made on the design of the atomic pilot plant in the Clinton Laboratory, operated by Monsanto Chemical Co., at Oak Ridge.

Experts from industry, universities, Army Air Forces and the Navy are working together on the plant, which is now in the design stage. Careful study is being given to selection and testing of metals and other materials of construction which must withstand high temperatures. This, coupled with the need for painstaking experimental work which is expected to run well into 1947 before final design of the plant is reached, has pushed the completion date to some time in 1948.

TVA LOSES AGAIN

DURING early July it looked as though Tennessee Valley Authority was going to get \$3 million from the Federal Treasury to begin construction of the fertilizer plant which it wishes to build at Mobile. After a brief hearing at which the industry was

not permitted to appear, the Senate inserted that sum in the appropriation bill. But the House rejected the item and the Senate receded.

It is now definitely promised (no one knows exactly how dependably) that there will be no further effort this year to put TVA into business in competition with industry. But industry executives say frankly "We are watching the situation closely, despite this promise."

HOW TO GET RFC DOLLARS

WARTIME loans by Reconstruction Finance Corporation were frequently made under conditions not permissible at this time. For example, it is no longer possible for industrial projects of marginal prospect to be financed through RFC simply because some war agency sponsors them. That sponsorship was adequate in wartime, but no longer.

Another little understood problem of borrowing from Uncle Sam's loan agency has caused many disappointments recently among would-be borrowers. This is a fact that loans must be refused by commercial banks before RFC will even consider helping a new undertaking. Only in rare instances will RFC waive this regulation. Those interested in new projects should, therefore, bring to Washington letters refusing credit by the usual and customary banking agencies if they are going to get serious attention to their requests for federal money.

The effort of RFC to avoid competition with commercial bankers has led to a very interesting banking pool arrangement in New York City. When it looks as though proposals to the government ought to have participation by commercial banks, the would-be borrower is asked for permission to refer loan requests to this group of commercial banking corporations of New York, or to some other commercial bank where the borrower would prefer to do business. Often this results in a joint investigation by the government and the bankers. And in some cases banks make marginal loans in part underwritten by the government.

"BUY AMERICAN" IS BAD

THE new law providing for stockpiles of strategic and critical materials was finally passed by Congress and signed by the President late in July. The bill sets a new pattern of preparedness in minerals, metals, chemicals, and a few other industrial commodities.

When signing the bill the President issued a statement severely criticizing one portion of the act, which provides for preference in purchases for the stockpile to be given to American producers. That "Buy American" requirement is, according to the President,

seriously in conflict with the other fundamental requirements of the law because it does not permit most economic and effective building up of reserves which may be needed in some later emergency period. The provision will increase the cost of purchases, tend to defeat conservation policies of other parts of the act, and otherwise work against the public interest, according to the President.

Perhaps most emphasized is the fact that this "Buy American" policy goes counter to the Administration program of reducing trade barriers. The President was particularly reluctant to sign the bill because the United States, by this act, goes exactly counter to the policy which it is now urging on other nations for development of international trade.

FERTILIZER FOR 1946-1947

MORE fertilizer materials will be available for American farmers during the fertilizer year which opened July 1 than in any previous season. This fact was forecast by Maurice H. Lockwood, president of The National Fertilizer Association. He has given out the following estimates of the probable U. S. supply of the major fertilizer components:

	Estimated Supply Tons	Increase Over Last Year	
		Percent	
Nitrogen	716,000	2	
Phosphoric acid	1,500,000	14	
Potash	766,000	5	

Lockwood also emphasized the fact that such supplies, if achieved, will represent approximately double the amount of fertilizer material for American farms used in the average prewar years. In the aggregate the current year's supply will be about 103 percent greater than the average of 1935-1939.

LIFE EXPECTANCY ARGUED

SPEAKING for the natural gas pipeline development, the coal industry spokesmen have been arguing before Federal Power Commission that natural gas should not be utilized extensively because the life expectancy of many natural gas fields is so much shorter than that of the coal deposits of the country. In one case a comparison was made between a certain natural gas supply adequate for 34 years and anthracite supply with 165 years of life expectancy. Those seeking natural gas development retort with comparisons of efficiency of fuel use, arguing that the customers are entitled to natural gas fuel which can be used with nearly double the thermal efficiency for many household and industrial purposes. Most certain is the fact that this inter-fuel controversy will continue a problem of large importance before Federal Power Commission for some years.



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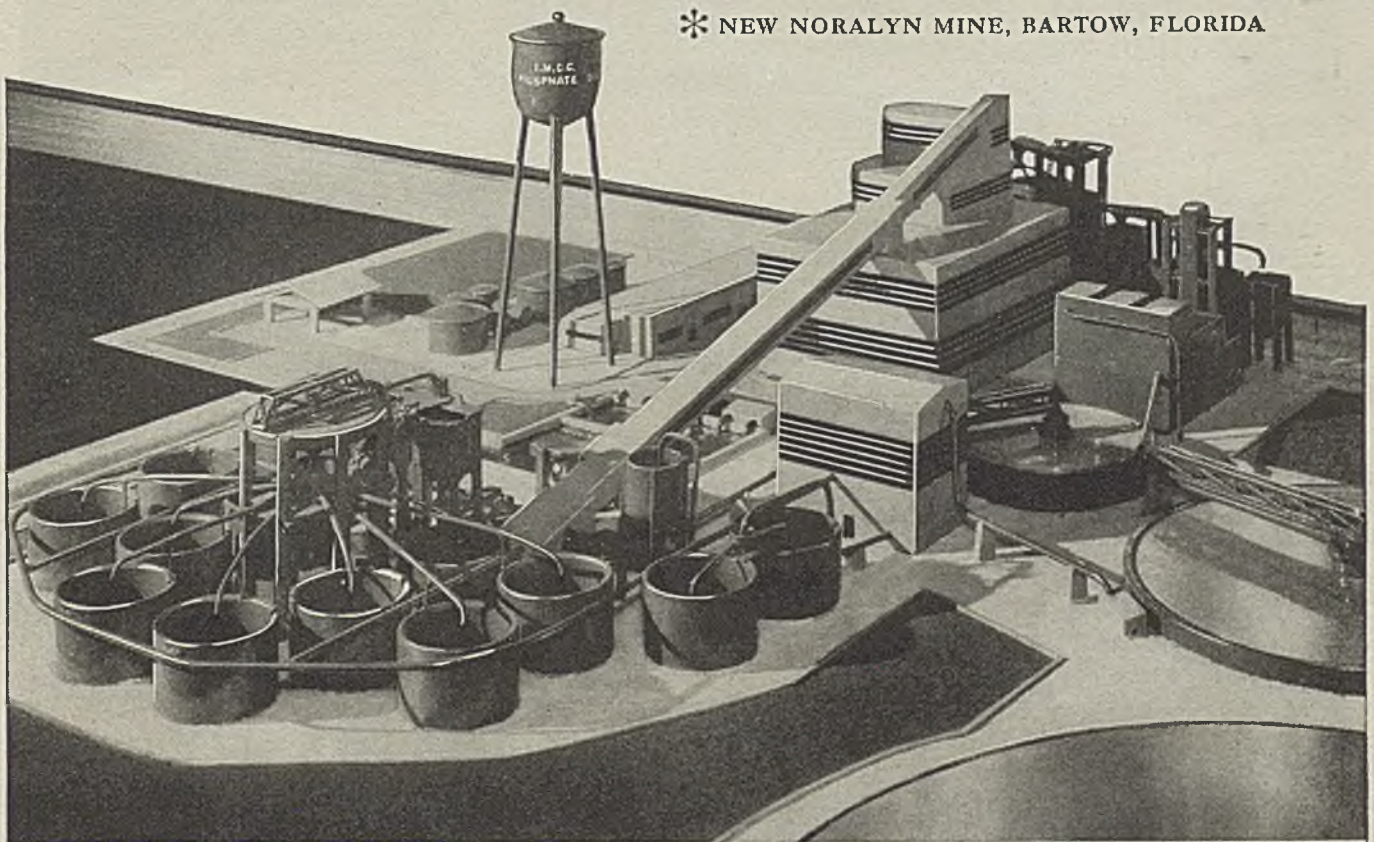
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throughout the world.

Many important metallurgical innovations have been developed by International's engineers for use in the Noralyn Mine which will be the largest phosphate mining operation in the country. Through its research and engineering development program, International has continually improved its processes of mining and refining Phosphate Rock to expand production for increasing market requirements.

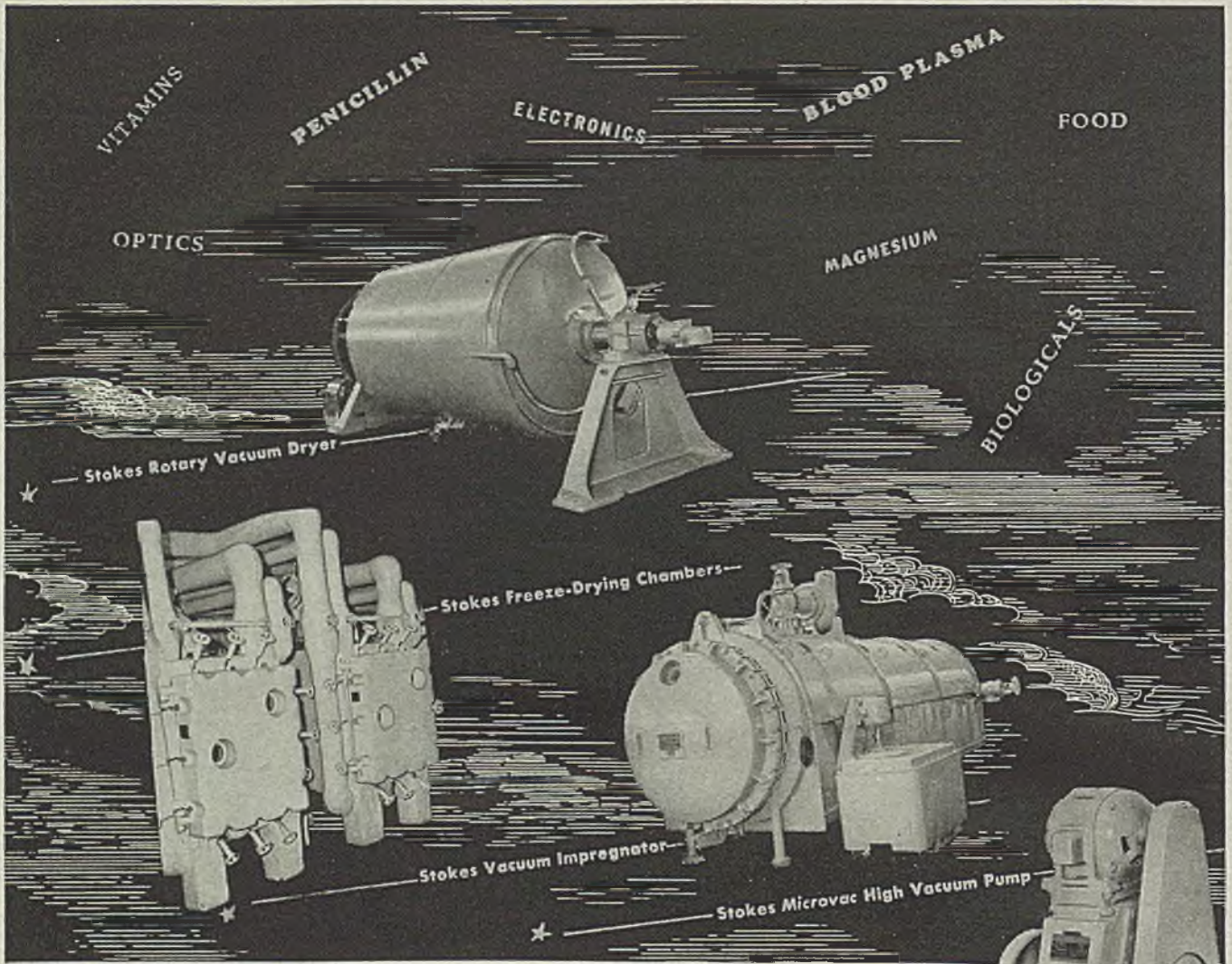
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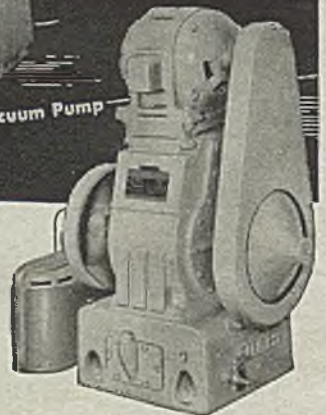
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SIDNEY D. KIRKPATRICK, Editor

AFTERTHOUGHTS AND SECOND GUESSES

NOW that the atomic-bomb tests at Bikini are over, the Monday morning quarterbacks have come into their own. Here on board the U.S.S. Panamint, the American scientists and the accredited observers from the United Nations hold almost daily sessions to appraise the significance of these two great experiments. The presidential and military evaluation boards have given us their preliminary findings of the damage. These reports, and others that come to us, are in general agreement that the tests were conducted in an unbiased, scientific manner—that there has been no effort to withhold any information that will be helpful in promoting a better understanding of the general nature and purposes underlying the tests. But despite this factual evidence, the question occasionally arises: Was there not some hidden purpose behind these tests? Were we not striving for something more significant than the military and scientific evaluations of this newest agency of destruction?

One of the documents of most interest in this connection is the report of the Chicago scientists to the Secretary of War, which was dated June 11, 1945—two months before Hiroshima, five days before the New Mexico test. Therein was officially raised for the first time the questions of social and political implication that have since been in continuing discussion and debate. Those questions have not yet been answered to everyone's satisfaction but it is interesting to note how many of them were anticipated by the scientists at that early date. The authors of the report realized that the final decisions as to the use of atomic energy for military purposes had to be made by the highest authorities of our own government—if not of the whole world. They expressed the fear that "the military advantages and the saving of American lives by the sudden use of atomic bombs against Japan may be outweighed by an ensuing loss of confidence and by a wave of horror and repulsion sweeping over the rest of the world and perhaps even dividing public opinion at home." In this respect the scientists were wrong for no such surge of opposition developed.

An alternate proposal suggested by the group, which consisted of three physicists, three chemists and one biologist, was that "a demonstration of the new weapon might be made, before the eyes of representatives of the United Nations, on the desert or on a barren island." With Japan invited to view such a demonstration, they felt that even her most fanatic war lords might be convinced quickly of the need to surrender and to join with the other nations of the world in an international renunciation of the atomic bomb. Looking back at what has happened since then, that idea now seems quite fantastic. Yet no doubt there are many people the world over who fervently hoped that the tests at Bikini might somehow have accomplished this same objective—i.e. to have frightened the world into accepting some idealistic plan for world security.

To those who still think in that vein, the recent tests are bound to have proved disappointing. From the very first announcement of the plans for Operation Crossroads, Admiral Blandy insisted that the tests were primarily for military and secondarily for scientific purposes and that no political or social significance should be attached to them. Certainly nothing has developed in our discussions here on the Panamint that would indicate any disagreement with that interpretation and use of the end results of the Bikini tests.

Rather, the Navy now has for the first time a fairly comprehensive picture of the coverage and extent of blast damage to its ships, the effects on superstructures and hull design, the threat to and possible protection for personnel, and, finally, a better knowledge of what can be expected from the secondary effects of fire and radioactivity. Science and engineering will be benefited by the data on heat and pressure phenomena, the varying resistances of different construction materials and the safeguards that must be employed when atomic energy is used for less destructive purposes. We have had something more than an experiment in a scientific laboratory. Large-scale, pilot-plant research has again paid dividends.

A-BOMB TESTS

AS VIEWED BY THE EDITOR

S. D. KIRKPATRICK

Editor, Chemical Engineering

Here is an opportunity to read a chemical engineer's first-hand impressions of the atomic bomb tests, Able and Baker, at the Bikini Atoll last month. Mr. Kirkpatrick sailed on the USS Panamint from Oakland, Calif., June 12 as a non-participating scientific observer of the tests to be made by the Joint Army-Navy Task Force One. His account of the explosions and destruction he witnessed which appear in these pages have been taken from the diary he kept.—*Editors*



I.N.S.-Joint Army Navy Task Force One Photo

1 July 1946 7:35 a.m.
TODAY is the big day. The word came through yesterday that Test Able is on. H(ow) Hour was changed to 0830—1 July. All observation ships had to clear the lagoon during the day so we pulled out at 1600 and came to this position—which I judge is approximately 18 miles at 55 deg. NE from the Nevada.

We got our positions yesterday afternoon. Most of us are up on the flying bridge which is just above the navigation bridge. A few are going into the crow's nest. The boys of the press have their typewriters on the bridge right under the captain's nose. I have a swell vantage point—on the flight deck, starboard, with completely unobstructed view.

At about 0830 I took my place between Prof. Alexandrov, the Russian observer, and Col. Ragab, the Egyptian. On my right was Prof. Skilling of Stanford and behind us were the naval officers—including Chaplain Hall—handy in case. At 0850 the first word came through that the bomb was on his way. The last two minutes seemed awfully long. I was looking right at the flash when the call came "There it is!" I looked steadily ahead and saw the first flash that immediately became a round, white ball of fire—about the same size but more intense

than the sun—when viewed through the dark goggles. The ball lasted only a moment and then the cloud started to rise above it but seeming to carry part of the fire with it. I watched it for a second or two, then when I felt my neighbor pulling off his goggles, I did the same and am mighty glad I did for it gave me a chance to see the slight orange-pink color that soon changed to white as the billowy clouds began to form into the well-known mushroom of the earlier bombs that we have seen so often in the movies. This mushroom stood out prominently from the rest of the clouds for despite what I've heard at the radio there were some clouds on the horizon at the time of the drop.

But to me the most beautiful sight of all was the way this pure white cloud seemed to keep growing and expanding as it mounted higher and higher into the sky. I'm no judge of such distances but I expect it was two or three miles above the horizon in two or three minutes. Then high above it and to the right I saw two parachutes drifting downward into a part of the mushroom that had divided into another cloud. About that time the first of the drone planes could be seen circling. Then, almost unnoticed I saw a cloud of smoke forming at the left of the mushroom which appar-

ently was drifting slightly with the wind. It was a fire at approximately the target center.

Alexandrov on the left and Skilling second man on my immediate right both say they felt the heat wave. I didn't nor did Col. Ragab on my immediate right. But a minute or so after we had taken off our goggles we did hear the roar. It was distinct but more like the rumble of distant thunder. I know it wasn't anything like so sharp as the explosion of the magazines at Lake Denmark which I heard at about the same distance one Saturday afternoon some 23 years ago. There was another sharper blast five or six minutes later which we judged was probably a torpedo on one of the destroyers.

We are now steaming slowly toward Bikini and with my glasses I can see the atoll which looks just like it did when we left yesterday. The same beautiful palm trees, all the high towers are there as far as I can make out. There's a little smoke and now at 1015 there is still the big white cloud that had mounted high in the sky and seems to be veering off toward the right.

It's 1245 now and I've just finished lunch. There was some speculation at the table as to just where the bomb hit. Judging from the damage and what we could see in the way of twisted masts, the burst must have

been more at the edge rather than the center of the target array.

John Grebe of Dow Chemical Co. was excited about an after-effect he'd noticed in the clouds. Some of them even far from the blast showed that they were polarized when you looked at them with Polaroid lens. Zeeman effect, I think he called it. Anyway it was quite noticeable and a little startling to see a section of a cloud that looked as white as the others suddenly turn pink or light orange when seen with the Polaroids. If that is at all characteristic it would make it comparatively easy to trace a radioactive cloud from an A-Bomb explosion. The big question now is "How soon will we get into the lagoon and have a chance to examine the damage?"

To be honest with myself I think I feel a bit disappointed and let down. The show was not as spectacular or dramatic as we had been led to expect. We were unnecessarily far away and it was impossible to see the target array even with good Navy glasses. We were poorly advised as to the exact direction and several of our best observers were on the wrong side of the ship to operate scanning instruments they had set up. The damage was less than a few well-placed aerial bombs would do, that is, as far as we can see now but we must remember that we are still outside of the lagoon.

Now let's see what there is on the plus side. The whole show went off without a serious hitch. The drop was on schedule to the minute. We were far enough away so that there was no serious hazard to the health or life and yet close enough to see the principal fireworks and the beautiful

aftermath in the clouds. Undoubtedly when we get into the lagoon we will find that the damage is more measurable than would have been the case if the chief target vessels had all been sunk or Bikini stripped of its observation towers, palm trees, and, of course, the Officers' Club and bathing beach.

So we'll stop for now.

2 July 1946 8:00 a.m.

The time for second guesses will soon be here and we'd better make them good this time. We are now in the lagoon, having entered yesterday afternoon about 3:30, and along with the Appalachian and the Blue Ridge, we are at anchor near the Mt. McKinley. As we came to position we had a good chance to observe the damage with our glasses for the Nevada was only about three miles away. The more we looked the more impressed we were.

Small boats began to move about in the lagoon pretty early in the day. Our schedule announced at breakfast, was for a meeting of the observers at 900 with stenographer present to take down 45 seconds of observation from each of us. That's cutting it down to the essence, isn't it? Then we hope to get a boat ride around the target ships this morning and definite arrangements have been made for us to go aboard several vessels this afternoon.

3 July 1946 8:00 a.m.

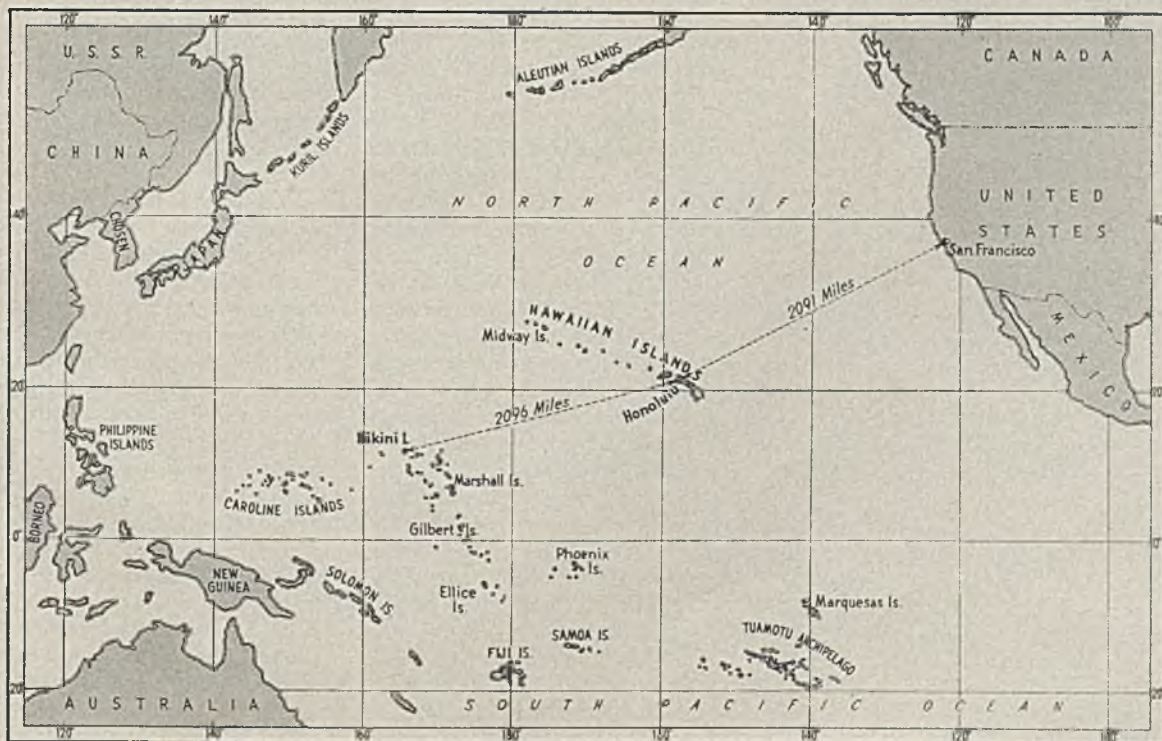
Too much happened around here yesterday. First there was that bull session in which the observers compared their observations. Then excitement alongside as the

Sakawa sank and they towed the submarine Skate over to its watergrave. Then a 3-hr. tour of the target array in a small boat, followed by a 3-hr. visit here with Donald Fink of Electronics and the USS Avery Island. Movie and to bed tired but ready to rest for a more strenuous day today.

Pretty hard to summarize the "second guesses" of the observers. It was most evident that not everybody saw the same thing in the same way. Greatest divergence of opinion developed on whether or not the flame ball was a sphere or a hemisphere, whether it was the same size or several times larger than the sun when viewed at the same time. Only a very few felt any heat wave, a few more reported shock. Much argument too about color, but the majority held that nothing deeper than pastels developed in the cloud—peachy pinks predominating.

One of the very best reports was that of Gene Starr who was in the crow's nest and could actually see the target with his glasses. He reported first a spark that quickly developed to a ball of flame that became ellipsoidal as it grew to a size somewhat larger than the apparent size of the sun. Some claim that it was surrounded by a dark rim or crust. Then a cloud came over the ball and the billowy mushroom was on its way. Some observers preferred to refer to it as a cauliflower which is OK with me.

These further facts developed in our conference and were later checked with Don Fink. The drop was from a level of about 33,000 ft. The time of free fall of the bomb was actually 47 sec. and not the 18.5 broadcast or the 32 that several of our



people counted after "bomb away" was called. Our position at the time of the drop was 18.5 nautical miles from the Nevada which I estimate was at least a mile from the center of the flame ball.

So much for the B-session. Now for the first inspection trip. Right after lunch we loaded up four boats. I went in the captain's gig—lead boat under Capt. Ring. We came into the target array from the Bikini Island side, passing first a couple of LST's that were apparently undamaged. The APA Brule looked untouched. There were pressure gages and test panels on her exposed side that appeared in original condition. Next we came to the Pensacola where it was apparent that there had been real trouble aboard. Both stacks had been blown off and the mast had a crazy twist to it—bending in the direction away from the Salt Lake City which was some distance away but had a mast bending in the opposite direction.

Next we saw the Sims-class destroyer Hughes. She had apparently been shielded somewhat by the Nevada. Her mast was bent slightly away from the blast center. The disks on the pressure gages on the opposite side were bellied out—indicating suction from the blast rather than pressure. The old Nevada had her tail bent pretty badly and her side was blistered in spots but on the whole she was much less badly damaged than a dozen other vessels.

Next we saw the old Nagato. We were terribly disappointed because she hadn't been sunk or at least badly damaged. Instead she stood there still in all her black and filthy port ugliness—little more battle scarred than before. As we passed her within 20 yd. I could see some of her wooden deck burning slowly in a smouldering way. The APA Banner was bent up a bit and her paint blistered on the bomb side. But the New York seemed all right except for minor damage on deck.

The saddest sight of all was the Independence—the fine aircraft carrier which we went over completely in our visit last week. We estimate that she was about a mile or a little less from the Nevada. But now she is a complete wreck and will have to be beached or otherwise destroyed. Whether or not most of the damage came from secondary fires is something that we argued about. Surely the fires that broke out on her deck and spread to her hangars were a contributing cause. Her decks are stripped of everything except strangely enough one army gasoline truck that we had thought might have been the start of the fire.

Destroyer Mustin was fairly near and even her paint was OK. Saw some live goats on board. A concrete barge we first thought an oil tanker was pretty well smashed up. It's apparent that the reinforced concrete does not resist a blast as effectively as steel. The latter will bend and become distorted but the concrete shatters. The old Salt Lake City is going to need a face lift-

ing. Her stacks are gone and her masts askew. On the side near the bomb she was fried to a crisp and everything on her was burned. She was at least two miles from the Nevada.

We seem to agree that the center of the drop must have been between the Nevada and the Prinz Eugen on one axis and between the Pensacola and the Sakawa on the other. As a matter of fact it might have been right over the Sakawa. When we first came into the lagoon we saw that she had been completely stripped of all superstructure and was badly listing. While we were in our B-session yesterday morning someone reported she was sinking. Those who rushed to the deck saw quite a sight I guess. She did a real movie nose dive before she finally disappeared. A few minutes later though the sub Skate was towed across our stern and I got a chance to see how badly she had been mauled. The boys felt she was being taken away to be beached.

4 July 1946 8:10 a.m.

Yesterday we had another session of second guesses—this time to get our recorded impressions of the extent of the bomb's damage. Views expressed checked pretty well with those I mentioned yesterday. Within the area of about one-half mile there was complete destruction, within a mile very serious damage due to both blast pressure and intense heat, between one and two miles heavy structural damage, between two and three miles, slight damage of any kind and beyond three miles little or none.

Directly after lunch we went inspecting aboard several target vessels. The first was the Prinz Eugen which was a little scorched on the blast side but otherwise undamaged. Next we went aboard the Pensacola—the US heavy cruiser built in 1929. It was much nearer the center of the blast and as I reported yesterday her two stacks were laid over, masts twisted, etc. The Pensacola must have had her starboard side exposed directly to the burst—rather than just her stern as the chart might indicate. Some one estimated that a pressure of a maximum of 5 lb. per sq.in. would have accounted for all the damage done to the stacks, masts and the steel deck. That of course is no mean pressure when you consider that most structures are designed for maximum wind pressures of only 40 to 60 lb. per sq.ft.

Next we went to the Saratoga. There was little or no evidence of any structural damage but there had been some hot little fires on her great deck. One of the first things we saw was an aluminum stove that had been melted by the heat and surrounded by lava like streams where the molten metal had flowed along the deck. Nearby were piles of charred fabrics that were little more than ashes. Rubber tires on a nearby vehicle showed evidence of having actually melted in spots on treads and sidewalls. The pressure gages—thin metal diaphragms over various

size openings—were all broken on the sides exposed to the burst but occasionally those on the opposite sides were OK. All of this damage on the Saratoga was surprising principally because the ship was at the outer fringe of the target array, between two and three miles from the burst.

Then we went to the beach and believe me we were ready for a swim. It's a hot dirty job climbing over these ships. Prof. Chalmer G. Kirkbride of Texas A. & M. wanted to bet that we wouldn't be allowed in the water because it would be badly polluted—if not by radioactivity then by oil and junk from the five target ships that are now in the bottom of the lagoon. He was wrong I'm glad to say. Bikini Island looked just exactly the same as when we left it. The water was crystal clear, the palm trees just as beautiful and the tents where we donned our swimming trunks were undisturbed. So—and this is most important—was the Officers Club. Met Murphy from Hooker Electrochemical who came as Lindley Murray's representative. Also saw Ted Hochwalt, Laughlin Currier, Al Baker, Benedict of Kellogg. They tell me that Bradley Dewey has decided to fly to Australia between tests in order to give some lectures to the chemical societies there.

5 July 1946 7:45 a.m.

You've got to get up before breakfast to get anything accomplished these days. Yesterday morning we first inspected the Brule, an APA transport vessel. We saw some excellent shadows which gave us a chance to confirm the general motion that the burst came over the Sakawa. There was a lot of freak damage, like the boom being picked up and swung in an orbit around the deck, doors left open had swung shut with such force as to imbed themselves in their frames. The main deck was just pushed down three or four inches without more serious trouble than busting a few water lines and closing down on some of the upper berths.

Next we went to the Nevada—the orange-red target center. We had to tie up along side an old rope ladder and shinny up the side to a ledge of the heavy armor plate—then walk along that a few feet to an iron ladder to get over the next ledge to the deck. The Nevada is the heaviest construction of any ship I've ever been on. No wonder she didn't sink. The principal damage was done on deck, to the target material that had been placed there and to some of the superstructure. Most serious damage was on her stern, the blast coming at an angle of maybe 20 deg. from her axis. Planes were badly twisted and generally busted up. There had been a number of fires which had burned up the QM exhibits just as they had on the Independence and Saratoga.

Then to the Island by about 2:30. The club didn't open until 3:30 so Kirkbride.

(Continued on page 125)

CHEMICAL ENGINEERING

in the Middle West



The Fourth National Chemical Exposition in Chicago again focuses attention on chemical engineering progress in the Midwest. Having contributed mightily to wartime production, process industries are losing no time in overcoming postwar bottlenecks and in taking advantage of wartime developments. Technological and economic improvements highlight this industrial progress.



HEAVY CHEMICALS



Francis J. Curtis, Vice President, Monsanto Chemical Co., St. Louis, Mo.

MUCH of the growth of the heavy chemicals industry in the Midwest over the past three years is a direct result of wartime expansion. Since the end of the war new construction has been limited to a few sulphuric acid plant additions and the conversion of at least one government ordnance plant to the manufacture of fertilizer.

This absence of expansion is a temporary condition only, probably brought about by the necessity of other construction activities which were neglected during the war. The present shortages of the basic chemicals, particularly alkalis, indicate increased expansion as soon as building materials become more readily available.

Large expansions for the production of methanol by Du Pont and Carbide and Carbon were completed in West Virginia

during the war. One plant for manufacturing anhydrous ammonia was constructed at Morgantown, a government installation operated by Du Pont.

Sun Oil Co. has constructed a carbon black plant at Toledo, Ohio. A carbide furnace with a capacity of 88,000 tons per yr. was built by Electro Metallurgical Co. at Bula. Facilities were increased at Hamilton, Ohio, by American Cyanamid Chemical Co. whereby 4,500 tons per quarter of dry and liquid alum can be produced. Recently, a contract was awarded for the construction of 177 byproduct coke ovens at Lorain, Ohio, for National Tube Co.

Construction activity at Midland by Dow during the war provided additional capacity for the production of chlorine and aqueous and anhydrous ammonia. At Marquette, expansion projects were followed for methanol and acetic acid. General Chemical enlarged its sulphuric acid plant at Detroit to a monthly capacity of 9,100 tons. Monsanto expanded the manufacture of industrial phosphates at Trenton.

Du Pont's phosphoric acid plant at East Chicago was expanded to 5,000 tons per yr. Since the war, Stauffer has built a sulphuric acid plant at Hammond, Ind.

Two sulphuric acid plants were enlarged at East St. Louis, Ill. Existing caustic soda, sulphuric acid and phosphorus facilities were also expanded here. Another sulphuric acid plant was built at Joliet, Ill. The government's synthetic ammonia plant at Baxter Springs, Kan., has been acquired by the wartime operators on lease. The plant is expected to be used to produce ammonium

nitrate fertilizer. At West Henderson, Ky., the government constructed a large ammonia plant during the war which was operated by Solvay.

PAINTS AND VARNISH



N. E. Van Stone, Vice President and Director of Operations, Sherwin Williams Co., Cleveland, Ohio.

NEW TECHNIQUES for both quality and economy have come out of the wartime struggles of the midwestern producers of protective coatings. Continual replacement of one scarce material after another has brought developments lasting in value beyond the war years.

Real economy in the use of coatings by industrial fabricators has been achieved in several ways. Application of lacquers has been made more economical by using heat to reduce viscosity to spraying consistency.

thereby using less of the expensive ester-type solvents. Specially heated containers deliver lacquers high in non-volatile content to a spray gun for application to any surface.

Economy in the spraying of enamels on metal has been effected by applying a high electrostatic field between spray gun and object, thereby causing practically all of the enamel spray to fall on all sides, even the back, of the metal in a uniform coat without having to turn the object being sprayed. This innovation practically eliminates the accumulation of spray dust which the user of the enamel has had to discard or reclaim.

Similar economy is attained on metal objects dipped in enamel by subsequently passing the dipped objects through a high electrostatic field, which thereby expels "tears" of paint from where it tends to collect in any lower extremity prior to baking.

Emulsion paints for interior wall finishes experienced a tremendous expansion in production. These paints, being thinnable by water and giving a flat sheen upon drying, have had a wide appeal to the user since he could obtain a maximum of decorative effect with a short drying time and with a minimum of skill required. The complex nature of the formulation to guarantee emulsifiability with water represents a real achievement in colloidal chemistry, especially with the continually changing shortages in raw materials available for these emulsion paints.

A considerable improvement in quality and quantity of hydrocarbon resins produced from petroleum diolefins served to alleviate the wartime shortages of rosin esters and other coatings resins. These resins promise to be of permanent value, particularly since the diolefin raw material is likely to be even more available with the rapidly expanding chemical transformations of crude petroleum by the petroleum industry.

Exceptional high-heat resistance is an outstanding feature of silicone coatings which have been recently announced. These mark the first practical introduction of inorganic polymeric materials in the coatings industry; and although, expensive at present in contrast to the more traditional materials, they are likely to find an ever-increasing use in coatings for vigorous service conditions.

A superior drying oil, obtained by furfural extraction of linseed oil, became commercially important in alleviating the shortage of tung and oiticica oils. The difference in solubility of highly unsaturated triglycerides and the slower drying, more nearly saturated triglycerides, makes this separation possible.

2-Ethyl-hexoic acid, a new vehicle for the usual drying oil metallic catalysts, cobalt, manganese and lead, went into commercial production and marked an advance over the older linseed rosin and naphthalene vehicles. Greater drying efficiency and less odor are the principal advantages of this new vehicle.

PETROLEUM



Bruce K. Brown, Vice President in Charge of Development, Standard Oil Co. (Ind.), Chicago, Ill.

Most spectacular improvements in the petroleum field have been those made in cracking and in synthesis. Production of 100-octane gasoline during the war was the largest single task in organic chemical synthesis which has yet been undertaken. Alkylation of light olefins with isobutane, using sulphuric acid or hydrofluoric acid as catalyst, produced more than 18,000,000,000 lbs. per year of isooctanes—and alkylate was only 30% of the aviation gasoline. Polymerization of olefins, followed by hydrogenation, also produced isooctane. Thousands of barrels per day of normal butane, pentane, and hexane were converted to isocompounds. Isopentane was also obtained from recycling plants which increased the production of natural gasoline.

Catalytic cracking, of the fluid and other types, was developed rapidly on a tremendous scale using data obtained from only a handful of pilot plants.

Other war contributions of petroleum research were toluene, heavy duty oils, cheaper butadiene for synthetic rubber, jellied gasoline for incendiaries, microcrystalline waxes for packaging, and greases which were unaffected by extremes of heat and cold.

Since the end of the war, much of the work has consisted of consolidating wartime gains through additional research. Further study of catalysts and operating conditions has brought about economies which permit more of the war plants to be used than had been expected. Toluene and other aromatics produced by hydroforming are being used for motor gasoline and for improved solvents. Alkylation is helping to compensate for the present nationwide shortage of tetraethyl lead. Though the ingenuity of chemical engineers, catalytic cracking units can now be constructed in sizes which permit small as well as large refiners to make use of this technological advance. Heavy duty motor oils with detergent, non-corrosive, and non-oxidizing properties are now on the market.

New products not connected with the war are also beginning to appear, particularly chemicals synthesized from the more completely separated petroleum fractions now available. Petroleum base insecticides are making increasingly efficient use of the properties of DDT.

Most significant postwar advance, however, has been the perfecting to economic feasibility of methods for making liquid fuels from natural gas. Two 6,000 bbl.-per-day plants are now planned for the Southwest, and will go into production within the next two or three years. This synthesis of hydrocarbon fuels will be accompanied by significant quantities of oxygenated products such as alcohols and aldehydes as well as gasoline and distillate fuels.

SOLVENTS



Charles D. Goodale, Manager, Technical Service Div., Commercial Solvents Corp., Terre Haute, Ind.

PROBABLY the most interesting development in the solvents field during the past year or two has been in connection with the formulation of protective coatings based on the newer types of film-forming materials. Under the stimulus of wartime needs these new coatings were studied intensively and their special properties utilized to solve unusual coating problems. Also ways were found of modifying the conventional methods of formulating and applying standard coatings—and to a degree which made them essentially new materials.

Among the coatings which have attracted special attention are those based on nylon, polyethylene and vinylidene resins, and new applications have been found for such materials as cellulose acetate, acetate-butyrate and triacetate, ethyl cellulose, the vinyls and various synthetic rubbers. These coating materials all involve special solvent problems which the industry is being called upon to answer. Even special methods of application—such as electrostatic spraying and the hot spraying of lacquer—contribute to the complexity of the formulator's problems and expand his demands for solvents and plasticizers, tailor-made for particular jobs.



With reconversion problems at a minimum, the solvents industry has nevertheless faced a practically insurmountable problem in supplying the volume and variety of solvents demanded. Shortages of molasses, coal and other raw materials, equipment strained to the breaking point by years of high-pressure war production, and work stoppages all have aggravated the problem. Under these abnormal conditions the solvents and the protective coatings industries have had to exercise all of their ingenuity to supply even the essential requirements of their customers. It is not surprising that during this period many substitutions have had to be made by solvent users when the preferred materials were not available in adequate volume. As more normal conditions return—and it is certainly hoped that they don't become less normal—the day of substitutions will be over. When that day arrives each solvent—including the newer ones—will find its own niche, judged solely on a cost efficiency basis.

RUBBER



Howard E. Fritz, Vice President, B. F. Goodrich Co., Akron, Ohio.

OUTSTANDING in the Midwest's contributions to the rubber industry during the last several years, as in fact, for many years previously, has been that made by the research staffs of some of the great companies in the industry located in that area. Among the cities with such concentrations of the technical talent are Akron, Ohio, and Detroit, Mich. Prior to the war, some of these organizations had been engaged in research in varying degrees on synthetic rubber so that when the emergency came, the industry possessed a solid background of information and experience which was rapidly turned into practical accomplishments in the building of the synthetic rubber facilities, in the production of the material in its raw material form, as well as its utilization in the rubber factories.

Thus it was, that when the government embarked on its program of providing enough synthetic rubber capacity to meet the needs of the nation and its allies in

prosecuting the war, these research groups formed the backbone of this effort. They took the synthetic rubber as originally made, and continued to improve it so that it would be more nearly equal to the natural product and, in addition, re-engineered various articles to make them superior in many cases to prewar products. This was particularly true in the case of the tires where the present product is, in some instances, superior in performance to the prewar casing because of the technical research poured into it.

In addition to these technical accomplishments, the rubber plants in the Midwest contributed a large proportion of the flood of products needed for the war effort. This was natural, because even with the scattering of production facilities throughout other areas in the country during the last several decades, a large proportion of rubber plants are still located in the Midwest.

One other important development in the midwestern rubber industry during the last few years has been the rapid expansion into the chemical and plastic fields. This is especially true with vinyl plastics where rubber machinery can be utilized with little or no change to process articles which outperform the previous natural rubber counterparts. This resulted in a net saving in the consumption of natural rubber. At the same time plastic products gave good account of themselves and rendered greater service than many of the old products had ever done before.

ALKALIS



E. M. Ford, President, Wyandotte Chemicals Corp., Wyandotte, Mich.

DURING the war, security requirements dictated that many of the nation's new plant facilities be placed in the Mid-West. This development accentuated a westward trend of many years. As a result there has been a rapid increase in production capacity for glass, chemicals, rayon, cellophane, soap and other chemical-consuming industries in the area from Cleveland to Omaha and Detroit to St. Louis. Expansion is continuing even though the war is over. Consequently,

new facilities for basic chemicals are needed and Wyandotte Chemicals Corp. is participating in this program with a \$25,000,000 outlay for additions to plants at Wyandotte, Mich.

This program of expansion and diversification makes possible an increase in the corporation's sales by more than 30 percent by 1948. Included is increased capacity for almost all of the company's alkali products. Soda ash production will be stepped up by 15 percent. This additional output will be manufactured by the ammonia soda process already used but will include many process improvements. Chlorine capacity will also be increased. Improvements in the present method of producing caustic soda with special emphasis on the high quality requirements of the rayon industry are also a part of the expansion program.

Capacity for Wyandotte precipitated calcium carbonate will be more than doubled. Today this product is being used in coating of paper, reinforcing of rubber goods, baking powder manufacture, formulation of paints, printing inks, toothpaste, penicillin tablets and other consumer products. Through this development calcium carbonate has advanced from just "whiting" to the status of a fine chemical.

Diversification is a feature of the program in that Wyandotte will enter the organic chemicals field on a large commercial scale after producing inorganic chemicals and cleaning materials for over fifty years. Technical research indicated that the best field for diversification lay in the manufacture of organic chemicals, a large and rapidly growing industry. In 1944, it was decided that the company would enter the field of glycols and related compounds. It is anticipated that the new plant will be in production by the spring of 1947.

Principal product of the glycol unit will be a substantially pure grade mixture of ethylene and propylene glycols. This material is suitable for many of the uses in which ethylene glycol alone has heretofore been used and in addition has some industrial applications of its own. The uses referred to include automotive anti-freeze, dynamite, synthetic resins, cellophane and others.

Other products of glycol unit will include chloroethers, polyglycols, ethylene and propylene dichlorides and solvent naphthas. The plant will utilize a process not now in commercial operation. Principal raw materials will be petroleum, chlorine and lime, the two last mentioned already being produced by Wyandotte.

Another organic chemicals plant included in the program is a large scale commercial unit to be completed in the fall of 1947 for production of a synthetic detergent of the alkyl aryl sulphonate type. Long a supplier of caustic soda and soda ash to the soap industry, Wyandotte will market synthetic

detergent as a companion product, enabling soap producers to improve their servicing of consumers in hard water areas.

RAYON



Hayden B. Kline, Vice President, Industrial Rayon Corp., Cleveland, Ohio.

USE of rayon for tire cord was barely emerging from the trial stage by bus and truck fleet operators when the war started. Sparked by the impact of the war, this industry stepped up its experimental developments, shook loose from the field of fashionable fabrics and met the challenge posed by the loss of many of our supply sources of crude rubber.

Reports by pioneer users of rayon cord tires, later confirmed by the results of rigid tests conducted by the Army, established two important facts, rayon cord tires lasted longer and they required less rubber. This new, public concept and evaluation of rayon as a fiber which could meet the demands of war as well as please the eye for fashions was followed by a display of rayon's versatility which even today has not reached its limit.

The wartime role of rayon reached out beyond tire cord. It included parachutes and shroud lines, insulation for the vast communications network of the Signal Corps and the wiring systems of destroyers, bombers and searchlight controls for anti-aircraft guns, linings for self-sealing gas tanks, uniforms, and cushion straps in helmets.

Here, in the Midwest, at Industrial's plants in Cleveland and Painesville, Ohio, the continuous process method of spinning viscose rayon, which performs the processes of spinning, washing, desulphurizing, bleaching, drying and twisting in one, continuous sequence of operations, had brought new standards of uniformity and strength to the manufacture of rayon. Tire yarn was coming off the continuous process machines in knotless lengths of more than 10 miles.

Two other major developments added new chapters to the manufacture of rayon tire cord. One was a complete break from

the conventional method of "down-twisting" yarn into tire cord and the introduction in its place of "up-twisting" machines. Nine-pound packages of continuous length cord were now possible as compared to packages of 0.6 to 1 lb. made by the conventional method. This technique enables a higher rate of production and, more important, secures greater strength for the tire cord by sharply reducing the abrasion normally encountered in twisting.

The second development was the application of electronic heat, by a process known as "Lektroset," to finished tire cord. Through the utilization of electronics, the twist in the tire cord is set and kinking and curling is prevented. The high degree of twist-stabilization thus obtained permits creel to calendar operation with rayon in tire manufacture and over-end warping on transfer creels at higher rates of speed.

PHOSPHATES

J. M. Gillet, Director, Commercial Research, Victor Chemical Works, Chicago, Ill.

THE PHOSPHORUS and phosphate industry in the midwestern area was fully occupied until a year ago with supplying the armed forces with munitions, foods, and sanitary supplies while at the same time supplying enough production to support the most urgent needs of the civilian economy. Thus no major developments in new products or uses were possible and plant expansions were limited to those absolutely essential to the war effort. Plants were run at maximum capacity month after month with no time out for more than emergency repairs, and as a result, the end of hostilities found the production facilities badly in need of rehabilitation.

In the meantime diversion of supplies from civilian to war purpose had piled up a large backlog of unfilled requirements. The industry was forced to choose between continued deterioration of manufacturing facilities or repairing its plants with consequent postponement of supplying the civilian demand. The choice was a compromise. Modernization and repairs have been slow because of shortages of labor and equipment but plants are gradually increasing in operating efficiency. A large surplus of army phosphorus compensated in part for curtailed phosphorus production and this surplus has been largely moved into useful civilian channels.

Shortages of alkalis, lime and coal aggravated by strikes, have however, still further postponed satisfaction of the demand. A new phosphorus plant is under construction in Florida and this constitutes the major item in the current expansion pro-

gram in the industry. Many new phosphorus compounds, mostly organic, have been announced by the various research laboratories including surface active compounds of anionic, cationic and non-ionic types, new plasticizers, oil additions, resins, etc. but few have reached large scale production. Facilities for making some of these new products will probably be in line for construction when the current rehabilitation program has restored efficiency to the established branches of the industry.

LEATHER

Fred O'Flaherty, Director Department of Leather Research, Institute of Scientific Research, Cincinnati, Ohio.

DURING the war years, research in sciences concerned with leather and its manufacture has received great stimulus. Some of the results are quite revolutionary and, in an industry based upon empirical development, this is very unusual. New synthetic tanning agents have been developed to augment and in some instances to replace older tanning materials. Examples of this are the zirconium tanning agents which produce more perfect white leathers. Synthetic materials are available from Rohm & Haas and Monsanto. In general, many substitutes have been used due to a critical shortage of previously used materials. It is surprising that in many instances the newly developed substitutes have proved superior and will continue to be used.

Developments in the field of plastics have had an influence on the leather industry. In some few instances such materials coated on fabrics have been used to replace leather, but a more important development is their use in connection with and as a part of leather. Plastic finishes are now being used regularly and improved materials are adding to the inherent quality of the leather.

Another interesting advance is the use of infrared installations in the drying of finishes on leather. Hoffman-Stafford Tanning Co. of Chicago has developed such installations which not only gives better leather but permits it to be made faster than ever before.

These developments are only the beginning of a progressive trend in the advance of leather technology. Leather is rated the seventh most important material used by the military, and the War Department is thus underwriting an extensive program of fundamental research in the sciences concerned with leather. This will result in even better leathers and especially better military leathers. A typical example is the new flashout army chrome retanner shoe upper leather.



EDMOND C. FETTER *Assistant Editor, Chemical Engineering*

Midwest Research Institute Catalyzes New INDUSTRY IN MID-AMERICA

When an individual, a community, or an entire region faces economic reverses, it can follow either of two courses. It can let itself run down without a struggle, or it can fight back. Mid-America, the region between the Mississippi and the Rockies, has chosen to fight back and the Midwest Research Institute is its strong right arm. Their banner: A balanced economy through industrialization.—Editors

MIDWEST RESEARCH INSTITUTE occupies a unique position in the industrial aspirations of Mid-America,* and there is good reason to believe that in two or three generations there will be as much industry in that area as there now is in the East. This region, ordinarily thought of as a larder, is ripe for an industrial flare-up, and Midwest Research Institute is doing its best to strike the sparks that will touch off the blaze. To understand just how ripe Mid-America is for industry, and how MRI figures in the picture, it is only necessary to look at the region's present state of economic affairs. Briefly, it goes like this:

1. First, and fundamental to the whole problem, is the fact that great strides have been taken in agricultural technique. Farm machines are taking the place of farm labor.

2. As a result, population and the general level of business activity are going downhill.

3. This downward trend is a matter of great concern to every business man in the area; they are awake to their plight and want to do something about it.

4. They see industrialization as the answer. They see their region in possession of all the prerequisites of industry—raw materials, fuel, transportation, and pools of capital and labor—all ready and waiting, and they realize that they themselves, the merchants, hotel keepers, public utility operators, real estate men, and just plain citizens, must make the first move to get the ball rolling.

5. For a long time this restless urge to "do something" resulted in no more than

local outbursts of nervous energy—clubs were formed, meetings held, speeches made, articles written, and campaigns conducted by chambers of commerce. None of this was very effective. It was more a symptom of the problem than a cure. What it lacked was coordination, staying power, and most of all, an organization that could provide a would-be entrepreneur with a concrete technical evaluation of his proposition.

6. These needs were supplied in 1943 when a group of public-spirited business and professional people in Kansas City, Mo., put up \$500,000 to found the Midwest Research Institute. They bought buildings,† filled them with the best men and equipment they could get, and handed over the job of transforming resources into smokestacks. With rare good fortune they got as working administrators men with the ambition, the energy, and the talent to grab the ball and run with it. Like no one before them the executives of MRI are attacking the need for industrialization as a regional problem and they are conducting an all-out campaign of press, radio, and word of mouth to sell the entire region on the benefits that science and industry can bring—and incidentally, selling the proposition that the most effective way to help the cause along is through cooperation with the Institute. Which is all to the good, because it gives the urge to "do something" a focal point. MRI, therefore, has all the prospects of providing real, if undeclared, headquarters for coordinating the movement to launch new industries based on regional resources.

In outline that is the whole story; it remains only to fill in some of the substantiating data† and to show in some detail how the Institute operates.

SAD STATISTICS

As to the impact of technology on agricultural efficiency, we have the estimate of the Department of Agriculture that farmer productivity has increased 2.1 percent per year since 1900. Or in other words, the number of men required to produce the same crop on the same ground has been cut about in half. And that is probably a conservative estimate.

Conservative or not, it is a demonstrable fact that the section is suffering adverse trends in population. First, it has failed to keep pace with the rest of the country in growth of population; in 1900 it had about 13 percent of our total population, but only 10 percent in 1945. Furthermore, people are actually moving out of the area; Bureau of Census figures on civilian migration show a net outflow of almost 1½ million persons between 1940 and 1945. It is thus evident that on a predominantly agricultural basis, the area is not able to offer its population a standard of living as attractive as other sections of the country. Actually, it can offer 10 percent of the country's population only 8 percent of the national income, enough to buy only 8.6 percent of all retail goods offered for sale in the U. S.

It is not hard to understand why the business leaders of the region blame this state of affairs on under-industrialization. They observe first that they really are light on industry, for with 10 percent of the population they account for only 5.8 percent of the country's manufacturing. They observe secondly that from 40 to 50 percent of the for-sale value of manufactured products consists of value added by manufacturing, and

† The statistics given here apply only to the six states, Nebraska, Kansas, Oklahoma, Iowa, Missouri and Arkansas, for which data are available. However, there is every reason to believe that complete data, if they were available on the rest of the region, would show the same pattern of industrial and economic want in the midst of plenty.

* By Mid-America is meant the tier of states between the Mississippi and the Rockies, from Canada to Mexico and the Gulf.

† At 4049 Penna. Ave., Kansas City 2, Mo.

Mid-America's Natural Resources†

Petroleum Reserves	2,000,000,000 bbl.
Natural Gas Reserves	1,000,000,000,000 cu. ft.
Coal Reserves	200,000,000,000 tons
Commercial Forest Reserves	43,000,000 acres
Leading Mineral Reserves:	Percent U. S. Total
Aluminum (bauxite)	95
Zinc	50
Lead	36
Bituminous coal	14
Semi-bituminous coal	17
Major Crops:	
Wheat	32
Corn	32
Oats	32
Grain sorghums	30
Soybeans	27
Cotton	20
Barley	17
Leading Animal Production:	
Horses	27
Hogs	35
Cattle and calves	25
Sheep and lambs	29
Mules	19
Major Mineral Production:	
Bauxite	98
Lead	55
Zinc	38
Fire clay	26
Petroleum	19
Natural gasoline	24
Natural gas	14
Forest Reserves:	
Hardwood	11

that most of this wealth remains in the area where the manufacturing is performed. And they conclude that Mid-America is paying dearly for neglecting its opportunity to process its own raw materials.

INDUSTRIAL POTENTIAL

That the region has the raw materials to support industry and manufacturing is demonstrated in the accompanying table, where the region's major natural resources are itemized as percent of U. S. total. They make an impressive array.

There are other assets in addition to fuel and raw materials. Air, rail and highway transportation are all favored by the comparatively level terrain and all are growing; there is also to be considered the increasing

Twenty-One of the Forty-Eight Research Projects Established at M.R.I.

Industrial Projects	
Granulation of NH ₃ NO ₃ Fertilizer	
Grain Sorghum Starch, Protein, and Oil Products from Glass	
Secondary Aluminum	
Control of Agricultural Fungi	
Reconversion Problems in Chemicals	
Non-Fuel Uses of Kansas Natural Gas	
Survey of Resources, Missouri Valley	
Chemicals by Fermentation of Grain	
Cleaning Agents	
Magnetic Sound Recorders	
Microbiological Culture Methods	
Rates of Chemical Reactions in	
Natural Gas Purification	
Regional Projects	
Industrial Uses for Agricultural Fibers	
Ceramic and Refractory Clay	
Utilization of Forest and Mill Wastes	
Chemical Treatment for Wood	
Surface Hardening Treatment for Soil	
Non-Fuel Uses for Petroleum, Nat. Gas	
Beneficiation of Marginal Ores	
Survey of Oklahoma and Arkansas Coal	
Regional Resources Map for	
Neb., Kan., Okla., Iowa, Mo. and Ark.	

attention being given to the development of the Missouri-Mississippi waterway for internal and deep-water shipping.

The area's industrial labor supply has expanded from roughly 500,000 industrial employees in 1940 to almost 1,000,000 in 1945, with wartime industries taking credit for the growth. Now that industry is retreating to prewar levels, some 400,000 of these industrial workers are "at liberty." As to the availability of capital, a quantity that is not readily measured, we must rely on the assurance of business leaders that it is there, and that investors are anxious to put money into new enterprises within the area. Though the section is hampered by the absence of an organized money market, projects requiring sums as large as \$2- to \$4-million have occasionally been financed locally, although it is customary to raise such large blocks of capital through the financial houses of Chicago or New York. However, even then the securities usually find their best market back in Mid-America.

RESEARCH FOR A REGION

That, then, was the environment into which the Midwest Research Institute was born. It had its inception at a two-day meeting held in June 1943 which was attended by representatives of business, industry, the professions, agriculture, and the colleges and universities of the area. The outcome was the incorporation of the Midwest Research Institute in December as a non-profit scientific Institute. The first project was initiated in August 1944, and by January 1945 it was a going concern, formally organized and with staffing and equipping underway.

Research activities of the Institute are divided into two categories, industrial and regional. As an industrial research institute it operates like Mellon Institute, Armour Research Foundation, and Battelle Memorial Institute; projects are financed by the sponsoring organization. As a regional research institute it undertakes investigations chosen by a "technical advisory committee" as being beneficial to the industrial development of the section as a whole; regional projects are financed by contributions and donations. Since the beginning of operations in January 1945 the Institute has undertaken 36 industrial and 12 regional projects, some of which are listed in the adjoining table. The thing to notice is the diversity of the investigations that the Institute has been able to undertake. In accepting projects from individual companies, priority is given to those which have a direct bearing on the economics of the area. Results of regional projects are published and widely circulated, but industrial projects are held confidential unless the sponsor gives specific authorization to reveal findings of the investigation.

So successful was the Institute during its first year that the trustees have decided to conduct a \$2-million fund raising campaign, \$1-million for new buildings and equipment and \$1-million to finance regional research. About \$20,000 has already been subscribed. A total in the neighborhood of \$500,000 has been appropriated to the Institute by sponsors in the form of industrial research contracts, and after only 16 months the industrial research operations have attained a self sustaining basis.

TOWARD A SOLID FRONT

It was recognized from the beginning that the effectiveness of the Institute would increase as more of the business and industrial leaders in the area became aware of its purpose and its work. Consequently a great many contacts have been made with these groups, and members of the staff have fulfilled well over 100 speaking engagements. One of the Institute's greatest assets is its president-director, Harold Vagtborg, who for the seven years prior to his move to MRI was director of the Armour Foundation in Chicago. It is largely through his enthusiasm for the job at hand that the Institute has been able to take hold so quickly as spearhead in the drive to unite the area in back of a common effort toward full development of the region's industrial potential.

Many of the educational institutions in the area have been visited and consultations held with the faculties to better acquaint them with the objectives of the Institute and the areas of possible collaboration. Industrialization of Mid-America will require every research facility available, and general acceptance of the Institute will enable it to become the most logical coordinator of research because of its multi-state concept. Although MRI is not formally affiliated with any educational body, it has placed research projects on behalf of industrial sponsors at the Kansas State College, University of Nebraska, Oklahoma A&M, and Texas A&M.

The Institute has been contemplating and expects soon to begin a cooperative educational program with the universities, whereby staff members will teach occasional special graduate courses. It is felt that such a program will prove beneficial, both in the stimulation provided staff members and the high quality of instruction made available to the universities.

One of the greatest single developments in recent years in the interests of the industrialization of Mid-America was the recent founding in Kansas City of the Linda Hall Library of the Sciences and Technology. The library has a \$6½-million trust fund to work with and will undoubtedly become



one of the nation's strongest in the fields of science and technology. It is hoped that within two or three years it will be able to approach its goal of 100,000 titles and 1,500 periodicals. A very close liaison has been established between the Institute and the Library.

The Institute has contributed to the organizing of the Technical Societies Council of the Kansas City Area and is rendering it secretarial service and handling the publication of its monthly bulletin. Further, MRI is actively encouraging the formation of a Midwest Research Council, a body that would be to the area what the National Research Council is to the nation, and whose functions would be (1) to coordinate all research effort in the area, and (2) to prepare and circulate periodic reports on new developments in all laboratories in and outside the area that have a bearing on the area's affairs.

One of the main activities of the staff is the rendering of a gratis consultation service to callers at the Institute who have problems of a technical nature. Already more than 200 such inquirers have been given advice on such varied subjects as the purchase of equipment, compounding of various chemicals, and the employment of technical personnel. No charge is made, for no laboratory work is required; the service is nevertheless a valuable builder of goodwill and an important factor in gaining recognition of the Institute as a center of technological development.

ORGANIZATION

The Institute's plan of organization is outlined in the accompanying diagram. Its trustees, now numbering over 100, are prominent figures in the fields of agriculture, in-

dustry, commerce, the professions, education, and the technical and public press. They are elected for the most part, but not exclusively, from the midwestern states and are chosen on the basis of ability to guide the Institute's general policies along lines of maximum service to the region. Twenty-one of the trustees are elected to the board of governors, in which is vested primary responsibility for the control and management of the Institute.

Real, full-time administrator of the Institute is the president-director, with the executive scientist functioning particularly as coordinator of the six main divisions of research. Of these six divisions, which were chosen after a careful survey of the needs of the region, five are now operative, the field of chemical engineering being carried temporarily as part of the applied physics division.

PLANT FACILITIES

Total staff of the Institute now numbers 83, with 50 on the technical staff and 33 in various service groups. On the research staff, 17 hold Ph. D. degrees, 8 M.S. degrees and 25 B.S. degrees. The Institute organization plan is patterned to establish the individual's responsibility, characteristic of the Mellon plan, but at the same time provide for staff attention to all projects, characteristic of the Battelle and Armour plans.

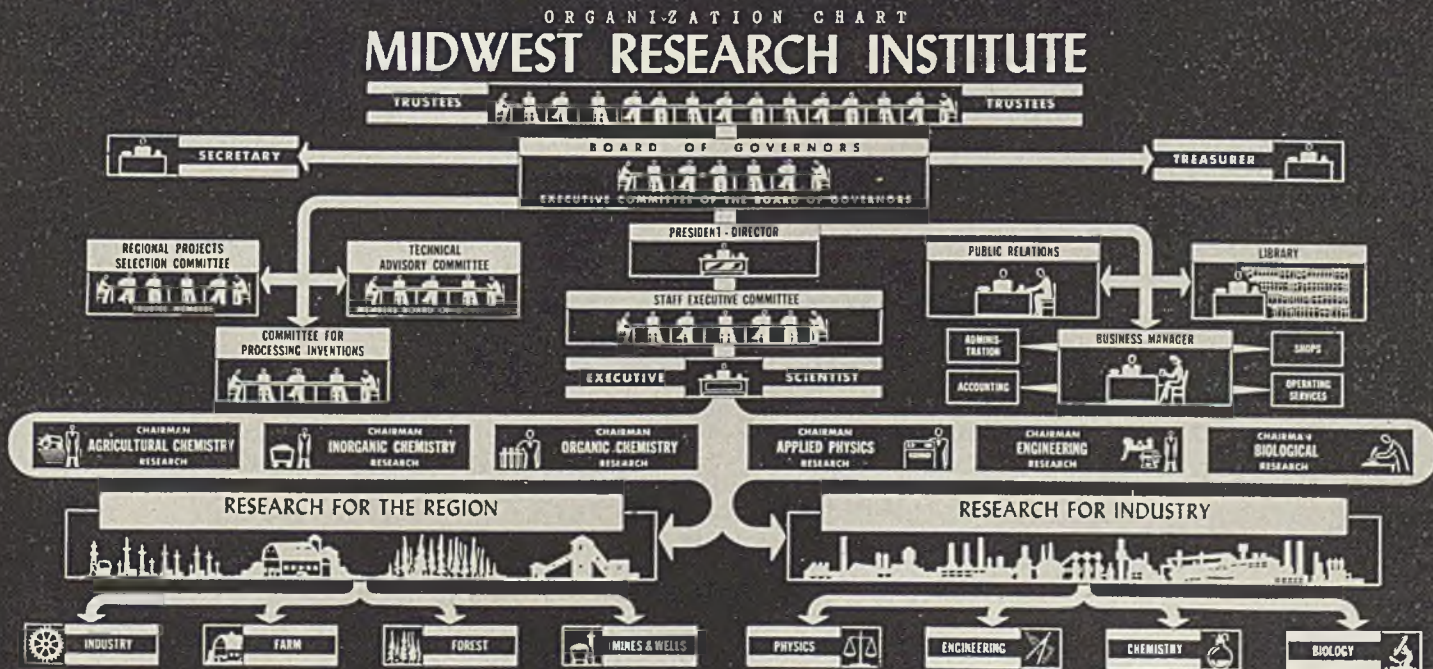
Laboratories and service departments now in operation are listed in an accompanying table. Although good progress has been made and excellent facilities are available, it is recognized that a great deal of equipment is still needed.

The Institute owns two buildings, rents a third, and has available 160 acres of land and buildings which are being developed as

Institute Laboratories and Service Departments Now in Operation

- Applied Physics Division**
 - Metallurgical Laboratory
 - X-Ray Diffraction Laboratory
 - Electronics Laboratory
 - Spectroscopy Analytical Laboratory
 - Photographic and Optical Department
 - Electron Microscope Laboratory
- Engineering Mechanics Division**
 - Engineering Design Group
 - Physical Testing Laboratory
 - Electro-Mechanical Laboratory
 - Mathematical Group
- Inorganic Chemistry Division**
 - Analytical Chemistry Laboratory
 - Ceramics Laboratory
 - Chemical Microscopy Laboratory
 - Geology and Mineralogy Laboratory
 - Glass Laboratory
 - Physical Chemistry Laboratory
 - Soils Laboratory
- Organic Chemistry Division**
 - Food Laboratory
 - Fermentations Laboratory
 - High Polymers Laboratory
 - General Organic Laboratory
 - Pilot Plant and Organic Engineering Lab.
- Agricultural Chemistry Division**
 - Bacteriology Laboratory
 - Cereal Laboratory
 - Colorimetry Laboratory
 - Biological Laboratory
 - Nutrition Laboratory
 - General and Agricultural Analysis Lab.
 - Starch Laboratory
 - Vitamin Laboratory
- Service Facilities**
 - Drafting Department
 - Carpentry and Woodworking Shop
 - Instrument and Machine Shop
 - Library

a proving ground and experimental farm. Present housing of the Institute is distinctly of a temporary nature, for the available space is already taxed to capacity. In fact, the Institute has had to decline about two-thirds of the projects offered to it because of space limitations. Plans have already been made for a large new building in the Kansas City suburbs, although construction must wait until building conditions are more nearly normal.



TECHNICAL SOCIETIES

Organize for Greater Service to Midwest

Significant among Midwest developments is the trend toward formation of central technical societies organizations. In several of the major cities the various technical, engineering and scientific societies have grouped together to form a united front in promoting better interchange of ideas and greater service to both the individual technologist and the community. Cities in which these societies have joined forces include Cleveland, Chicago, Cincinnati, Kansas City, and others. Examples given show the aims and scope of these organizations.—*Editors*

Chicago Technical Societies Council

LEWIS A. BAIN

*Chemical Engineer, Western Electric Co., Inc.
Chicago, Ill.*

AMONG the "War Babies" that have flourished and grown into successful peacetime enterprises, few portend greater things for the future than the Chicago Technical Societies Council. Already the largest organization of its kind, encompassing groups in widely divergent fields of engineering, science, and technology, the CTSC has an impressive record of achievement and a concrete, well planned program for the future.

Early in 1943 the War Production Board petitioned the Chicago Section of the American Society of Mechanical Engineers to organize a War Production Clinic for the purpose of stimulating the output of war goods in the Chicago area. The WPB offered assistance to the project in the form of financial assurance and a mailing list, and suggested that the cooperation of other technical societies be secured. Sixteen other societies did cooperate and the combined efforts resulted in a conference that was successful beyond expectations. When the clinic was over and the books were being closed, the committee in charge found that they had a surplus of \$400 and, more important, an effective organization. "Why not," this group decided, "keep this organization alive to operate additional conferences and carry on other activities as the occasion may arise?" Out of a series of

meetings held during the summer and early fall of 1943 the idea of the Chicago Technical Societies Council developed, and, in October, the CTSC was launched. At this time the founder societies were joined by others, so that the charter group comprised 32 societies.

Since then, as the organization has functioned and its values have become evident, other groups have become affiliated so that the CTSC now embraces 47 engineering, scientific, and technical societies having a total membership of approximately 19,500. The complete list of these societies is shown in the table. In no similar organization is there an affiliation of technical people having the divergence of interests covered by the CTSC member societies.

Growth and progress of the CTSC is indicated not only by this increase in size and representation alone, but more significantly by the interest shown in its activities and its recognition by civic, governmental, institutional, and other public groups as the general representative of technical people in Chicago.

The council proper is composed of one delegate and one alternate from each member society having less than 100 members and two delegates and alternates from the larger societies, a total of 87 delegates and 87 alternates in all. From this group are

elected a board of directors, who in turn select committee chairmen and personnel. In some cases committees are bolstered by non-delegate or alternate members of affiliated societies, particularly where it is possible to obtain representation from corresponding committees within the member societies. The CTSC has an office at 53 W. Jackson with a full time, paid executive secretary, Mr. Paul A. Jenkins, in charge.

MEMBERSHIP

In order for a society to be eligible for membership in the CTSC, it must be located in Chicago or vicinity, its membership must be predominately composed of persons engaged in engineering, technical, or scientific work, its principal aim must be the furtherance of the particular field covered by that society, and its membership must be open to anyone possessing the necessary technical qualifications for admission to that society. The entire local membership of each constituent society is automatically affiliated with the CTSC and is entitled to its privileges. Member societies and their constituents pay no dues or fees to the CTSC and assume no financial obligation for its operation. The Chicago Technical Societies Council is entirely self-supported by income from its publications, the Sci-En-Tech News and the Sci-En-Tech Register and from the annual Chicago Production Conference and Show. This income provides all funds for the maintenance and operation of the CTSC office, for the operation and activities of the committees, and for all other expenses.

Philosophy of the CTSC, the objectives



set forth by its founders, and the stimulus to its phenomenal growth are summarized in the stated purposes of the organization:

1. To provide a medium for cooperative action by the engineering, technical, and scientific societies in Chicago and vicinity on matters of mutual interest which are beyond the scope of the individual societies or which can be performed better by cooperative action.
2. To provide a means for more effective public service by the member societies.
3. To cultivate greater appreciation by the public of the part which technology, engineering, and science has contributed to human welfare.

BASIC OBJECTIVES

Importance of these purposes is becoming increasingly apparent as current events bring the technical man into unprecedented prominence and the nation comes to him for answers to its problems with ever greater frequency.

Furtherance of these purposes forms the basis for the activities assigned to the CTSC committees. Realizing that in the past many benefits have been relinquished due to the very limited inter-communication and mutual assistance among the technical societies, as a primary step these committees have undertaken to bring about a high order of cooperation and understanding among its affiliates. Committee activities are further directed towards service to the member societies, their constituents, Chicago industry, and the citizens of Chicago. The achievements of these committees form an imposing record which is a tribute to the unanimity and cooperativeness of Chicago's technical societies. Future objectives and programs, including specific actions required for their fulfillment have been formulated after careful and thoughtful planning which has taken into account the realities of committee work.

The conference committee is charged with the planning and preparation of the annual Chicago Production Conference and Show. From modest beginnings in the 1943 War Production Clinic, which was a one-day conference consisting of 24 panel sessions and general meetings at luncheon and dinner, this event has matured in successive years to culmination in a three-day conference and exhibit that is an important item on the agenda of Chicago technical, business, and production men. The 1946 Conference, centering on the theme "Production for Profit" was held on March 20-22, 1946, at the Stevens Hotel. Approximately 2500 persons attended the 46 panel sessions covering subjects from personnel problems to bridge building. Many thousands viewed exhibits by some 100 manufacturers. Other features of this show were educational exhibits by

the Museum of Science and Industry, the John Crerar Library, Iowa State University, the Chicago Plan Commission, and the War Assets Administration.

INTERCHANGE IDEAS

Facts and figures demonstrate the enthusiasm with which these conferences have been received and indicate their effectiveness as a service to the Chicago area. In addition to providing business and production men with information from experts on newest and most efficient production methods, technical people are provided with a means of "cross fertilizing" ideas with one another. Chemists learn what radio engineers are doing, and mechanical engineers find out what's new in the field of plastics, and so on. Plans already under way for next year's conference and show indicate that it should surpass its predecessors.

The publicity committee is responsible for securing proper publicity of CTSC activities, and has been notably successful, particularly in connection with publicity for the 1946 conference and show. In recent months several local radio stations have expressed interest in the CTSC as a source of program material. This committee also has a program for increasing the effectiveness of the individual publicity efforts of the member societies by a series of meetings with their Publicity Chairmen.

A news committee serves as consultant to the editor of the CTSC monthly publication, the Sci-En-Tech News. Original conception of the "News" envisioned it as a calendar of meetings of the member so-

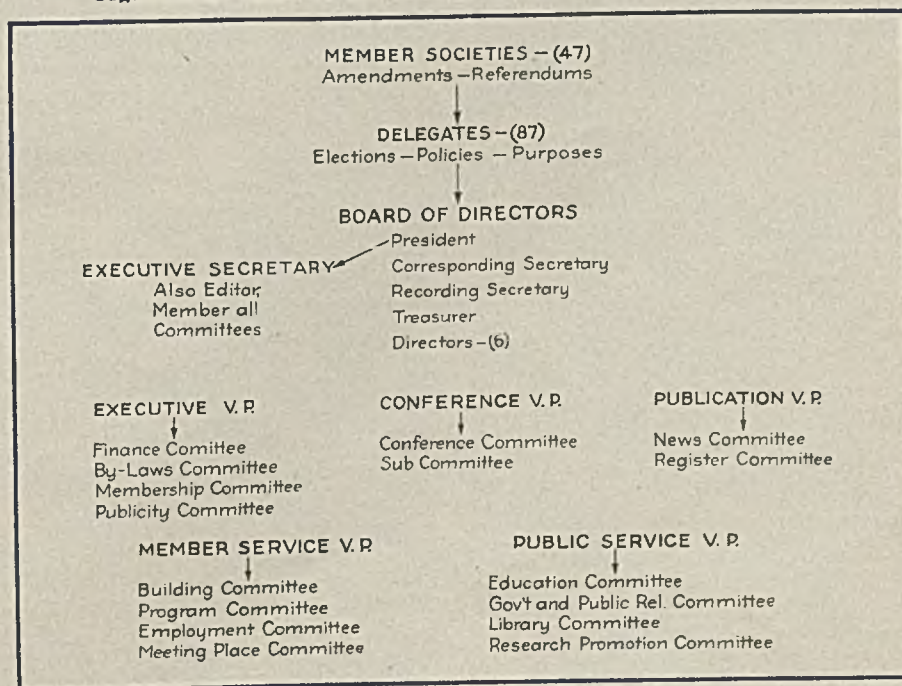
cieties. The present Sci-En-Tech News contains 16 to 20 pages and includes, in addition to complete announcements of all member society meetings, information and news concerning these societies, reports of council meetings and activities, information concerning legislation affecting the technical professional, news of councils in other cities, book reviews, editorials, articles of interest to the society members, and advertising matter. The Sci-En-Tech News is mailed without charge to all members of the affiliated societies.

PUBLICATIONS

The register committee is the advisory group to the publisher of the Sci-En-Tech Register. This publication is the "Who's Who" of Chicago technical people, listing with pertinent data all of the members of the affiliated societies. The first issue of the register was published in 1945, and subsequent issues will be prepared at suitable intervals. The register is available only to the members of the CTSC societies, it is not sold to outsiders. The technical people in Chicago who have copies of the register find it of great assistance in connection with their society work and professional contacts.

A building committee is charged with the formulation of plans for the acquisition of a suitable building to accommodate the activities of all Chicago technical societies. During the past two years this committee has held a number of conferences with persons and groups particularly interested in such a building. One such conference

Organization chart of the Chicago Technical Societies Council



was held at the request of Mayor Kelly of Chicago with the chairman of the Chicago Plan Commission who outlined tentative plans for a great civic center to replace blighted areas surrounding Chicago's loop. A Chicago Technical Societies' Building is possible in this group. Several of Chicago's universities and colleges have expressed interest in joint occupancy of a building with the technical societies.

During the coming year the building committee plans to prepare a complete prospectus of specifications, financing, etc., suitable for fund raising purposes. A functional analysis of the proposed building will be made expressed in terms of areas needed for each purpose the building must serve—refectory, meeting place, committee rooms, social rooms, etc.—so that definite floor plans, general specifications, and cost estimates can be drawn up. The committee will also work with the Chicago Plan Commission and the city government in considering the availability and desirability of possible building locations.

EMPLOYMENT

The employment committee has during the past year carried on a highly commendable program of placing in suitable positions discharged servicemen: having technical training. This program has been a cooperative effort with other groups under the leadership of the Chicago Business Vocation Committee. Veterans being discharged at Great Lakes Naval Training Station or Fort Sheridan who have specialized training or aptitudes are screened to the Chicago Business Vocation Committee. Veterans having technical abilities are referred to the CTSC office where they are interviewed so that they can be most effectively placed in positions that are available. Council members in the several general fields covered by its

affiliates do the interviewing, and a high record of successful placement has been achieved. Over 300 men have been interviewed to date. Plans are under consideration to continue this type of service on a permanent basis.

The meeting place committee compiles a directory of meeting and refectory facilities in Chicago suitable for holding technical gatherings of all kinds, as a service to and in cooperation with corresponding committees within the societies.

Comprised of the program chairman of the CTSC constituent societies, the program committee has compiled a summary of society meeting dates and places. As a result of their efforts conflicts in meeting dates have been largely avoided. In addition to this, the program committee has the responsibility for joint programs, exchange of speakers, and general program cooperation among the societies. This phase of the work dovetails with the "cross fertilization" brought about at the conference panel sessions, which is vitally important to progress along broad scientific fronts.

During the past year the educational committee organized a series of educational sessions which followed regular council meetings. Forum type meetings were held around subjects having great current interest to technical people, such as technical employment, licensing, patent legislation, technical education and the technical man in society. The educational committee was responsible for a series of Sunday afternoon popular lectures on scientific subjects held at the Museum of Science and Industry. The programs for each of these lectures were arranged by one or a group of the constituent societies, and were attended by several thousands of visitors to the Museum. This series will be resumed in the fall.

It is proposed that this committee make an evaluation of trade and professional

schools in Chicago and serve as an advisory body on technical and scientific curricula. The Chicago Public School Investigating Committee in a recent report to the mayor recommended the CTSC as one of eight groups to be represented on a commission for the nomination of members of the Public School Board. This representative has been selected and his name submitted to Mayor Kelly.

SERVICE TO PUBLIC

To this committee is assigned the task of compiling lists of scientific and technical extension courses offered by colleges in the Chicago area and also lists of lectures and cultural courses given by museums, libraries, etc., which might be of interest to CTSC affiliates. It is proposed that the educational committee act as a clearing house for information for students from other nations.

The library committee has undertaken to increase the usefulness of the technical library facilities in the Chicago area. Accomplishments of this committee during the past year include obtaining evening hours at the John Crerar Library—making available to the members of constituent societies a "Directory of Libraries of the Chicago Area"—furnishing technical periodicals to the military hospitals in the Chicago area—and maintaining a library page in the Sci-En-Tech News.

CTSC library committee was represented at a business and industry library investigation meeting along with leading Chicago librarians, business, industry, and research people.

As objectives for the future the library committee proposes to institute in cooperation with other groups, a survey of its present state of Chicago's technical library facilities and services, and to formulate concrete proposals for improvements.

A research promotion committee was originated as a wartime service to industry. Future activities of this committee were presaged during panel sessions at the 1946 conference at which the values of a research program were enumerated, and ways and means for carrying such a program in a small business were outlined.

The government and public relations committee served during the war years as a clearing house for the evaluation of enemy alien patents and certain inventions submitted to aid war production. During the past year this committee has held conferences with authorities in the field of civic affairs and social sciences, so that it is prepared to undertake its role as advisory body to the technical societies on civic affairs and matters of government. One project that will probably get underway during the next year is the compilation of a handbook of local government which should

Chicago Technical Societies Council Members

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|--|--|
| American Association of Cereal Chemists | American Society for Testing Materials |
| American Association of Engineers | Association of Vitamin Chemists |
| American Association of Scientific Workers | American Welding Society |
| American Association of Spectrographers | Chemical Arts Forum |
| American Ceramic Society | Chicago District Enamels Club |
| American Chemical Society | Chicago Dairy Technology Society |
| American Electroplater's Society | Chicago Professional Paper Group |
| American Foundryman's Association | Chicago Rubber Group |
| American Institute of Architects | Electrochemical Society |
| American Institute of Chemists | Industrial Engineers Association |
| American Institute of Chemical Engineers | Illuminating Engineers Society |
| American Institute of Electrical Engineers | Institute of Food Technologists |
| American Industrial Hygiene Association | Institute of Industrial Engineers and Executives |
| American Institute of Mining and Metallurgical Engineers | Industrial Management Society |
| American Industrial Radium and X-Ray Society | Institute of Radio Engineers |
| American Pharmaceutical Association | Instrument Society of America |
| American Society of Agricultural Engineers | Illinois Society of Engineers |
| American Society of Civil Engineers | Physics Club of Chicago |
| American Society of Heating and Ventilating Engineers | Society for the Advancement of Management |
| American Society for Metals | Society of American Military Engineers |
| American Society of Mechanical Engineers | Society for Experimental Biology and Medicine |
| American Society of Refrigerating Engineers | Society of Illinois Bacteriologists |
| American Society of Tool Engineers | Society of Plastics Engineers |
| | Western Society of Engineers |



make technical people in the Chicago area better acquainted with the realities of their local government and encourage them to individual participation in local governmental affairs. A legislative sub-committee will continuously study and, through the news columns of the Sci-En-Tech News, report on national and state laws and legislative trends affecting the professional status of members of the CTSC affiliated societies.

In the early stages of the council's growth,

it was not contemplated that all committees would show immediate achievement. A few projects were selected for concentrated effort which seemed to offer the possibility for immediate service to the affiliated societies, while longer range objectives were superficially explored by their respective committees. In recent months, under the stimulus of the functional vice presidents and the council's executive secretary, long range objectives have been translated into the specific

programs described in the preceding paragraphs. The CTSC has, as a result, progressed into a mature organization capable of accepting the responsibilities placed in it.

The Chicago Technical Societies Council stands as a symbol of the results that are possible when engineers, scientists, and technologists apply the scientific method to their common problems, and foreshadows a better society when they apply this sort of effort to broader fields.

Engineering Society of Cincinnati

PAUL H. GOODELL

*Member, Board of Directors and Program Sponsor
Engineering Society of Cincinnati
Cincinnati, Ohio*

FROM a modest beginning in 1888, Cincinnati has one of the most active local engineering societies in the country. During the years preceding the war a need was felt for a permanent headquarters. A suggestion was made that a building program be undertaken as a memorial to the late Harman Schneider, founder of the co-operative system of education and for 33 years dean of the College of Engineering and Commerce at the University of Cincinnati.

Eighty-nine Cincinnati industries organized as the Herman Schneider Foundation, responded to the proposal under the leadership of Mr. F. V. Geier, president of The Cincinnati Milling Machine Co., and on March 15, 1944, a new permanent headquarters was presented to the engineers of Cincinnati.

BUILDING FACILITIES

The building is used jointly by 19 member societies of the Cincinnati Technical Societies Council, comprising some 4,000 members of which 1,282 are members of the Engineering Society. Not only has the building greatly stimulated the interest and participation in the organized professional societies in the Cincinnati area, but during the past year it provided accommodations for approximately 185 meetings attended by over 18,500 people.

The building houses an auditorium capable of seating 500 people, a memorial library dedicated to Dean Herman Schneider, a reception lounge, offices, dining room, kitchen and several small committee rooms.

The Engineering Society manages the building for the Herman Schneider Foundation, and also acts as the business agent for the "Engineer and Scientist," official publication of the Technical and Scientific Societies Council of Cincinnati. The publication, which is in the form of a weekly

paper, contains announcements of all society activities and editorial material of local technical interest. In addition, a 180-page directory is printed annually listing each society organization, its officers, committees, and personnel. The Engineering Society also sponsors a weekly radio program covering activities of all societies and interviews with visiting speakers. The program, "Science Looks Ahead," is a joint educational feature of the local Columbia network station WKRC, and it may be heard each Tuesday at 10:45 p.m.

ORGANIZATION

The society activities are administered by a president and nine directors, assisted by a staff of four people, a public relations counsel, and an advertising manager for the publication. The president is elected annually and three directors are elected each year for a three-year period. Each director sponsors a segment of the organization responsibilities such as programs, house operations, membership, finance, fellowship, etc. The society has over 40 committees of which eight are engaged in program activities, including major technical programs, joint programs with other societies, a woman's auxiliary, Sunday family meetings, inspection trips, numerous lobby and bridge programs, and two weekly noon luncheon groups serving constituents in different sections of the city.

Several of the committees also work in the fields of professional development and public affairs. Vocational guidance counseling for high school seniors is a service project which is making a contribution in the field of education. Another committee concerns itself with legislation affecting the engineer, and still another is interested in the development of the relationships among engineering societies, both local and national.

The scope of the work in public affairs is

indicated by the names of the several committees in this field. They are: Regional Planning, Atmospheric Anti-Pollution, Stream Sanitation and Water Supply, Transportation and Traffic, River Development, Aviation and Airport Development.

FINANCES

The annual operating expenses including publication activities will be approximately \$30,000 for the current season. The major part of this revenue is raised by membership dues, which vary from \$7 to \$15 per year for various grades of membership with a rebate of \$2 to each resident member who maintains active status in one or more of the professional societies. Each society affiliated with the council contributes 75c. per year as a subscription fee to the directory and weekly publication for each of its members. An additional 10c. per member is also provided to finance a combined meeting of all the societies usually held in February. In 1946, over 1,400 members attended this meeting.

The growth of the Cincinnati Society is primarily attributed to the closely affiliated Council organization and the permanent headquarters valued at \$150,000. The council is now entering its eleventh year and is one of 34 similar councils in the country, many of which are patterned after the Cincinnati organization. In addition to the Engineering Society, the following local sections of national engineering societies also participate in the Cincinnati Council:

Member Societies

American Chemical Society
American Electroplaters Society
American Foundrymen's Association
American Institute of Architects
American Institute of Chemical Engineers
American Institute of Electrical Engineers
American Society of Civil Engineers
American Society of Heating and Ventilating Engineers
American Society of Mechanical Engineers
American Society for Metals
American Society of Refrigerating Engineers
American Society of Tool Engineers
American Welding Society
Illuminating Engineering Society
Institute of Radio Engineers
Ohio Society of Professional Engineers
Society for the Advancement of Management
Society of American Military Engineers.

INTEREST TURNS TO EQUIPMENT

COINCIDENT with the fall meeting of the American Chemical Society, during the five days of September 10 through 14, Chicago will play host to the Fourth National Chemical Exposition, sponsored since 1940 in the even numbered years by the Chicago Section of the ACS. As in 1944 the scene of the event will be the Chicago Coliseum which provides a great deal more space for the exhibits than was previously available at hotels. In fact, it has been necessary to open up still more space than was used in 1944, to accommodate the approximately 200 exhibitors scheduled to be present.

As on earlier occasions we have approached exhibitors in certain classifications with the request that we be provided advance information for publication on what would be exhibited, and particularly on what that would be shown was new since the last previous showing of the same exposition, two years before. From our coverage we have omitted chemicals as such, although not those chemicals that have materials of construction uses; publishers; societies; and factory site development agencies. Included here, so far as we received information, are the exhibits on plant equipment, construction materials, packaging equipment and supplies, and plant and laboratory control equipment and apparatus.

Aetna Scientific Co., Everett 49, Mass. (Booth 168)

Will Exhibit: Laboratory and production equipment including a solution still designed to yield pyrogen-free water for purposes requiring water of the utmost purity, such as ampoule and other work. Also the company will show an industrial autoclave with a full-opening door, as well as a rolling-door autoclave.

Once again *Chemical Engineering* brings advance word on the exhibits at the National Chemical Exposition at Chicago to its readers, so that those who attend may spot points of interest before reaching the Show, while those who do not may know what they are missing. Each Chicago Show has been bigger than the one that preceded it and this one gives evidence of exceeding previous records by a considerable margin, both in interest and in attendance. Occurring at the same time as the Fall meeting of the American Chemical Society, September 10 to 14, the Show gives Chicago the opportunity of rivalling New York as the center for chemical equipment display.—*Editors*

American Cyanamid & Chemical Corp., New York 20, N. Y. (Booth N49)

Will Exhibit: Ionac ion-exchange resins and their use in demineralizing units for producing chemically pure water.

American Pulverizer Co., Chicago 5, Ill. (Booth N31)

Will Exhibit: A small working model of the company's American Ring Crusher, showing details of construction and the manner in which the rolling rings and adjustable grinder plate operate.

H. Reeve Angel & Co., New York 7, N. Y. (Booth 112)

Will Exhibit: Plant and laboratory filter papers of Whatman and Reeve Angel types.

Barco Mfg. Co., Chicago 40, Ill. (Booth N20)

Will Exhibit: Several types of flexible-ball, swivel and revolving joints including standard Barco ball joints for loading and unloading line service and for the elimination of

breakage in piping due to vibration; swivel joints for all types of movable steam and hydraulic plates and headers; and revolving joints for continuous rotating service.

Barnstead Still & Sterilizer Co., Forest Hills, Boston 31, Mass. (Booth 154)

Will Exhibit: Automatic water stills, water purity meters, and water demineralizing equipment, including the company's latest type of four-stage unit.

New: This concern is now offering four-stage demineralizing units including two anion exchange stages and two cation exchange stages so arranged that the flow passes in series through two complete two-stage units, thus permitting much longer operation between regenerations and also, according to the manufacturer, making possible much greater purity of demineralized water.

Bemis Bro. Bag Co., St Louis 2, Mo. (Booths 37-38)

Will Exhibit: All types of bags made by this concern, with special emphasis placed on multi-wall bags, shipping sacks and water-proof paper-lined textile bags of types used extensively in the chemical industry.

Bjorksten Laboratories, Chicago 1, Ill. (Booth 67)

Will Exhibit: A variety of displays illustrating the industrial research service offered by this laboratory to industry.

New: A package known as the "Walpouch," which is constructed of 0.0025 gage aluminum foil, somewhat in the form of an envelope, but suitable for the packaging of moisture-sensitive materials in small units. The Walpouch is said to hold 3 oz. of powdered material, 4 oz. of liquid, or 6 oz.

All photos from Third National Chemical Exposition





At Chicago's Fourth National Chemical Show

of semi-liquid material, and to withstand a pressure of 12 lb.

The Bristol Co., Waterbury 91, Conn. (Booths N53-N54)

Will Exhibit: A wide variety of industrial control instruments featuring continuous pH controls; a new bellows differential flow meter; a time-temperature controller; and an impulse-sequence cycle controller. In addition the company will display a running time recorder, a recording ammeter, a direct-reading humidity and temperature recorder, a Free-vane recording electronic thermometer controller, an air-operated Free-vane indicating thermometer, a reset Free-vane air-operated controller; and an air-operated flow controller.

New: Of these instruments, the most recent design is the new bellows differential flow meter. A new type of shaft-seal without packing is used for transmitting motion from the bellows to the recorder mechanism.

Brown Instrument Co., Philadelphia 44, Pa. (Booths N34-N35)

Will Exhibit: A wide variety of industrial control instruments including flow meters, electronic instruments, recording control thermometers, this company's new adjustable Indexet, pressure controllers, pneumatic transmitters and receivers and other new and improved models.

New: The adjustable Indexet is a new pneumatic receiving instrument for automatic control to which two new mechanisms have been added to facilitate adjustment to the process. There is an adjustment for "span" and another for "zero shift."

The Carpenter Steel Co., Welded Alloy Tube Div., Roselle, N. J. (Booth 124)

Will Exhibit: Stainless steel tubing, sanitary stainless steel tubing, and fittings for use with stainless steel tubing.

New: Flexible stainless tubing recently developed by fabricators working in conjunction with this concern.

Chamberlain Engineering Corp., Akron 9, Ohio (Booth 163)

Will Exhibit: A new protective coating.

New: This coating, known as Neolac, is an all-plastic maintenance coating for protecting process equipment, structural steel, wood and concrete against corrosion. The material is said to have high resistance to both acids and alkalis, and unusually low absorption characteristics.

Chicago Pump Co., Chicago 18, Ill. (Booth 63)

Will Exhibit: This company's wide-band air diffusion system for aeration, mixing, oxygenation and flocculation in chemical and microbiological processes.

Coming Glass Works, Corning, N. Y. (Booth 72)

Will Exhibit: A representative line of this company's laboratory ware and apparatus emphasizing: low actinic ware for vitamin research, volumetric ware, fritted ware for controlled filtration, ground joints of both sleeve and ball and socket types.

Distillation Products, Inc., Rochester 13, N. Y. (Booth 138)

Will Exhibit: A complete high vacuum system and a high vacuum gage. A feature will be a large graph showing the range in which this company's many high vacuum gages operate.

New: Large pictures will illustrate new developments that have been made in vacuum coating systems of both laboratory and very large production size.

Durametallic Corp., Kalamazoo 24F, Mich. (Booth 119)

Will Exhibit: Displays illustrating the functions and applications of this company's packing and mechanical sealing devices, showing various types of Durametallic packings for special jobs. The display will also high-light flexible handled tools.

Emery Carpenter Container Co., Chicago 38, Ill. (Booth 97)

Will Exhibit: A variety of fiber drums for dry and semi-solid materials in capacities from 1 to 56 gal.

New: This company's Pres-To-Form drums and Pres-To-Form Specials for dry and semi-solid commodities will be shown. These containers are of solid kraft and their tops and bottoms are formed, without cutting or scoring, in hydraulic presses.

Eppenbach, Inc., Long Island City 1, N. Y. (Booth N17)

Will Exhibit: Colloid mills and other mixing and homogenizing equipment, as well as stainless steel kettles.

New: The Agi-Mixer, a combination paddle mixer and homogenizer.

Fansteel Metallurgical Corp., North Chicago, Ill. (Booth 79)

Will Exhibit: A complete, full-scale gluten hydrolyzing plant of tantalum and Haveg, one of several which this company has built for export to China. In the plant gluten (usually soybean flour) is digested with hot hydrochloric acid, the latter being evaporated and recovered, leaving a residue of glutamic acid in a state of high purity.

Fisher Governor Co., Marshalltown, Iowa (Booth 7)

Will Exhibit: A variety of devices for pressure control and liquid level control, including diaphragm-actuated control valves such as are used with industrial instruments in the chemical industry.

Fisher Scientific Co., St. Louis 3, Mo. (Booth 78)

Will Exhibit: A wide variety of laboratory and industrial control devices, plus laboratory apparatus.

New: This company's unitized laboratory furniture; also a Crystalab Ultra-Sonorator, a supersonic generator providing in a commer-



cially manufactured instrument a device for the production of supersonic vibrations.

General Ceramics & Steatite Corp., Keasbey, N. J. (Booth 114)

Will Exhibit: A new line of high-fired porcelain chemical process equipment. On display will be a porcelain tower, kettle, cylindrical vessel, pumps and miscellaneous pipe, fittings and electrolytic diaphragms.

Glascote Products, Inc., Cleveland 17, Ohio (Booth 77)

Will Exhibit: A small stainless steel reaction vessel for laboratory and pilot-plant work, a glass-lined reactor for pilot-plant, semi-works or small production use; and a cutaway section of an agitator stuffing box similar to that used on glass-lined tanks.

Groen Mfg. Co., Chicago 39, Ill. (Booths N21-N22)

Will Exhibit: Stainless steel steam jacketed kettles and special chemical processing equipment, with and without motor-driven agitators.

Hart-Moisture Meters, New York 17, N. Y. (Booth N46)

Will Exhibit: Plant control instruments, including moisture meters.

New: Several new types and various new accessories including portable, electronic instruments for making instantaneous moisture content determination in plants and laboratories, as in paper, chemicals, etc.

Hasco Valve & Machine Co., Milwaukee 3, Wis. (Booth 80)

Will Exhibit: Valves and fittings in stainless 316, Hastelloy, nickel, Monel, Inconel and aluminum, as well as heaters for water and acids, and possibly a new stainless steel expansion joint.

Haveg Corp., Newark, Del. (Booth 94)

Will Exhibit: Corrosion resisting equipment of many types for plant use, based on synthetic resins combined with asbestos or graphite.

New: Haveg grade 60, an adaptation of the furane type resin. The material is suitable for molding large-scale plant equipment and is said to be the first material of this nature which is entirely resistant to both acids and alkalis and to a number of solvents. This material is said to be tough, non-porous and rigid, suitable for use at boiling temperatures.

Heil Process Equipment Corp., Cleveland 11, Ohio (Booth N23)

Will Exhibit: A complete line of tank linings for industrial use, including steel tanks with any required lining, an exhaust hood, tank heating equipment, and baskets or cranes for handling material into and out



of tanks. Linings include synthetic rubber, Koroseal, various thermoplastics, lead, ceramics, carbon brick and special metals.

Illinois Water Treatment Co., Rockford, Ill. (Booth 29)

Will Exhibit: Water demineralizing equipment in laboratory and small commercial sizes.

New: Three new models of this company's equipment will be shown including models having flow rates of 12, 60 and 100 g.p.h.

Industrial Lining Engineers, Inc., Edgeworth, Pa. (Booth 115)

Will Exhibit: Vinyl rubber tank and equipment linings, showing reparability of this material. Such linings are said to possess most of the chemical resistances of conventional linings but to be more resistant to oxidation and oils. Mechanical injuries caused by accidental impact may be repaired by unskilled workmen in a matter of minutes. The exhibit will also show polyethylene and some 30 synthetic rubber and plastic linings for tanks and equipment.

Jensen Machinery Co., Bloomfield, N. J. (Booth 105)

Will Exhibit: This company's industrial chilled water unit, cut away to show the patented feature which enables water to be cooled to 32 deg. F. without freezing on to the unit.

The Johnson Corp., Three Rivers, Mich. (Booths 35-36)

Will Exhibit: Working models showing operation and application of this company's rotary pressure joints, automatic boiler-water level control and pressure equalizing boiler feed pump. The company will also exhibit an instantaneous steam water heater, compressed air and steam separators, compressed air aftercoolers and the Johnson Electrap, a condensate return trap.

W. H. Kessel & Co., Chicago 10, Ill. (Booth N29)

Will Exhibit: Plant and laboratory control equipment including pH meters, refractometers, photomicrographic equipment, carbon determination equipment, other optical instruments.

Kieley & Mueller, Inc., North Bergen, N. J. (Booth 155)

Will Exhibit: Diaphragm valves, pressure regulators and pump governors.

New: A new line of Kontrol Motor diaphragm valves, pressure regulators, and pump governors will be introduced at the Show, in a variety of corrosion resisting alloys and in many sizes and types. The display will show all-steel, boltless diaphragm motors and a complete new line of valve bodies.

Lead Industries Association, New York 17, N. Y. (Booth 10)

Will Exhibit: Different chemicals which may be and are handled in lead or lead-lined equipment; various methods of installing lead tank linings to meet various practical conditions; methods of hanging and supporting lead pipe for handling corrosive chemicals; lead heating and cooling coils, pumps, valves and special fittings.

Loeb Equipment Supply Co., Chicago 22, Ill. (Booths 24-25)

Will Exhibit: Alsoop Hy-Speed and Slo-Speed portable electric mixers, as well as Scaled Disk filters, steam-jacketed stainless steel kettles and bottle filling machines produced by the same manufacturer.

Macbeth Corp., New York 11, N. Y. (Booth N12)

Will Exhibit: This company's line-operated pH meters and color-matching equipment. The pH meters are direct reading and continuous indicating. The color matching



equipment duplicates—for exact color matching identification—ideal, overcast, north-sky daylight conditions.

The Master Package Corp.,
Owen, Wis. (Booth 104)

Will Exhibit: A variety of fiber shipping drums and pails in a wide range of sizes. The drums range from 1 to 31½ gal. capacity and the pails from 3½ to 6½ gal.

The McIntyre Co., Newton 58,
Mass. (Booths 13-14)

Will Exhibit: A complete line of small rotary positive-displacement hydraulic and metering pumps, in six series, and three series of fluid motors.

Moore Products Co., Philadel-
phia 24, Pa. (Booth 137)

Will Exhibit: A variety of automatic control equipment, all of which will be shown in operation on miniature processes or on typical test room procedures.

New: All equipment shown will be relatively new, including a brand new Nullmatic controller for flow, temperature and other variables, a new Nullmatic thermometer used as a primary element on a miniature control process, and other slightly less recently developed equipment including a differential pressure transmitter which will be shown combined with two thermometers to indicate differential temperature, a self-contained flow controller, a Nullmatic liquid level gage, a constant differential relay, a liquid level controller of the flexible shaft type, a valve positioner, and a Nullmatic pressure regulator.

The Moto-Truc Co., Cleveland 3,
Ohio (Booth N8)

Will Exhibit: Platform, pallet and high-lift trucks, all of which have been improved in a number of details since the last show.

National Carbon Co., New
York 17, N. Y. (Booths 85-86)

Will Exhibit: Equipment constructed of standard carbon, graphite and Karbate, particularly for absorption-stripping operations. The setup demonstrates the application of standard towers, raschig rings, a cascade cooler, a seven-tube heat exchanger, centrifugal pumps equipped with flexible couplings and nozzles, globe valves, flexible couplings, slotted couplers, pipe and fittings. Two types of standard Karbate plate heaters will also be shown, together with Karbate bayonet and shallow-tank heat exchangers.

National Technical Laboratories,
South Pasadena, Calif. (Booth
N41)

Will Exhibit: A complete line of this company's instruments for pH indicating, recording and controlling, as well as Beckman quartz spectrophotometers and infrared spectrophotometers.

New: A new a.c. portable glass-electrode pH meter said to feature unusual stability of operation and reproducibility of measurement will be exhibited, together with a new automatic titrator developed specifically for certain wartime applications but now considered to have promise for peacetime applications in process control.

The Pfaudler Co., Rochester 4,
N. Y. (Booth 1)

Will Exhibit: A variety of glass-enameled process equipment including a pilot plant distillation assembly, storage tanks, evaporating dishes and kettles of various sizes, and a specially designed agitation display. The exhibit will also include stainless steel equipment of various types and sizes.

New: Among the new developments exhibited by this manufacturer is a complete standardized line of stainless steel heat ex-

changers and condensers, and a new stainless steel quick-acting pocket-type valve.

Productive Equipment Corp.,
Chicago 12, Ill. (Booth N39)

Will Exhibit: A Selectro vibrating screen of this company's manufacture.

Radio Corp. of America, RCA
Victor Div., Camden, N. J.
(Booths 55-58)

Will Exhibit: Equipment of two general classifications, including scientific instruments and electronic apparatus. Among the former is the company's standard console model of electron microscope.

New: A newly developed vacuum unit consists of a vacuum chamber with a high speed pumping unit for evacuation. The equipment is provided with a power supply available at various terminals within the vacuum chamber through which heat can be provided to materials being treated. The company's new vacuum gage, also to be shown, is of the thermocouple type, suitable for measurement of pressures from atmospheric down to 10⁻⁴ mm. Hg. A new metal detector conveys materials to be examined on a continuous belt through an inspection aperture where the material is screened by a high frequency electromagnetic field. If metal is present, the reaction produced is detected and amplified to operate a signalling device or ejector.

Rapids-Standard Co., Grand
Rapids 2, Mich. (Booths N18
and N33)

Will Exhibit: A variety of materials-handling equipment, including both power operated and gravity types. The feature will be a "merry-go-round" display of this company's gravity conveyors coupled with power belt conveyors. The exhibit will include hand trucks and warehouse floor trucks.

New: A new solid-roller gravity conveyor for medium duty and other new developments in this company's gravity conveyors.

Raymond Pulverizer Div., Com-
bustion Engineering Co., Chi-
cago 22, Ill. (Booths 73-74)

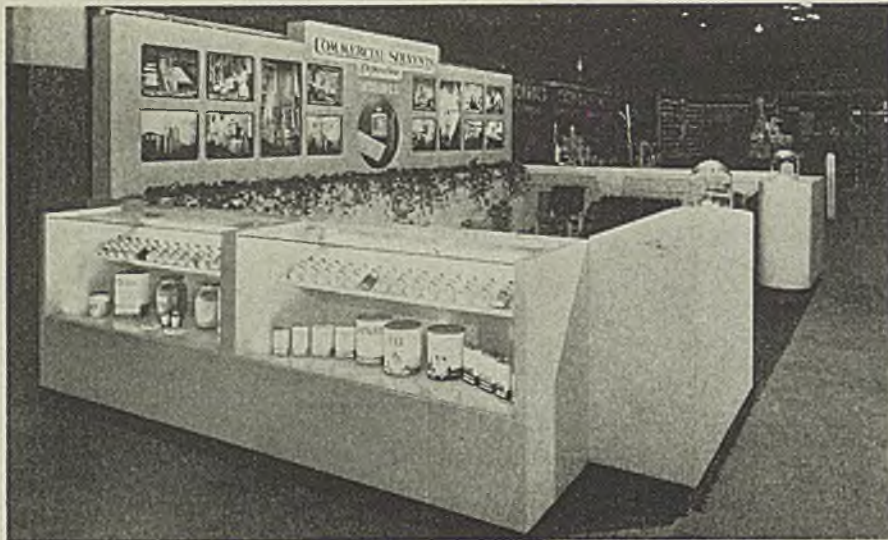
Will Exhibit: Various types of pulverizing equipment including a new vertical mill for super-fine grinding, a roller mill with whizzer separation, and laboratory pulverizers.

New: For grinding materials up to 95-99 percent finer than 5 to 10 microns, this manufacturer has developed a vertical hammer mill of special type, suitable for the reduction of medium-soft non-metallics such as graphite, dry colors and talc.

Resisto Pipe & Valve Co., Cam-
bridge, Mass. (Booth N36)

Will Exhibit: Acid-resisting lead valves and lead-lined valves from ¾ to 16 in., as





well as acid-resisting centrifugal pumps, stainless steel, rubber-lined and bronze centrifugal pumps, lead castings and lead-lined wood and steel tanks.

Milton Roy Co., Philadelphia 18, Pa. (Booth 5)

Will Exhibit: Several typical proportioning pumps applied to automatic chemical feed systems.

New: A system of continuous proportioning by electronic control and automatic pH measurement measures and records the pH, while the controller automatically sets the length of stroke of the pump, as called for to maintain the desired pH value.

Schaar & Co., Chicago 7, Ill. (Booth 21)

Will Exhibit: General laboratory equipment, laboratory supplies and reagent chemicals. Among these will be pH equipment, 5-gal. bottle shaking machines, and laboratory autoclaves.

The Selas Corp. of America, Philadelphia 34, Pa. (Booth 88)

Will Exhibit: Equipment for both liquid conditioning and heat processing. The display will include the company's complete line of micro-porous filter media and the Selaseparator for phase separation of immiscible liquids, shown in pilot-plant and laboratory models. The equipment for improved heat processing will be displayed in several diversified applications, including a model of a continuous tube still and a batch cooking unit which will be in operation.

Simplicity Engineering Co., Durand, Mich. (Booth 75)

Will Exhibit: A stainless steel vibrating screen of the two-tray, high-speed type, built to comply with all sanitary code requirements.

Sparkler Mfg. Co., Mundelein, Ill. (Booth 19)

Will Exhibit: A small demonstration filter:

in operation, equipped with a glass side wall so as to show the principle of the equipment. In addition, the company will have a large 36-in. stainless steel filter on display.

D. R. Sperry & Co., Batavia, Ill. (Booth 60)

Will Exhibit: Filter press plates and filter bases, to meet a variety of filtration problems.

Taylor Instrument Cos., Rochester 1, N. Y. (Booths 143-144)

Will Exhibit: Fulscope control instruments, featuring their adaptability. Various components of the Fulscope controller will be shown on a panel surrounding the instrument itself, to illustrate how instruments can be altered in the field to perform varying functions.

New: A model of a new liquid level transmitter of particular interest to the chemical industry.

Titeflex, Inc., Newark 5, N. J. (Booths 99-100)

Will Exhibit: This company's Titeflex-Stonehart filters and Titeflex-Wright Cord filters. The first of these is a polishing filter, available in iron, bronze and stainless steel, in capacity ranges from 75 to 6,000 g.p.h. The second uses a special type of filter medium composed of continuous cords applied to a rotary vacuum filter. It is adaptable to automatic discharge and filter medium cleaning, in the handling of heavy masses and sludges.

Tri-Clover Machine Co., Kenosha, Wis. (Booth 12)

Will Exhibit: A complete line of light-

gage welding fittings in sizes from 1 to 10 in., available in both types 304 and 316 stainless steel; and a number of centrifugal pumps manufactured in corrosion resisting materials.

New: A complete new line of light gage stainless steel type 316 conical-end fittings in sizes from 1 to 4 in. will be shown, developed primarily for chemical industry use where corrosion resistant piping is necessary.

Trimount Instrument Co., Chicago 5, Ill. (Booth N31)

Will Exhibit: Manometers for flow and pressure measurement, electronic pressure measuring and pressure transmitting equipment, electronic level control instruments and a cathodic protection system for deep well pumps and elevated water storage tanks.

The U. S. Stoneware Co., Akron 9, Ohio (Booths 61-62)

Will Exhibit: Corrosion resistant equipment and construction materials of chemical stoneware and of a variety of resistant plastic materials. Included will be Tygon tank linings, flexible tubing and protective coatings, rubber, acidproof tile, sheet and homogeneous lead tank linings, baked-on hard coatings of phenolic and furane types. Equipment shown will include a novel drum-tumbling unit for various size drums, laboratory jar mills, chemical stoneware suction filters and vessels, pipe and fittings, tower packings, laboratory equipment and supplies, and acid- and alkali-proof cements.

Wheelco Instrument Co., Chicago 22, Ill. (Booth N15)

Will Exhibit: Electronic type automatic control equipment.

New: All equipment shown will be new, including an electronic level controller designed for process plant use. The setup used will employ one tank containing a single probe pickup unit to sense the interface between oil and water, while controlling the water level. Another tank will utilize a gage glass pickup to maintain a set level, and a third tank a double-probe sensing unit for control of a continuous flow of water. One control instrument will handle all three applications.

Wilkens Anderson Co., Chicago 6, Ill. (Booth 111)

Will Exhibit: Laboratory equipment, pH meters and spectrophotometers.

New: The new Waco dead-stop end-point titrator, an instrument for determining moisture, will be exhibited; also a new Coleman junior spectrophotometer designed for simplified operation.

Yarnall-Waring Co., Philadelphia 18, Pa. (Booth N16)

Will Exhibit: Steam traps, fine-screen strainers, spray nozzles and this company's remote liquid level indicator. The traps shown are this company's Impulse type which will be featured in a sound film narrated by Lowell Thomas.

Reprints of this report are available at 25 cents per copy. Address the Editorial Dept., Chemical Engineering, 330 West 42nd St., New York 18, N. Y.

Recycling Process Uses Cheap Oxygen for AMMONIA OXIDATION

In cases where byproduct oxygen may be obtained cheaply, or possibility in some instances where excess hydro power may be had at low cost, the authors show that a recycling process using oxygen instead of air may be employed to great advantage in producing nitric acid by ammonia oxidation. Oxygen has often been suggested for the purpose but previous processes have offered various disadvantages that have been overcome, it is claimed, in the proposed method.—*Editors*

SEVERAL PROCESSES have been developed in the past to use oxygen rather than air in the oxidation of ammonia for nitric acid production. These have recognized a number of important advantages that would result, but at the same time have introduced disadvantages of their own that have tended to discourage their use. The process suggested here averts these disadvantages through the use of a large excess of oxygen. After absorption of the nitrogen oxides to form nitric acid the tail gases are recirculated to prevent loss of oxygen. The equipment used is substantially the same as that of the standard processes but its capacity is greatly increased because of the acceleration of the oxidation of NO to NO₂. A considerable saving in the initial cost of plant and in power costs will result.

During World War II, millions of tons of nitric acid were made by the oxidation of ammonia. Although the processes used in various plants differ in details, the general scheme adopted is the same in all of them.

Replacement of air with oxygen for the oxidation of ammonia in this process obviously has many advantages. Among others, a great saving in alloy steel required is made possible by the elimination of a large per-

centage of the inert nitrogen, while a saving in the power for compression can also be realized. Although oxygen is usually an expensive gas, the use of which can be justified only by the direct production of a concentrated acid, there are cases where its use is economically feasible for the production of a weak acid as in conventional plants. For example, in the production of calcium cyanamide, liquid air units are usually provided to supply the nitrogen, while the oxygen byproduct is generally wasted. Such is also the case in plants where ammonia is produced with hydrogen obtained from either the electrolysis of water or the liquefaction of coke oven gas (which usually obtain nitrogen by liquefaction of air).

Existing processes for the use of oxygen in ammonia oxidation, are not very satisfactory. Generally, when oxygen is used, a rich ammonia mixture close to the theoretical ratio of 2O₂:NH₃ is preferred. The use of a rich mixture involves two difficulties. The first has to do with the lower explosive limit which according to the data of the Fixed Nitrogen Research Laboratory¹ is about 22 percent for an air-ammonia mixture and 13.5 percent for a mixture of ammonia and pure oxygen. When using a mixture much higher than 10.5 percent NH₃, which is generally considered the highest allowable limit in plant practice with air, specially designed converters will have to be adopted. Although it has been found that a safe converter can be constructed², for example, one using a water layer which prevents the flashing back of any premature combustion³, this practice has not been widely adopted.

OVERHEATING PROBLEM

The second difficulty encountered in using a rich ammonia mixture with pure oxygen is to keep down the temperature of the catalytic combustion. Although a temperature rise of about 650 deg. C. is obtained with a 10 percent air-ammonia mixture, making it necessary to use a preheat of about 300 deg. C. in order to maintain the catalyst temperature at the optimum level of about 950 deg. C., the use of a rich O₂-ammonia mixture would give rise

to excessively high gauge temperatures. The usual practice for avoiding this difficulty is to add a suitable amount of steam to the mixture⁴. This not only keeps down the temperature but also reduces the explosion hazard. It is disadvantageous however, in that extra cooling surface must be provided and a large additional amount of cooling water used. Also a certain loss of weak acid is unavoidable as the condensate is generally discarded.

In one proposed method of using oxygen⁵, both difficulties above mentioned are overcome by the stepwise addition of ammonia to the mixture. A serious drawback of this process is that mixtures containing NO and ammonia must come in contact with the catalyst which is known to accelerate the reaction $4\text{NH}_3 + 6\text{NO} = 5\text{N}_2 + 6\text{H}_2\text{O}$, as well as the formation of NO by ammonia oxidation. Thus, a serious loss in yield is to be expected.

Another process which has been suggested for the use of oxygen in ammonia oxidation involves the use of a non-explosive mixture containing a large excess of oxygen⁶. According to this process, the resultant mixture is subjected to a condensation system only, in which a part of the nitrogen oxides is removed as dilute nitric acid while the rest is returned to the system and mixed with more ammonia and oxygen to be oxidized in the converter. No attempt to use an absorption system is suggested. The process is simple and requires inexpensive equipment, but the condensate acid which can be obtained by water cooling is low in strength and the removal of nitrogen oxides cannot be complete. As the tail gas is recycled and mixed with ammonia, ammonium nitrate would be formed which not only would cause operating difficulties but would also be partly decomposed to nitrogen in the converter.

As none of the above processes is completely satisfactory, little attempt has been made to use oxygen in ammonia oxidation even where cheap byproduct oxygen is available. Also these processes all differ considerably from current practice using air. The process here proposed for utilizing oxygen, however, involves none of the difficulties mentioned above and follows closely

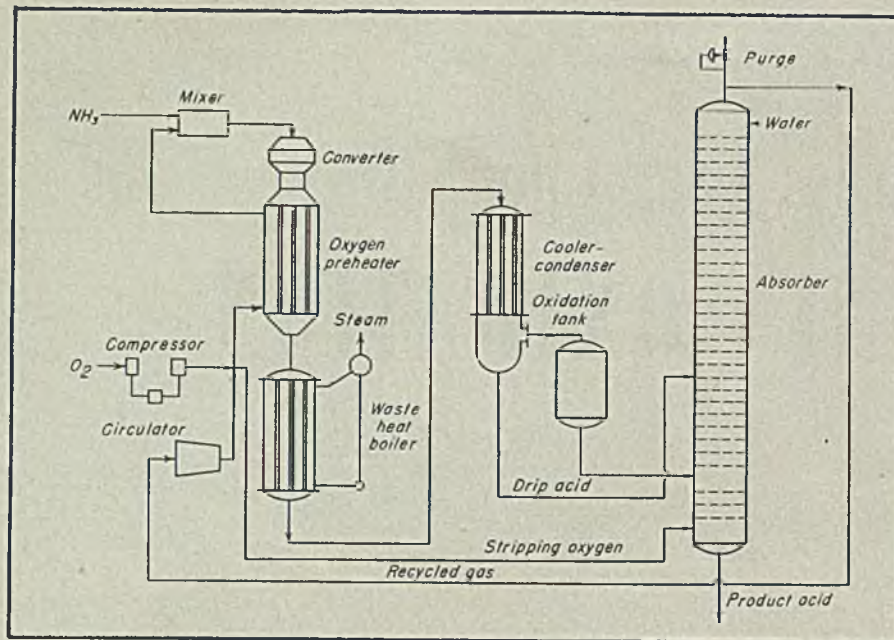


Fig. 1—Flowsheet of proposed ammonia oxidation process

the series of operations in current practice. The equipment needed in this process, furthermore, may be of proved design such as is now used in many up-to-date plants. However, certain parts of it may be greatly reduced in size per unit of capacity.

DESCRIPTION OF PROCESS

A flow diagram of this process is shown in Fig. 1. It can be seen from this diagram that the process is essentially the same as current practice except that oxygen is used instead of air and that the tail gas, containing mainly oxygen from which nitrogen oxide has been almost completely removed by absorption in water, is recycled and mixed with fresh oxygen to be used in the catalytic oxidation of ammonia. A mixture containing about 10 percent ammonia may be used, so that the converter design may be identical to that now used for air oxidation. In fact, a mixture as high as perhaps 11.5 percent can be used since the temperature can still be kept down by using a lower preheat and since modern proportioning flow control equipment can be relied on to maintain smooth operation without danger of a faulty mixture in the explosive range. Such a rich mixture cannot be used in air oxidation as there would not be sufficient excess of oxygen to give the desired high yield⁸.

After conversion, the gas may be cooled, first in an air preheater, followed by a waste heat boiler, and finally with water in a cooler-condenser. After passing through an oxidation chamber, which may be smaller than usual or even omitted altogether on account of the high oxygen partial pressure—and the consequent increased rate of oxidation—the gas mixture is absorbed either in bubble cap apparatus or packed towers. A hubble plate tower is shown in

the figure. This absorption equipment can be greatly reduced in size as will be discussed later. The nitrous gas content in the tail gas from the absorption system can be reduced to a much lower figure than the few tenths of 1 percent usually encountered, because of the tremendous excess of oxygen present. Or, if the emphasis is on saving alloy steel, complete absorption will not be necessary and an auxiliary scrubbing column using soda liquor may be adopted to remove the last trace of nitrogen oxides before the gas is recycled.

As the oxygen used would contain a small amount of inert gases and since some nitrogen is formed in side reactions, the concentration of these inert gases would build up with recycling and it is necessary to purge a part of the tail gas while the rest is recycled. Some oxygen is necessarily lost in the purge gas, but with oxygen of reasonably high purity, such as that obtained by air separation or by electrolysis of water, the efficiency of oxygen utilization can be very high. Assuming an oxygen purity of 98 percent and an oxidation efficiency of 95 percent, the percentage oxygen utilization at various percentages of nitrogen build-up in the recycled gas is shown in Fig. 2. It is evident that a utilization of over 80 percent can be readily obtained without high N_2 build-up in the recycled gas.

ANTICIPATED SAVINGS

Modern ammonia oxidation plants are generally operated under pressure to obtain higher strength acid with smaller equipment and higher catalyst utilization compared with atmospheric oxidation. For such pressure plants, power expense is always an important cost item. This power requirement can be greatly reduced if oxygen recirculation is used.

In estimating the power requirement and percentage saving in power as compared with an air oxidation plant, certain assumptions were made, including: (1) A gas mixture of 11.5 percent NH_3 ; (2) an oxidation efficiency of 95 percent; and (3) utilization of 78.5 mols of stripping oxygen per ton of NH_3 , for bleaching the acid. In the air oxidation process, 87 percent of the total air used goes to the converter, 5 percent to the oxidation tank, and 8 percent to the bleaching section of absorber. It was also assumed (4) that oxygen and air are available at 100 deg. F. and atmospheric pressure; and (5) that oxygen purity is 98 percent.

As most modern plants are operated under a pressure of either about 60 psi. abs. or 120 psi. abs. at the compressor discharge, two cases using these pressures are calculated for consideration. For a conventional air oxidation plant, it is estimated that power requirements are about 1,010 and 1,435 brake hp.-hr. per ton of NH_3 oxidized at operating pressures of 60 and 120 psi. abs., respectively. Under similar conditions, power requirements using oxygen recirculation are also estimated and the results are given in the solid lines in Fig. 3. The dashed lines show the percent power saving as compared with air oxidation. Thus if by-product oxygen is available, 50 percent power reduction can easily be realized at an oxidation pressure of 60 psi. abs., while as much as 65 percent reduction is possible when the oxidation pressure is at 120 psi. abs.

In pressure oxidation plants operating at approximately 120 psi. abs., a considerable portion of the power can be recovered if the tail gas is preheated by heat exchange with the converter effluent and then expanded in an engine. Net power requirement for such a plant is naturally lower than the estimated figure given above. However, under such circumstances, the amount of steam that can be generated in the waste heat boiler will be considerably lower.

As the circulating pump can easily be of the centrifugal type, it is obvious that capital investment for compressors should be lower with the recirculation process.

OXIDATION AND ABSORPTION

The greatest advantage to be realized by using oxygen instead of air is in the increased rate of the reaction: $NO + \frac{1}{2}O_2 = NO_2$. A higher rate for this oxidation reaction not only increases the NO_2 content of the gas entering the absorption system (thus raising the equilibrium acid strength), but also drastically reduces the size of the absorption equipment required. The reaction involved in nitric acid absorption is generally considered as: $3NO_2 + H_2O = 2HNO_3 + NO$. The NO thus formed must then be oxidized to NO_2 according to the first equation before it can be further absorbed. Unfortunately, this reaction is a compar-

tively slow one. In all nitric acid absorption systems, a proper amount of space must be provided for it to take place. No matter whether the system is a plate tower, a number of absorption tanks provided with bubble plates, or a series of packed towers, it must be designed so that the greater part of the equipment volume is left void for this gas phase reaction. The amount of space required is evidently dependent on the rate of the NO oxidation reaction, which for the same partial pressures of NO and NO₂, is favored by a higher partial pressure of oxygen.

The reaction rate in question may be expressed as shown in Eq. (1) where N_{NO} = number of mols of NO in a unit mass, and C_{NO} and C_{O₂} = concentration of NO and O₂ respectively in mols per unit volume. At constant pressure, if we let 2a equal the initial total number of mols of NO in the initial volume V₀, b equal the initial total number of mols of O₂ in the initial volume V₀, V equal the volume at any instant t, and x equal the fraction of NO oxidized at any time t, the Eqs. (2) and (2a) hold, where R is the gas constant, T is the gas temperature, P is the pressure, and r is the fraction of total oxidized NO as N₂O₄. Under the usual plant oxidizing conditions,

the change in volume is small due to the low concentration of NO in the gas mixture, and V can therefore be considered as approximately equal to V₀, so that Eq. (3) can be substituted for Eq. (2).

In order to compare the rate of oxidation of NO using oxygen to that using air, we have to make the same assumptions for operating conditions as previously given, with the exception that a 10.5 percent NH₃ mixture is used in the case of ammonia oxidation with air. Also it will be convenient to assume that 5 percent of oxidation air is added before any oxidation of NO begins. Thus considering the same number of mols of NO, we can obtain Eq. (4) from Eq. (3). Here the subscript 1 denotes the case using oxygen recycling and the subscript 2, air.

Eq. (4) can be readily evaluated and the results are shown as the solid lines in Fig. 4, from which we can see that the oxidation reaction rate is greatly accelerated when oxygen recycling is used, especially at high values of x, where the rate of oxidation using air always becomes exceedingly low. The vastly increased rate at low partial pressures of nitrogen oxides is especially significant, considering the fact that the gas phase reaction is the controlling factor in the rate of absorption at this part of the absorption

$$-d(N_{NO})/dt = k(N_{NO})(C_{NO})(C_{O_2}) \quad (1)$$

$$dx/dt = [2ka^2(1-x)^2(b/a-x)]/V^2 \quad (2)$$

Where

$$V = V_0 + (1+r)x(aRT)/P \quad (2a)$$

$$dx/dt = [2ka^2(1-x)^2(b/a-x)]/V_0^2 \quad (3)$$

$$\frac{(dx/dt)_1}{(dx/dt)_2} = \frac{V_0^2(b_1/a-x)}{V_0^2(b_2/a-x)} \quad (4)$$

$$2kt = \frac{V_0^2}{(b-a)^2} \left[\frac{x(b-a)}{a(1-x)} + \ln \frac{b(1-x)}{(b-ax)} \right] \quad (5)$$

$$k_p = \frac{(P_{NO})(P_{HNO_3})^2}{(P_{NO_2})^2(P_{H_2O})} = k_1 k_2 \quad (6)$$

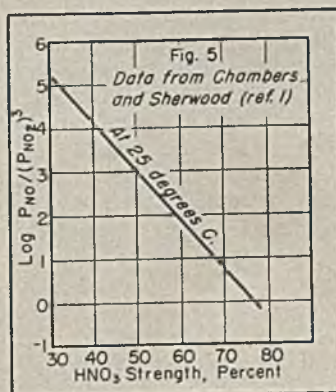
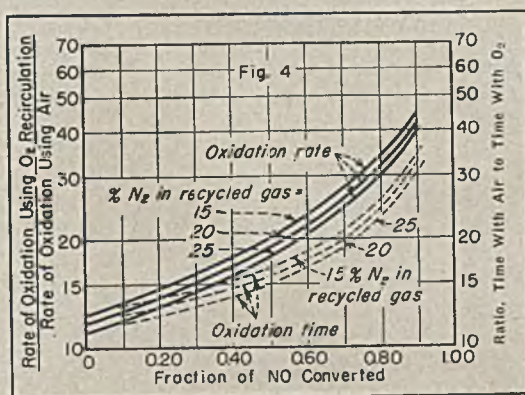
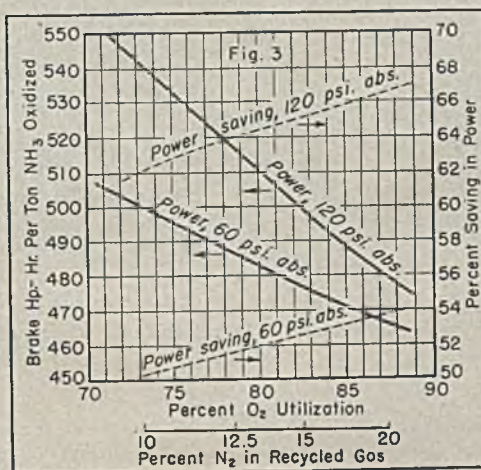
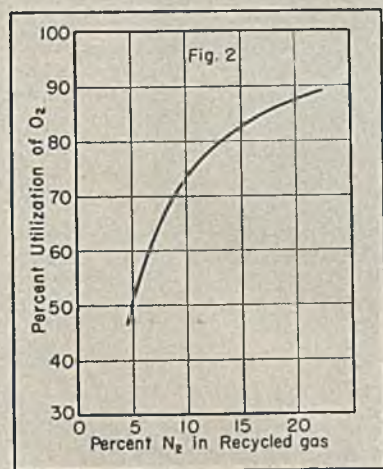
Where

$$k_1 = (P_{NO})/(P_{NO_2})^2 \text{ and } k_2 = (P_{HNO_3})^2/(P_{H_2O})(\sigma ab)$$

system. In actual plant practice, it has been found that only one-quarter to one-third of the total nitrogen oxides entering the system is absorbed in the top half of the absorption tower or the last half of the absorption tanks used, as the case may be. The saving in alloy steel is, therefore, greatest in absorbing the last portion of the oxides.

Eq. (3) may also be integrated to give Eq (5), and the time required to oxidize NO from 0 to 100x percent completion can be compared for the cases using air and oxygen respectively. The calculated results are shown by the dashed lines in Fig. 4.

Fig. 2—Effect of nitrogen build-up on oxygen utilization
 Fig. 3—Power required and power saved by recycling process
 Fig. 4—NO oxidation rate and time compared with air oxidation
 Fig. 5—Equilibrium data for nitric acid solutions



ACID STRENGTH

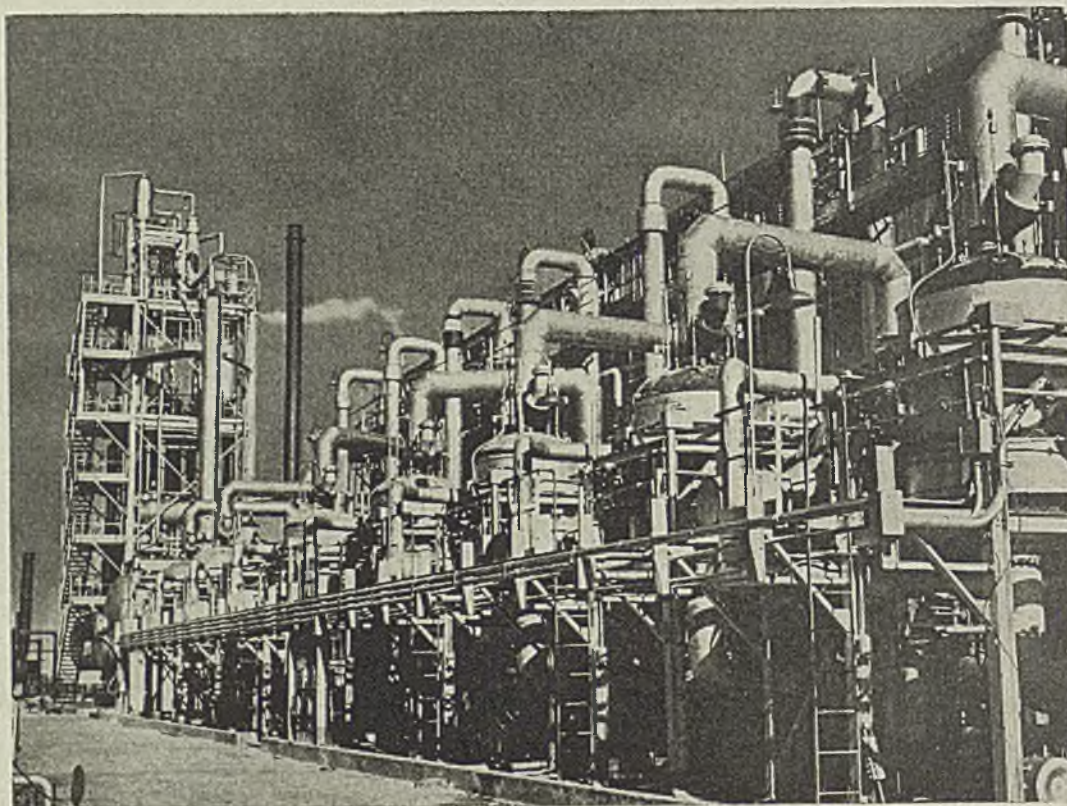
The equilibrium constant for the NO oxidation reaction is given in Eq. (6). At any temperature, vapor pressure data over aqueous nitric acid at various concentrations will determine k₂ thus enabling us to calculate k₁, which is plotted against acid strength in Fig. 5. It can be seen from this graph that the lower the value of k₁, or the higher the state of oxidation, the higher will be the equilibrium acid strength. Therefore, by using a large excess of oxygen as in the recycling process, a higher equilibrium acid strength can be expected. However, this advantage is partially offset by the fact that, with the large excess of oxygen, a greater part of the nitrogen oxide would be removed as HNO₃ in condensate acid, thus impoverishing the gas to absorber. By proper equipment design, it is still possible to condense the water produced by the catalytic reaction quickly enough to minimize the amount of NO₂ reacted before reaching the absorber.

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PHTHALIC ANHYDRIDE

From Petroleum Breaks a Coal-Tar Tradition



Each vessel for converting *o*-xylene to phthalic anhydride has vapor cooler heat exchanger, behind which are located condenser boxes. Installation is at Oronite Chemical Co.

NOW PULLING into full capacity production is the new phthalic anhydride plant operated for Oronite Chemical Co. by Standard Oil of California at the latter's Richmond, Calif. refinery. The plant is unique and of particular significance in that it is the first commercial producer of phthalic anhydride in the world to break away from the 29-year tradition of using naphthalene derived from coking operations as the basic raw material.

Of immediate interest, naturally, is the fact that this plant's use of *ortho*-xylene derived from petroleum processing frees it completely from dependence on coal mining, steel mill and coking operations or on foreign sources of naphthalene. It will help relieve the fear that the limited

supply of naphthalene from domestic coke oven operations might throttle the further expansion of the phthalic anhydride industry. Equally significant is the emphasis the development gives to the growing independence of the synthetic organic chemical industry on coal tars and its swing toward the use of petroleum hydrocarbons.

On the Pacific Coast, this plant will be remembered as the first and only producer of phthalic anhydride west of the Mississippi River, thereby rendering this region independent in respect to a basic organic chemical formerly only produced some 2,000 miles away. In addition to accelerating a healthy decentralization of industry in this country, large-scale production of phthalic anhydride in California

should aid greatly in the sound integration of the chemical and process industries of the West. Already two additional firms will soon begin production of alkyd resins from phthalic anhydride to bring the total number of western producers of these resins for sale from two in 1938 to eight at the present (see Table II).

Research and development work on the *ortho*-xylene process was done at the Richmond laboratories of California Research Corp., research subsidiary of Standard Oil Co. of California. Construction and operation of the phthalic anhydride plant is by Standard of California for Oronite Chemical Co., its chemical subsidiary.

Construction work on the plant, which was designed by F. B. Badger & Sons Co.,

was completed during the late summer of 1945; initial operations began in early September. The plant has a design capacity of 3,500-4,000 tons annually or close to 5 percent of the total domestic phthalic anhydride capacity of about 86,500 tons at present. Total cost of the California plant has recently been placed at close to \$1,500,000.

THREE DECADES OF P. A.

As an industrial chemical, phthalic anhydride has been with us for three decades. For it was in 1916 that a process of vapor-phase oxidation of naphthalene was developed. Before that time, the high price of the anhydride had discouraged all but academic interest in the chemical.

Less than 70 tons of phthalic anhydride was produced in this country during 1917 when the principal outlet was for the manufacture of coal-tar dyes, but production climbed to almost 400 tons in 1920, then to some 3,350 tons in 1930 and 29,000 tons in 1940. Under wartime demands of phthalate esters, the peak production was reached in 1944 when 62,000 tons was turned out. The figure declined slightly for 1945 but still represented a 30,600 percent increase over 1925 and a 425 percent over 1935. Table III shows the rise in production and the decline in unit sales value of phthalic anhydride since 1917.

Actually, the history of phthalic anhydride production can be divided into five distinct phases of growth, each more or less dominated by a new use. These periods might be broken down into those of coal-tar dyes, dibutyl phthalate and other plasticizers, alkyd resins, war uses and the be-

ginnings of the postwar period. The unusual thing about phthalic anhydride is that throughout its growth history it has retained, and quite often expanded, most of its earlier uses. Today, this polybasic acid is used in the manufacture of more than 50 chemicals and pharmaceutical products. About 25-30 percent of the output is consumed in the producing plants.

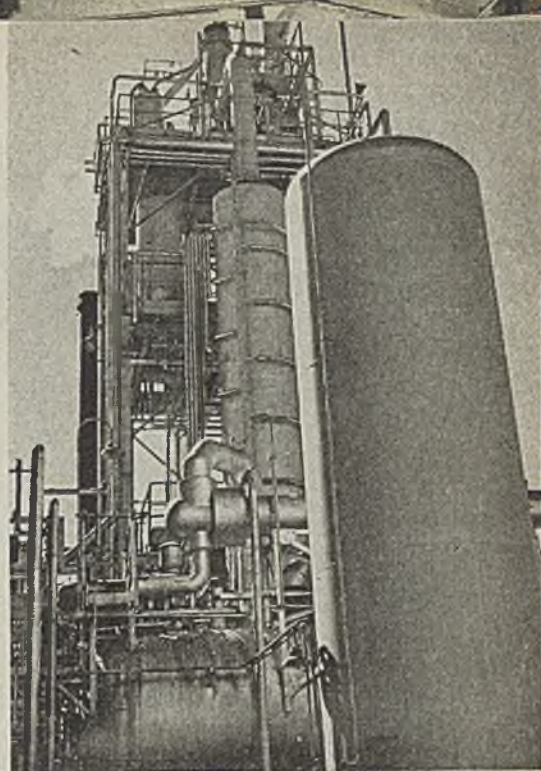
The period 1917-1921 was largely dominated by the use of phthalic anhydride for the manufacture of anthraquinone, alizarin, eosine, rhodamines, fluorescein and many vat dyes and other coal-tar chemicals. About 1922 new uses for phthalate esters as plasticizers caused a growth that dominated the field until about 1930. Dibutyl phthalate, still the most important plasticizer in use today (see Table IV), became widely used in lacquers and resins. Some compositions, such as cellulose acetate, may contain up to 40-50 percent of this ester. From about 1930 until the outbreak of the war, alkyd resins based on phthalic anhydride expanded rapidly for use in protective coatings. In 1944, the output of phthalic anhydride glycerol type resins totalled 63,925 tons, of which 99 percent was used in protective coatings.

With the coming of the war, phthalic anhydride was largely channelled into war and essential uses, mainly those already familiar to the trade. However, considerable amounts of dibutyl phthalate were used in smokeless powder to lower hygroscopicity and somewhat later the discovery of the effectiveness of dimethyl phthalate as an insect repellent for use by troops in the tropics created new demands. By late 1944 it was estimated that the insectifuge was absorbing about 15,000 tons annually or some 25 percent of total phthalic anhydride production at that time.

Prospects for phthalic anhydride in the near future are bright, chiefly since it still remains the cheapest aromatic polybasic acid of commerce. Its usage in the synthesis of dvestuffs and other organics, such as benzoic acid and derivatives, will most likely be retained and probably increased somewhat. Phthalate plasticizers are expected to continue their growth, especially for use in some of the newer resins such as the polyvinyl polymers. The war uses in smokeless powder and insect repellents have dropped sharply, but as a compensation the outlook for phthalate alkyd resins is probably more promising than ever.

P. A. FROM XYLENE

Briefly, the Standard of California process consists of: (1) Feeding preheated air and vaporized o-xylene into catalyst-filled tubes where conversion to phthalic anhydride takes place; (2) cooling the resulting vapors in heat exchangers; (3) condensing and removing the crystals of anhydride; (4) melting the crystals and distilling for purifica-



High-purity molten anhydride from the distillation equipment is pumped to this aluminum storage tank blanketed with inert gas

tion; (5) solidifying the phthalic anhydride into the proper physical form for the market. A pictured flowsheet of the process is given on pp. 138-141 of this issue.

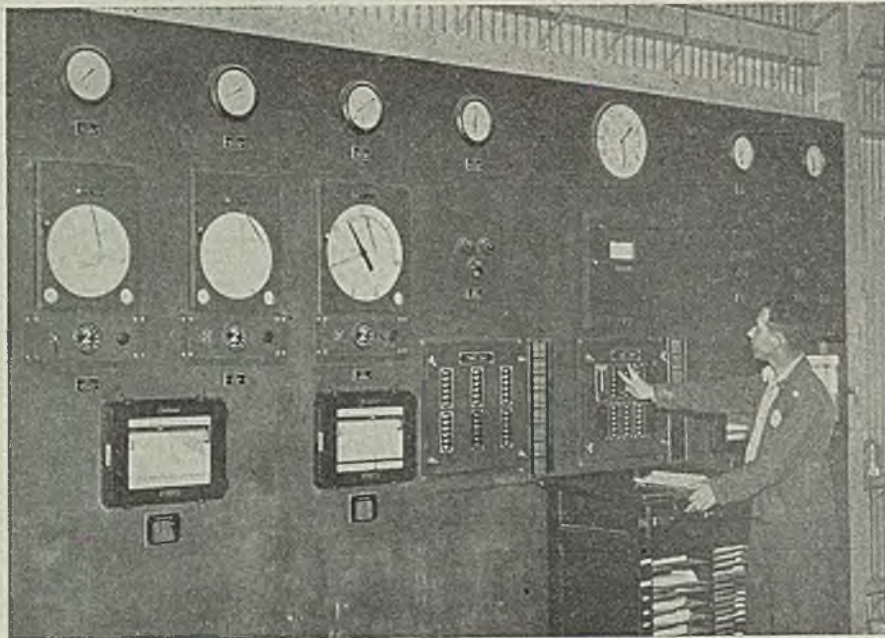
FROM HYDROFORMER UNIT

Raw material feed for the Richmond phthalic anhydride plant is ortho-xylene supplied by the hydroformer unit in the adjacent refinery of Standard of California. This unit, originally built to supply nitration grade toluene for explosives, converts naphtha into a product of high aromatic content. Ortho-xylene, which constitutes about 20 percent of all xylenes in the hydroformer product, is separated from the meta- and para-xylenes to give a raw material feed of high purity for the phthalic anhydride plant.

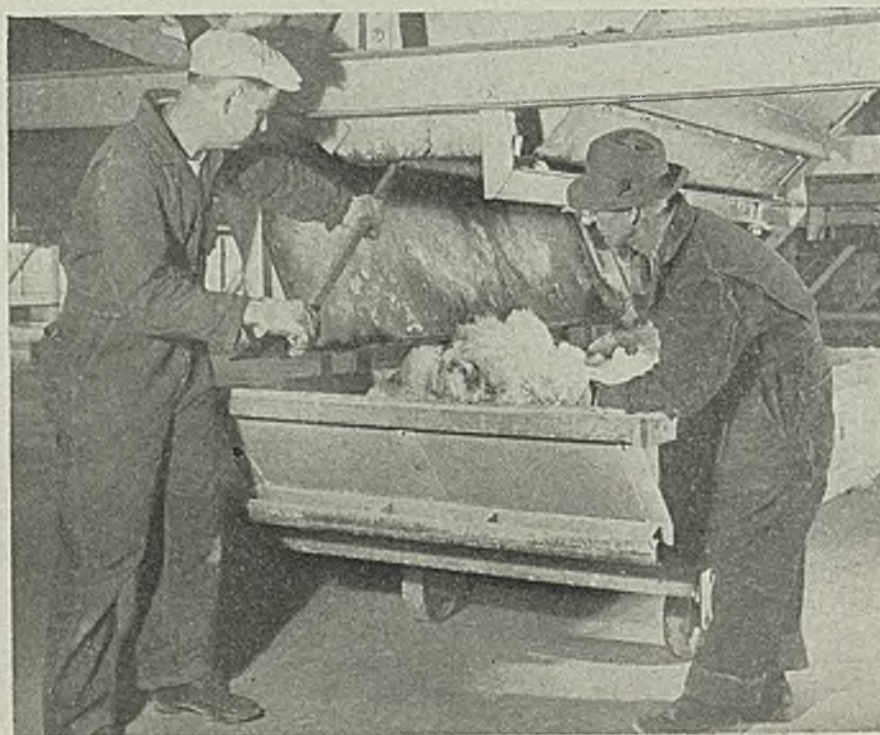
Ortho-xylene is pumped from the two storages, which are 20,000 gal. ordinary steel tanks, into the converters by eight small gear pumps. The plant has a total of eight of these converters with accessory equipment, each individually operated. Rate of feed, temperature, air ratio and other factors are adjusted to give optimum yields.

Both indicating and recording instruments are used on the flow of xylene and of air to the converters. Various sound and visual alarm systems, as well as automatic kick-off devices, are used as safety measures in case of failure of pumps, insufficient ratio of air to xylene, excessive temperature rise, stoppage of flow or any other abnormal condition. Primary purpose of these measures is to guard against an over-rich air-to-xylene ratio in the converters that might give rise to a condition of

Long a basic chemical of commerce, phthalic anhydride will continue to play a major role in our synthetic resins and coatings industries. The first commercial plant to make this chemical from petroleum raw materials has just begun operations in California, thus becoming the pioneer producer west of the Mississippi River. The Oronite process, outlined in this article and illustrated in the pictured flowsheet on pages 138-141 of this issue, uses ortho-xylene instead of naphthalene as the starting material.—Editors



Air and xylene flow temperature in catalyst mass and other variables are regulated to give maximum yields and prevent uncontrolled oxidation



Crystals of crude phthalic anhydride are dumped periodically from the condenser boxes into carts which carry them to the melt tank

uncontrolled oxidation. Cable-drive speed regulators are now used for the gear feed pumps, but these will probably be replaced by quicker-responding diaphragm valve pressure regulators.

Air to the converters is supplied by two centrifugal compressors. The air, after passing through the two intake filters, is compressed and fed by an insulated common header into a horizontal, muffle-type gas burner for preheating. Spent gases from the burner travel with the air throughout the system. Temperature drop in the air line between the burner and the converters is about 70-80 deg. Theoretically, three molecules of O₂ are needed to oxidize each molecule of xylene to phthalic anhydride, only two-thirds of that required for oxidation of naphthalene. In actual operations, about 10 times the theoretical requirement of air is used in order to avoid operating within the explosive limits.

A standard-type machine which burns natural gas is used to provide inert gas for blanketing xylene in storage tanks, purging stills and lines and for blanketing vessels containing molten phthalic anhydride.

HEART OF THE PROCESS

Liquid ortho-xylene is pumped at controlled rates into the vaporizers, which are steam heated. There are eight of these units, each provided with a knockout pot for safety. The xylene is vaporized at substantially atmospheric pressure and the vapors are injected directly into the stream of heated air. Temperature of this mixture must always be above the dew point so as to have all xylene in the vapor state as it enters the converter, the chemical heart of the process. Since the explosive limit of xylene in air is approximately 1 mole percent by volume of xylene, operating practice is always to maintain a lean mixture. This is purely a safety measure.

The insulated converters, which are of conventional design and about 10 ft. in overall height and 6 ft. in outside diameter, are essentially heat exchangers. Each consists of a bundle of tubes filled with catalyst which are cooled by circulation of molten salt outside the tubes. Molten salt is pumped from an outside tank, around the tubes and back to steam boilers where it is cooled by generating 450-lb. steam which, incidentally, is sufficient to supply about 20-25 percent of the steam requirements

Table I—United States Producers of Phthalic Anhydride

Producer	Plant Location
American Cyanamid & Chemical Corp.	Bridgeville, Pa.
Barrett Co. Div., Allied Chem. & Dye Corp.	Frankford, Pa.; Ironton, Ohio
E. I. du Pont de Nemours & Co.	Deepwater Point, N. J.
Monsanto Chemical Co.	St. Louis, Mo.
National Aniline Div., Allied Chem. & Dye Corp.	Buffalo, N. Y.
Pittsburgh Coke & Chemical Co.	Pittsburgh, Pa.
Reichhold Chemicals, Inc.	Detroit, Mich.
Sherwin-Williams Co.	Kensington, Ohio
Standard Oil of California (Oronite Chemical Co.)	Richmond, Calif.
Tar & Chemical Div., Koppers Co., Inc.	Kobuta, Pa.

Table II—Western Producers of Alkyd Resins for Resale¹

Producer	Plant Location ²
American Cyanamid & Chemical Corp.	Azusa
Andrew Brown Co.	Los Angeles
California Flaxseed Products Co.	Vernon
California Ink Co., Inc.	W. Berkeley
General Electric Co. ³	Anaheim
Reichhold Chemicals, Inc.	S. San Francisco
Sherwin-Williams Co. of California ⁴	Emeryville
Specialty Resins Co.	Los Angeles

¹ In addition, there are a large number of firms producing for internal consumption only. ² All producers for resale in the Western states are located in California. ³ Plant now under construction.

Table III—United States Production of Phthalic Anhydride¹

Year	(In Pounds)	
	Production	Sales Value Per Lb.
1917	138,857	\$4.23
1918	227,414	2.85
1919	290,677	0.99
1920	796,210	0.46
1921	2	0.39
1922	1,629,182	0.35
1923	2,343,802	0.29
1924	2,787,308	0.24
1925	3,000,332	0.20
1926	4,379,108	0.18
1927	4,549,820	0.17
1928	6,030,854	0.16
1929	9,168,946	0.15
1930	6,693,001	0.13
1931	2	—
1932	6,259,000	0.12
1933	14,075,844	0.11
1934	20,680,379	0.12
1935	23,421,558	0.12
1936	31,244,378	0.12
1937	45,210,784	0.14
1938	27,650,270	0.14
1939	44,274,430	0.14
1940	57,946,415	0.14
1941	81,300,000	0.14
1942	94,807,180	0.14
1943	114,118,000	0.14
1944	124,063,000	0.125
1945	123,301,944 ²	0.125

¹ U. S. Tariff Commission. ² Not available. ³ Preliminary.

of the entire phthalic anhydride plant. Theoretically, the heat of reaction is less than that for the oxidation of naphthalene to phthalic anhydride; this amounts to +5,460 B.t.u. per lb. for naphthalene and +4,550 B.t.u. for ortho-xylene. In actual operations, side reactions cause both materials to give a heat of reaction considerably higher than the theoretical.

Catalyst used in the converter tubes is, like that for naphthalene, based on V₂O₅. Physical and chemical care in preparation of the catalyst mass is of the utmost importance to prevent dusting and physical deterioration as well as to avoid susceptibility to poisoning and to provide a high degree of activity. Although the plant has now been operating for over nine months, no detectable deterioration of the catalyst has yet occurred.

The period of contact of the vapors with the catalyst is less than one second, although the conversion reaction itself is practically instantaneous. The temperature of the catalyst mass in the tubes is controlled in order to maintain optimum conversion conditions. Actual temperatures are recorded by inserting nine thermocouples

at different levels into the catalyst mass of the same number of tubes for each converter.

Theoretical yield of phthalic anhydride from naphthalene is 116 percent, while from ortho-xylene it is almost 140 percent. This difference is explained by the breakdown of one of the naphthalene rings and oxidation of two of its carbon atoms to CO, CO₂, and water. With ortho-xylene, theoretically no carbon is lost and the reaction is entirely one of addition; actually some CO₂ is formed since side oxidation reactions do occur. Under plant operating conditions, yields of phthalic anhydride from xylene compare very favorably with the best of those from naphthalene.

Passage of the air-xylene mixture through the tube bundles is by downflow. The reacted vapor mass leaving the bottom of the converters is pulled through the coolers, which are vertical tubular heat exchangers. There is a cooler for each of the eight converter units. The steam generated from all the coolers goes to a common header.

CRYSTAL CONDENSATION

After cooling, the gases go through the condensers. There are eight of these units, each with large box-like compartments connected in series. White, straw-like crystals of phthalic anhydride collect on the sides of the compartments until their weight makes them fall into the tapered bottoms. At regular intervals the bottom doors are opened and the crystals dumped into buggies and wheeled away without the necessity of shutting off the individual compartment being dumped. The middle boxes give the highest yield and a pure product containing no carbonaceous material. Actually, the crude crystals from these boxes average close to 99.9 percent purity without any further treatment.

Spent gases from the tops of the condensers go through furnaces having gas burners with a steam jet at the top of the stack. The waste gases are burned in these stacks, about 50 ft. high, so as to eliminate any fume nuisance.

Crystals of crude phthalic anhydride from the condensers are dumped into buggies and then into one of two under-

ground melt tanks. The melt tanks, heated with internal steam coils, are blanketed with inert gas. From this point, the process is operated on the batch principle. Molten anhydride is transferred by a deep well pump from the melt tank to the primary still of two distillation stills in series.

PRODUCT DISTILLATION

This primary still is direct fired and equipped with steel, conventional design packed columns. The heart cut from this unit goes to the secondary still which is heated with 450-lb. steam and has fractionating columns with plates. Both columns are operated under low vacuum. The stills have conventional type condensers as well as intermediate and product storages.

Molten anhydride product is pumped to an aluminum storage tank blanketed with inert gas and heated by means of internal steam coils. From here it is fed to a stainless steel water-cooled surface for solidification. The final product, looking very much like white, lustrous soap chips, is weighed on automatic scales into paper bags of 80 lb. capacity. The bags are sewed and the product is ready for shipment. Off-quality material is dumped back into the melter for reworking.

Freezing point specification of the Oronite phthalic anhydride is 130.5 deg. C. minimum as compared to that of the pure chemical of 130.95. The Oronite product analyzes 99.7+ percent minimum phthalic anhydride and in the molten state its color is water white.

The author wishes to express appreciation for the many courtesies and fine cooperation extended during the development of this article by the personnel of Standard Oil of California and its subsidiaries, especially by J. T. Rutherford, manager of chemicals research and development, Richmond Laboratories, California Research Corp.; I. E. Levine, supervisor, chemical product and process research in the same laboratories; R. L. Cundall, manager of the chemical division of the manufacturing department of Standard of California; and by S. H. Manifold, manager of the market research department of Oronite Chemical Co.

Table IV—Growth of Phthalate Plasticizers

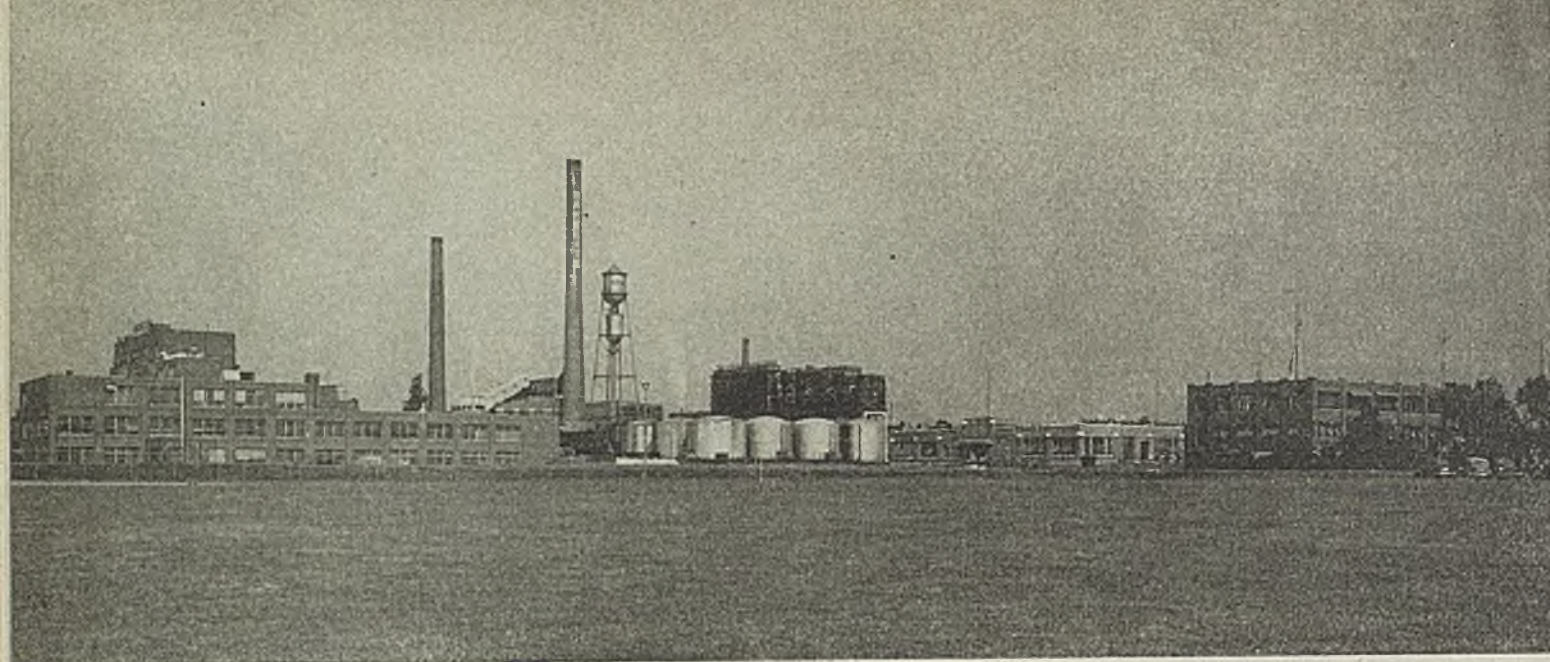
	Production, Lb.	
	1944 ¹	1940 ²
Dibutyl phthalate	47,810,000	8,799,528
Diethyl phthalate	3,478,000	2,306,063
Dimethyl phthalate ³	42,837,000	—
All other phthalates	22,685,000	7,821,833
Total phthalate plasticizers	116,810,000	18,727,424
All other plasticizers ⁴	62,566,000	18,175,158

¹ Bureau of Foreign & Domestic Commerce, U. S. Dept. of Commerce. ² U. S. Tariff Commission. ³ Includes dimethyl phthalate for use as an insect repellent. ⁴ Includes esters of phosphoric, sebacic, and stearic acids and all other cyclic and noncyclic plasticizers.

Table V—Approximate Operating Conditions in the Production of Phthalic Anhydride

	From Naphthalene		From Ortho-Xylene
	Fixed Catalyst	Fluid Catalyst	
Type of catalyst	V ₂ O ₅	V ₂ O ₅	V ₂ O ₅
Type of catalyst bed	Fixed	Fluid ¹	Fixed
Temp. of conversion, deg. F.	675-250	2	>1,000
Theoretical heat, B.t.u. per lb. ²	5,460	5,460	4,552
Actual heat, B.t.u. per lb.	8,000-10,000	10,000	—
Theoretical yield, weight percent	116	116	140
Actual yield, weight percent	70-80	65+	70+
Principal reaction byproducts	CO ₂	CO, CO ₂	CO ₂
Catalyst contact time, sec. (approx.)	0.1	>1	<1

¹ The only fluid catalyst bed is that in the plant of Sherwin-Williams Co. (see *Chem. & Met.*, pp. 100-101, July 1945). ² Reported to operate at a temperature several hundred degrees lower than those using fixed beds. ³ Per pound of raw material oxidized to phthalic anhydride.

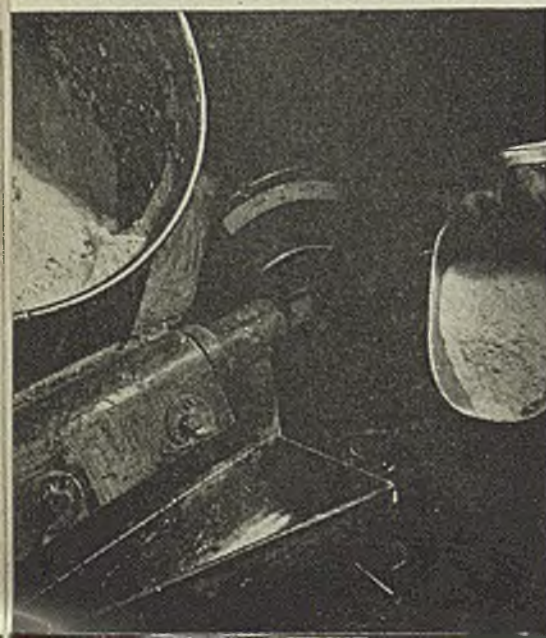


At Bound Brook, N. J., plant Bakelite produces many synthetic resin products. Here vinyl resins in form of white powders, produced at South Charleston, W. Va., plant are compounded and fabricated



Resins arrive in multi-ply paper bags or in hopper-bottom boxcars and are dumped into pneumatic air system for conveying to storage

Raw materials must be weighed

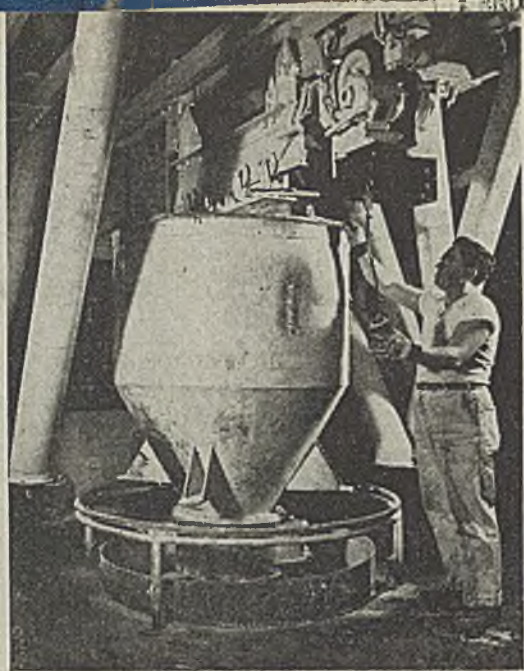


Compounding and Fabrication of VINYL RESIN

JAMES A. LEE

Managing Editor, Chemical Engineering

It isn't often that an editor is permitted to inspect a synthetic resin plant and even more unusual for him to be granted permission to put his observations into print. Yet this happened recently and here is what he saw at the Bound Brook, N. J., vinyl resin plant of Bakelite Corp. This is one of the newest units in the rapidly mushrooming plastic manufacturing industry. Here the raw resins made at the South Charleston, W. Va., plant are processed with lubricants, stabilizers, opacifiers, and coloring materials, and fabricated into plastic sheet, film, plate, molding powder and other forms. For these operations Bakelite engineers have used not only standard equipment but have also adapted several designs from other industries.—*Editors*



A batch of raw materials, other than resins, is made in weigh lorry



Batch of dry components is transferred into blender and resin and plasticizers added. Latter is sprayed over mass for best mixing results

THE ORIGIN of vinyl plastics dates back to 1838, when a white powder was produced by exposing vinyl chloride to sunlight. In 1872, other vinyl materials were discovered which were unaffected by solvents or acids, and rubber-like vinyl compounds were obtained in 1912. But it was not until 1927, when industry was seeking new and improved materials, that the intensive research of Carbide and Carbon Chemicals Corp. developed the first commercially successful vinyl resins. They were turned over to National Carbon Co., another member of the Union Carbide and Carbon Corp. family, to pioneer on a pilot plant scale. And when Bakelite Corp. came into the fold all compounding of resins, within the Union Carbide family, naturally became that subsidiary's responsibility.

Plans were made in 1940 for a large plant at Bound Brook, N. J., where Bakelite's greatest production activities already were centered. This plant was completed in the fall of 1941 just in time to be of inestimable value to the armed services during the entire period of the war, since they filled a place which many of the other, older resins could not, and did it extremely well.

Here the synthetic resins in the form of white powders, produced at the South Charleston, W. Va., plant of Carbide and Carbon Chemicals Corp., are compounded and fabricated. This consists of mixing the resins with the proper lubricants, stabilizers, opacifiers, and coloring materials, then fluxing and milling. The resin "doughs" are next sheeted and ground, extruded, or calendered on paper, cloth or without backing material, depending upon the form to be produced. The fluxing, milling and sheeting operations are accomplished with heated mixers and roll mills in much the same manner as rubber compounding.

The principal raw materials for the Bound

Brook plant consists of several types of vinyl resins, polyvinyl butyral, and copolymer of vinyl chloride and vinyl acetate. Four varieties of the copolymer are used in which the ratio of vinyl chloride to vinyl acetate covers a range from 86:14 to 95:5. In general, those resins containing large amounts of the chloride are used in flexible types of products and conversely those resins low in chloride are the basis for the rigid products.

RAW MATERIALS

The next most important group of raw materials from the standpoint of volume is the plasticizers. To some extent, they, too, are made at the South Charleston plant. For general-purpose plastic compounds diethylhexyl phthalate and tricresyl phosphate are used. For plasticizing polyvinyl butyral resin triethylene glycol di-2-ethylbutyrate is required. Copolymer resins containing higher ratios of vinyl acetate do not require the addition of plasticizing agents to form rigid shapes. This probably accounts, in part, for the desirable aging characteristics rigid materials exhibit.

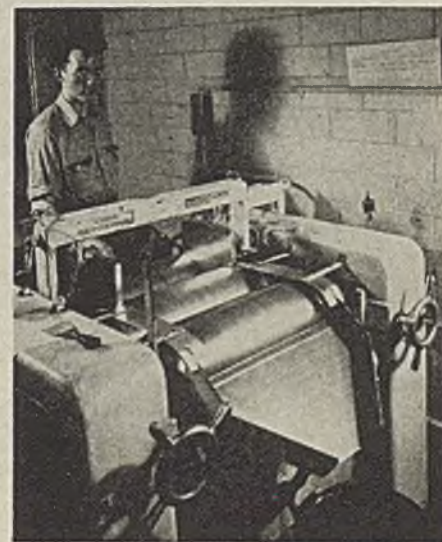
Other raw materials, heat stabilizers, colorants, fillers, and lubricants come from other suppliers. Heat stabilizers inhibit decomposition of the vinyl chloride. They are lead soaps, litharge and white lead. For coloring materials, lakes and pigments are preferred because of better light stability than dyes. The fillers consist of finely divided clay, calcium carbonates and other materials. The principal lubricants are metal soaps and fatty acids.

Raw materials are shipped to the plant by rail or truck. Resins arrive in multiply paper bags or in special hopper bottom boxcars, while plasticizers reach the plant in tank cars, and the other components in drums, barrels and bags. The plasticizers are stored

in steel tanks outside the building. The other materials are stored in the raw materials storage space running the entire length of the building on the south side.

In the center of this long room are two pneumatic air systems for handling the resin raw material. Bags of resin are emptied into the system's hopper and the resin is then passed through a vibrating screen located in a horizontal tank under pressure to prevent dust. Here any metallic particles or tramp contamination which may have been picked up during shipment of the resin will be removed. The resin is then transferred by air pressure through a 4-in. line to the top floor. Here the resin is stored in any one or more of the 28 aluminum storage bins of 35,000 to 40,000 lb. capacity each, arranged in two rows along the north and south sides

3-roll paint mill is generally used for dispersing colors in resins but they may be added in blender



of the building. The powdered resin is separated by cyclones atop the bins and the air returned through bag houses and exhausted to the atmosphere.

Dry components, fillers, dry lubricants and some colors are carried to the floor below that on which the resins are stored by means of freight elevators. They are stored in hoppers equipped with dust collectors.

A batch of the dry components, other than resin, is made in a weigh lorry placed beneath the hoppers. Lorry and contents are then moved along the overhead tramrail to a blender underneath a resin storage bin. Below the storage bins are stainless-clad steel blenders of 5,000 lb. capacity. Each blender is jacketed and equipped with a horizontal ribbon agitator, which is designed to draw the mixed material to the opening in the center of the bottom for discharging.

The batch of dry components is transferred into the blender and the resin added. Approximate weights are checked automatically and final adjustments are manual. A photoelectric device on the scale shuts off the addition of material when the predetermined weight has been reached. Plasticizers are added to the charge in the blender through metering pumps and a pipe line running the length of the blender on one side and near the top. By spraying the liquid plasticizer over the mass the best mixing results are obtained.

Certain of the lubricants are too viscous at room temperature for proper blending with the resins and other components of the batch. To overcome this factor, such lubricants are heated to the point at which they are sufficiently fluid in nature to allow adequate mixing. This blending system was installed so as to improve the quality of product and to increase output of the equipment.

The blended compound in the form of a powder moistened with the plasticizer is dropped into a stainless-clad steel weigh lorry directly below the blender. The mass is held in the lorry until the mixer is empty and ready for another change. A lorry operates on an overhead tramrail and serves two blenders. It is moved to a point above the opening in the floor through which the contents can enter a mixer.

COLORANTS ARE ADDED

In most cases the colorants are added to the mass in the mixer. It is not necessary to add them to the resin mass at an earlier step in the processing, but if the colorants were so added, particularly the intense ones, they would make it difficult to clean the equipment. When long runs are made the colorants are added in the blender.

The colorant used determines the method employed to disperse the colorants in the plastic compound. In some cases a 3-roll paint mill is used to grind the pigments into the plasticizer to form a paste.

An intensive type of mixer is used to disperse the paste colorants with resin and is

generally used when the mix is wet or damp. Dry resin-colorant mixes are blended in an end-over-end dry blender. The resultant mix is added to the mixer as a color composite.

A system of signal lights provides communication between the mixer operator and the operator of the charging lorry on the floor above. Each mixer has a capacity of about 150 lb. of material. The mass is mixed until it reaches a predetermined temperature on the indicator. This requires from 2 to 8 minutes, depending on the formulation. The mixer fluxes the mass by frictional or applied heat and changes the dry, bulky material into a coherent dough.

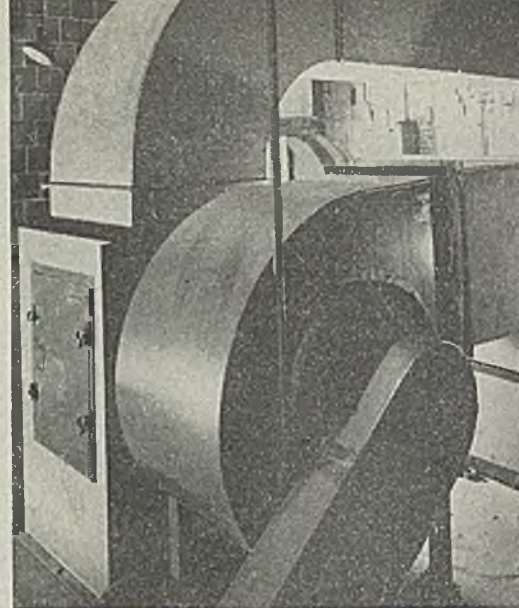
The mixer dumps the mass onto a conveyor which carries it onto a hot 2-roll mill. After further mixing on this mill it is removed by hand and placed on an elevating conveyor which carries it to the top of a 4-roll 3-high calender. Rolls are 66 in. wide and steam heated. To govern thickness of the product, a motor is provided to move the rolls together or apart, as the case may be. The motor requires one minute to move the rolls apart 0.0025 of an inch. Flexible material can be calendered into tape, thin film, heavy sheeting or material to be granulated. Rigid compounds are generally calendered into sheet form.

WHY THE BAYS?

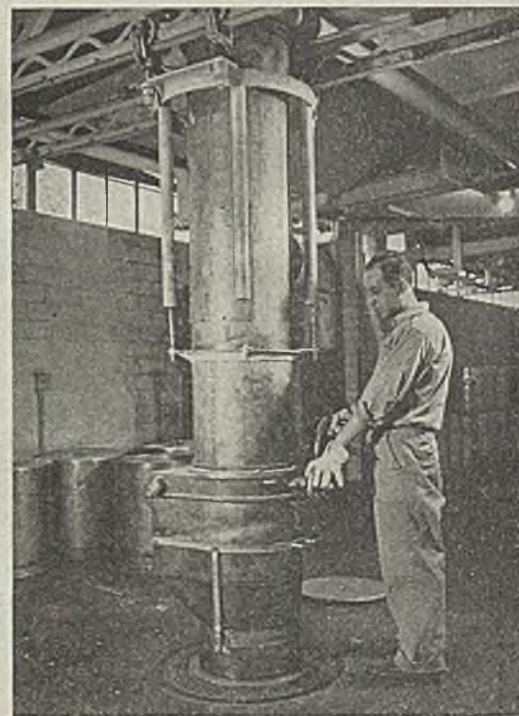
The reason for having a number of bays and for separating them by partitions is to segregate the operations and raw materials, especially colors and resins, leading to different types of end products. In each of the bays material for a different purpose may be produced. In one bay film of 0.004 of an inch in thickness was leaving the calender. It is for use in making consumer goods such as rain coats, shower curtains, umbrellas, etc. In another bay the calendered film is moved directly by overhead conveyor to a granulator. After granulation it is pneumatically conveyed into a cyclone and discharged onto a magnetic separator and vibrating screen. The material is then bagged for shipment. This granulated plastic is for electrical insulating and molding compounds.

Most of the bays contain two mixers. The two are required to supply the mill and calender when thick sheeting is produced.

In yet another bay transparent, translucent or opaque sheeting from 10 thousandths of an inch up with a matte or polished surface is made from calendered sheeting in a hydraulic press with heated platens. The press has ten openings. Sheets of plastic are built up into sandwiches consisting of a number (depending on the thickness to be planished) of metal planishing plates and sheets of plastic, then loaded into ten openings of a 20-opening hydraulic elevator. Alternate openings are vacant. Sandwiches are transferred to empty openings in the elevator. The elevator is dropped one opening and the sandwiches to be pressed are



Air conditioning system when installed was one of largest in industry

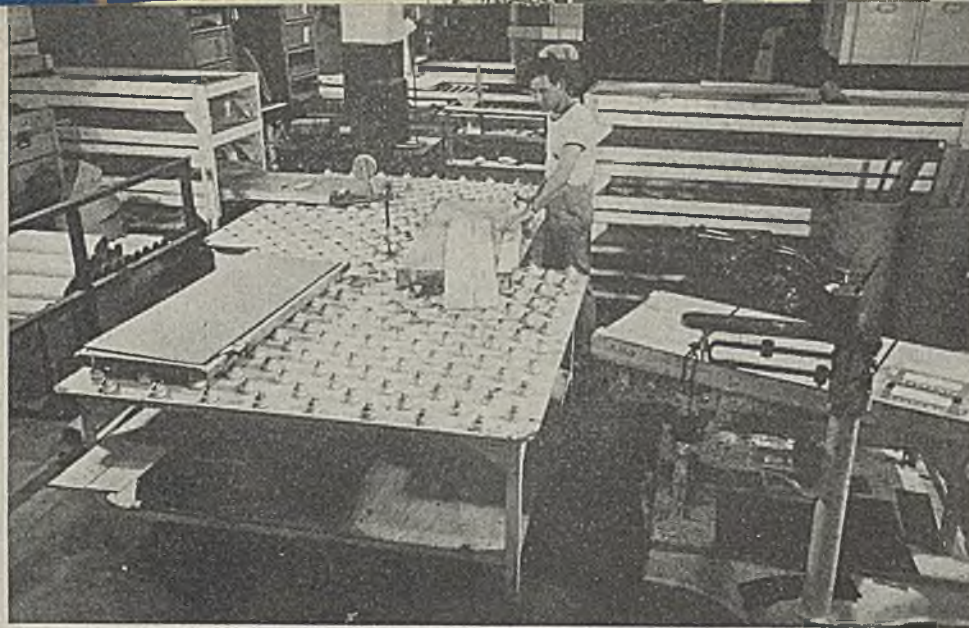


Blended compound is dropped into stainless-clad steel weigh lorry

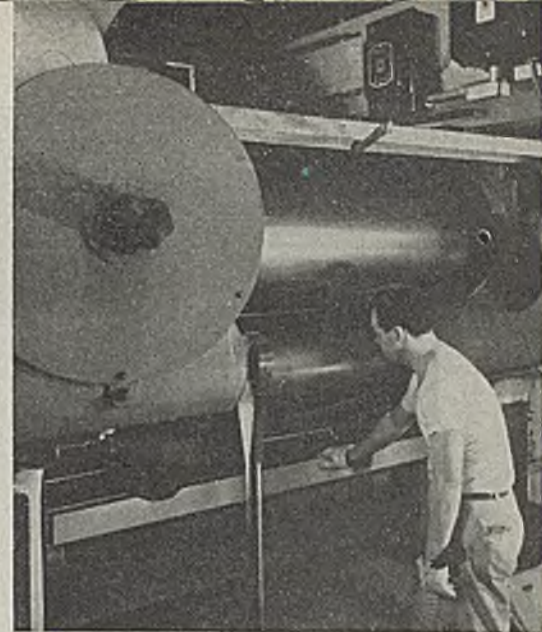
inserted in the open press. Pressing cycle is automatic and is controlled by recording and controlling equipment.

When the sheets are removed from the pressing operation they are carefully inspected under fluorescent lights for imperfections and packed into paper-lined wooden boxes. To protect the finish on the surfaces of the planished sheets and metal plates the operators wear gloves.

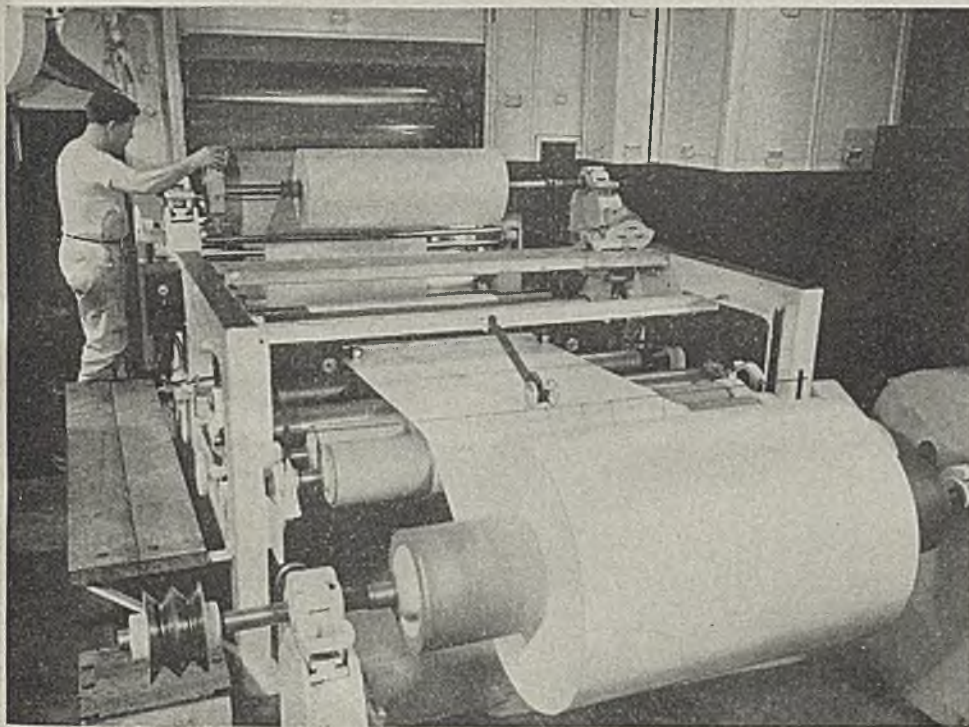
Boxes of plastic sheets are handled on ball-type conveyor tables. This type of conveyor is convenient for handling boxes where there are corners to be turned and for turning the boxes around and otherwise handling



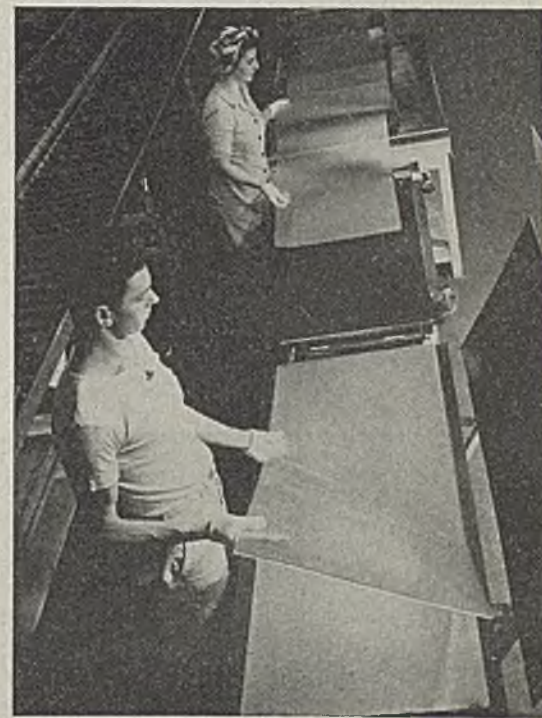
Boxes of plastic sheet are handled on ball-type conveyor tables which are useful where there are corners to be turned



Further mixing of the ingredients in the mass is done on roll mills



After mixing is complete the mass is placed on air elevating conveyor which carries it to top of a 4-roll 3-high calender



Sheets are carefully inspected by men and women wearing gloves

them. The conveyor was constructed in Bakelite's own machine shop from ball and socket units obtained from conveying equipment companies. The steel balls are 1.5 in. in diameter and each socket unit is rated at 100-lb. load carrying capacity. These conveyors are frequently used in the automobile industry.

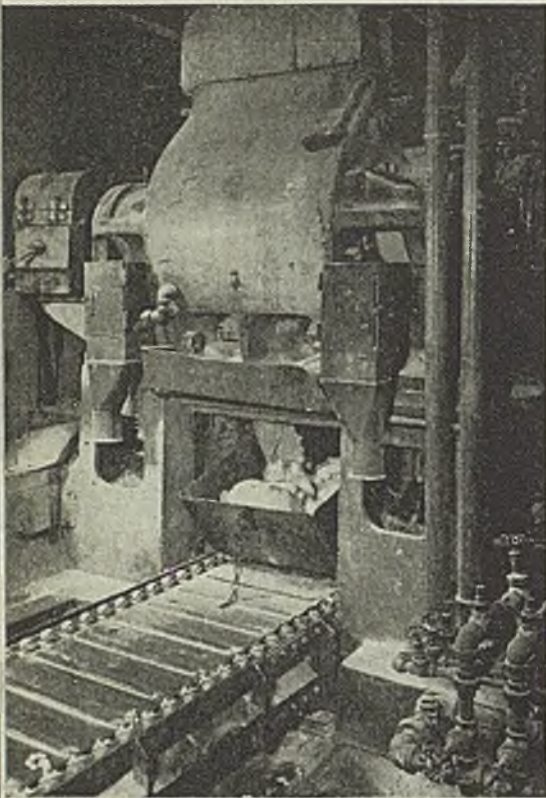
Vinyl resin coated paper to be made into closure liners for food products is produced in another bay. Vinyl resin compound plasticized with an innocuous material is calendered onto bleached sulphite paper for this purpose. A magnetic gage continuously measures the thickness of the coating on

the paper. The resin compound for the closure material is white, soft and flexible. It will not be attacked by foodstuffs and most chemicals. The resin coating and paper are of approximately equal thickness and total 0.005 of an inch.

The sandwich material for safety glass is based on polyvinyl butyral resin. The demand for safety glass is so large in normal times that the equipment in one bay is kept continually busy on this one application. The resin is plasticized with triethylene glycol di-2-ethylbutyrate. The materials are then mixed. The mass is calendered and dusted with sodium bicarbonate which re-

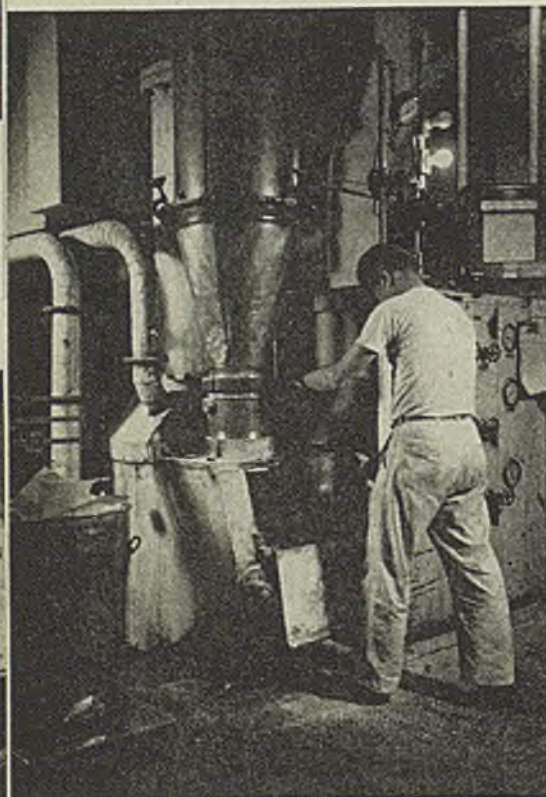
duces the tackiness. Film on leaving the calender passes through a festoon dryer where the water is removed and then rolled into continuous lengths. The speed of the festoon passing through the dryer is coordinated with the calendering rate by two photoelectric devices.

The building in which the vinyl resin compounds are produced is of Gothic design. The railroad siding along the south side is reserved for incoming raw materials and the siding along the north side for outgoing finished products. Raw materials are stored in the space that extends the entire length of the building on the south



Colorants are generally added to mass when in mixer. When long runs are made they are added in blender

Mixer fluxes mass by frictional or applied heat and changes dry, bulky material into coherent dough



side. Finished plastics are stored in the corresponding space along north side. In between these two large rooms and perpendicular to them are 16 operating bays. This arrangement provides straight-line flow of materials.

BUILDING LAYOUT

The general layout of the building is such that extensions can be added without disrupting the present plan concerning facilities and flow of materials. The significant feature of the construction is the fact that all manufacturing areas are windowless, with artificial lighting and air conditioning for purposes of cleanliness, working comfort of personnel, and maintenance of uniform processing temperature. These features are very important from the standpoint of product quality. Every possible precaution is taken to prevent contamination of the materials during storage and processing in order to turn out a product of the highest purity and perfection. Much of the processing equipment has been made of special alloys to prevent any corrosion or even tarnishing with resultant discoloration of product. The resin storage bins are aluminum, and the blenders, lorries and hoppers are made of stainless-clad steel. All machinery has been painted white to encourage cleanliness. The operators are required to wear white work clothes. The men and women in the lamin-

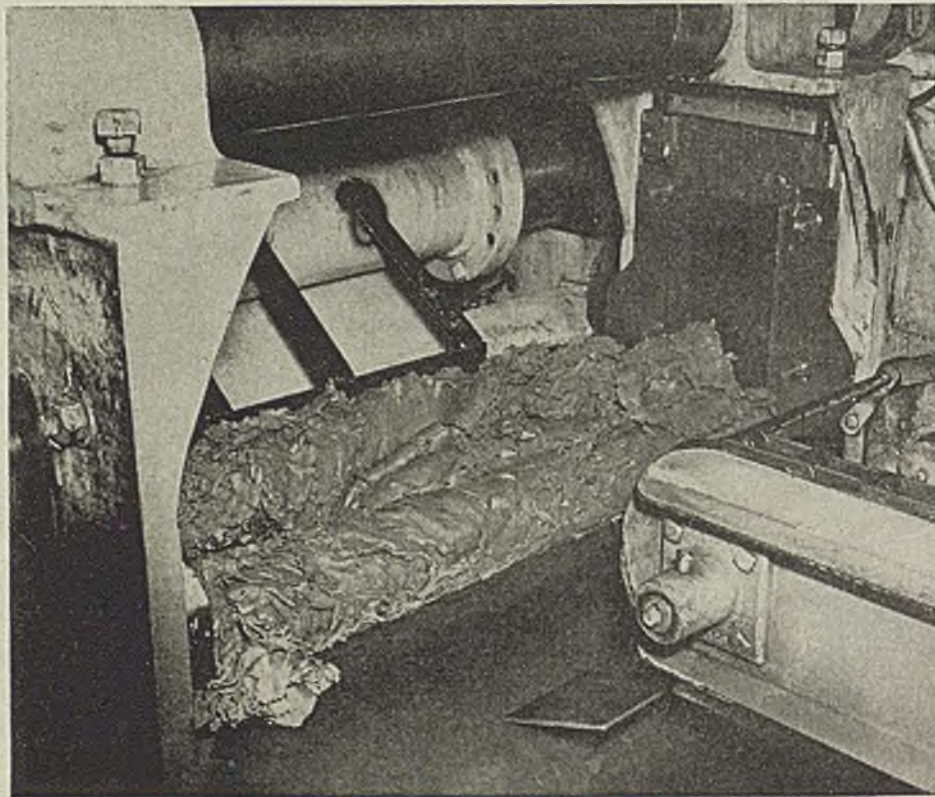
ating bay wear white gloves. Dust arresters are used on several operations to further insure manufacture of high quality products.

When the fabricating plant was completed in 1941, the air conditioning system was one of the largest industrial installations at that time. An interesting sidelight in connection with this great plant and its large air conditioning system is the role that the late Dr. Lco Baekeland, founder of the Bakelite Corp. played in the field of air conditioning. Dr. Baekeland is said to have been the father of modern industrial air conditioning (paper read before the International Congress of Applied Chemistry in Berlin, June, 1903).

This air conditioning system consists of two compressors, each with capacity of 500 tons per 24 hours of refrigeration. Only one is used regularly during the summer months; the second is used for stand-by service and for possible additions to the buildings.

The volume of air circulated in each of the 16 manufacturing bays is 45,000 cu. ft. per min. All of the air is filtered and half of it is conditioned to 85 deg. F. and 40 percent relative humidity, to be circulated in the working area. The balance of the air is filtered raw air and is circulated inside the machine enclosures. The positive air pressure maintained in each bay, for the purpose of excluding air-borne dust, is a fraction of one inch hydrostatic water pressure.

Mixer dumps the mass onto a conveyor carrying it onto a hot 2-roll mill which gives the vinyl resinous mass additional mixing. Each mill is in its own bay separated by partitions in order to segregate operations and raw materials



A-BOMB TESTS

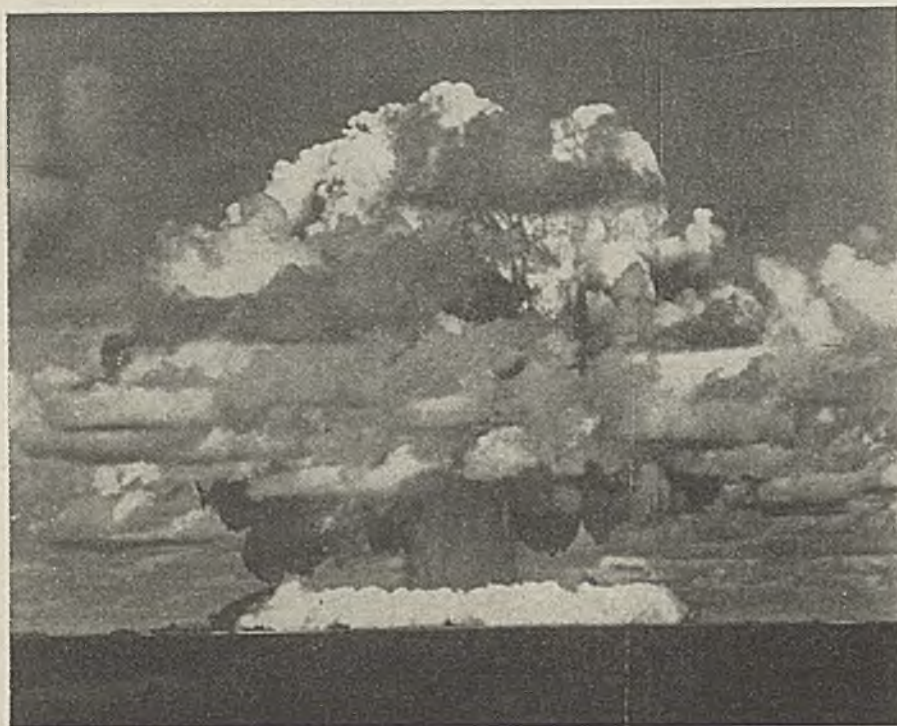
(Continued from page 96)

Skilling and I tramped through the jungle to the original Jap hangout during their occupancy. There's not much left except a cistern, two wells, some trenches, etc. There is a lot of Japanese markings on lumber and crates. We then walked for a half mile out

on the coral shelf on the ocean side of the island. Home tired and hungry after a refreshing dip to eat a ten course "4th of July" dinner, even a cigar and a package of cigarettes at each place. We said goodbye to Bikini Lagoon, the boys all agreed that it was good to get on the way again, that it really felt like old times to be in the open sea with the good ship Panamint plunging and rolling along on a visit to Guam and other of the islands.

TEST BAKER

A Great Spectacle Impressive to Behold



—Press Assoc.

Baker Day—25 July 1946

THIS is the day we've been waiting for. The gods are with us for the weather is fine and everything is set for the big underwater test of the world's fifth atomic bomb. It's now 0735 so there's exactly an hour left before the scheduled explosion. I've been up since 0530, mostly on deck watching us steam into position. A new position, at that, because it is apparent that the wind has shifted and is now blowing from rather than toward the NE. Therefore we guess that we'll be on a SW line from the point of detonation—probably about 12 miles away, or even less. We can see the target array, even without glasses, which is an improvement over the first test.

I have never seen quite so many in the wardroom for breakfast promptly at 0700. They gave us steak and potatoes—with

onions, believe it or not! I sat opposite big Bob Aiken of Ossining, N. Y., who reminded us that the day after an execution in Sing Sing the papers always say "the dead man ate a hearty breakfast." We did. Both of the radar television screens were on the beam and we could see two views of the target array. One was from a low tower on the island, for you could see the palm trees on Bikini Beach. The other was probably from our own radar. It was possible to identify the *Saratoga* and the *Nagato* which will help us orient ourselves in relation to the schematic diagram given us.

It's now 0855 and the excitement is over. What excitement it was! As a spectacle, Baker made up for more than all our disappointment at the sight we saw at Able. It was tremendous in size—and did not follow any previous pattern. Before I at-

tempt my feeble description, let's go back a bit and pick up where I left off. About 0745 I went up on the boat deck and argued with some of the navigators about our position.

At 0800 I went up two decks higher to the flying bridge where I had seen the first test. I sat along side of Major Orlando Rangel, the Brazilian observer. First there was a flash that lasted only an instant. To me it was formless and brilliantly white. Immediately there arose the grey-white pillar of steam and water. It was only perhaps 10 or 20 ft. high and 2,000 or 2,500 ft. wide when I first saw it. Then it built right up upon itself and in a second or so it was four or five times as high as it was wide—so it must have been at least 10,000 ft. and could possibly have been 15,000. Then the billowy clouds began to spread out from the whole base like vapors from a boiling kettle. Suddenly a whiter, brighter cloud shot upward from the middle of the pillar and in less than a minute because it preceded the sound of the blast which reached us at 54 sec. according to Major Rangel's stopwatch. I neglected to say that almost simultaneously with the blast, some of us felt a very slight heat wave—about like a momentary flash of average sunlight—no more or less intense.

Then as the kettle continued to boil, the clouds became darker and denser and completely blotted out the whole horizon in the direction of the target array. Looking upward, I tried to find the typical mushroom pattern in the mounting clouds. There may have been a slight hint at such a formation but it was indistinct. There were rounded "heads" or billows as the clouds went higher and higher. But about this time, I was attracted by the waves that were beating up against the reef. At first they were just white-caps but each was followed by a larger and higher wave until they reached a peak I would estimate at 10 ft. They continued for five minutes or so but gradually subsided.

By this time the foggy clouds at the horizon had lifted enough for us to catch fleeting glimpses of the island and targets. At first we thought that Baker had "shot the works." Then we began to recognize one after another of the more prominent ships.

26 July 1946—8:10 a.m.

We are in the lagoon and have been since about 4 o'clock yesterday afternoon. Our position is a little more than a mile from the beach at Bikini and perhaps two or three miles from the target array. Things are still on the "hot" side from standpoint of radioactivity but I expect that we'll be in the small boats before the end of the day, cruising around the ships even if not permitted to go aboard.

Blandy gave some figures which interested me immensely since they gave expert con-

firmation to some of my wild guesses of yesterday morning. He said that the pillar of water was 2,100 ft. wide at its base and I had guessed it was between 2,000 and 2,500 ft. He said it rose to a maximum of 9,000 ft. in height before merging into the clouds. I guessed that it had been at least 10,000 ft. but might possibly have been 15,000. Not bad for a landlubber amateur, don't you think? We were also fairly close on the height of that wave which at its peak I had estimated at 10 ft.

We had a two hour session appraising the observations of the observers. These meetings of the Monday morning quarter-backs give me something of an inferiority complex. I know I'm color-blind but I hate to be reminded that I can't see other things that others can see. For instance yesterday there were at least a dozen in our group who said they saw whole ships or parts of ships carried high aloft by the geyser caused by the bomb burst. Dunbar of Yale admitted that he saw a ship standing almost upended in the column. John Grebe said he saw what he thought might have been a submarine. Others reported they saw debris. Gene Starr of Oregon, who was in the Eagle's Nest this time, saw some ships roll violently on their keels—maybe as much as 45 deg. Marshall Stedman of Canada believes he saw the Arkansas sink. So much for what we saw.

27 July 1946—7:55 a.m.

There was better agreement on what we heard. The noise that came to us was clocked at 53, 54 and 55 seconds by various observers. Some thought it sounded about like the crack of a pistol—others said it was more like a shotgun. The arrival time of the shock wave, which most of us felt as a sensation in our cars was 12 seconds. Calculations based on both of these figures indicate that we were about 11.1 to 11.3 statute miles from the burst. The water wave was calculated to have moved forward at the rate of 65 to 70 ft. per sec. It ran up the beach at Bikini for about 30 ft. or so but did not wash over any except the very smallest islands. It was probably between 5 and 10 ft. high. It took the wave about three minutes to reach Bikini.

28 July 1946—8:30 a.m.

Yes sir, we're homeward bound! The conference with Admiral Blandy and party yesterday afternoon gave us a lot of satisfactory information but none quite so thrilling as the news that we were to pull out at 6 o'clock for Kwajalein and await orders there for debarkation to the States. The whole thing had an electrifying effect on the ship. You could feel it in the very atmosphere. The crew sang louder and longer last night. And all of us are studying our calendars to dope out when we may hit the USA.

There's lots to report as a result of two things: the conference with the Blandy party and our own inspection of the beached destroyer Hughes. I'll do them chronologically. We got a sudden call yesterday morning that the observers might make an inspection of one of the damaged vessels. So we got into one of the Panamint's landing craft and pulled away about two miles to the beach at Enu Island where the salvage vessels had beached the US Destroyer Hughes 410. It had been badly mauled by the blast and was listing so that her deck was only 2 or 3 ft. above water. Apparently she was "cool" enough radiologically to permit attaching a tow and they hauled her over to this small island next to Bikini. As we came up to her we could see that the stack and superstructure had been crumpled. On her port side, a great section of her bridge had been pushed out, apparently by the waves, and was dangling down at an angle of 45 degrees. Pulling around to the starboard (beach side) we saw a strange sight. Two of her large torpedoes had been ejected partly from their projecting tubes. One was sticking straight out about 10 ft. The other was further extended and held only by its tip so that it dangled dangerously at an angle of perhaps 30 deg. As we passed by within 20 to 30 ft. we held our breath for fear that the torpedoes might come loose and come at us.

Now for the Blandy conference that started about 1430 and was shared with some of the officers from the Blue Ridge. Admiral Blandy was piped on board. With him were Admiral Parsons, General Kepner, Dr. Sawyer, technical director, Captain Neskern, (ship materials expert), another naval captain on safety and Captain Quackenbush, the naval photographer. They held forth for almost two hours. Blandy told us first that the radioactivity was persisting longer than had been expected and that it would be several days, perhaps a week, before it would lift sufficiently to allow complete inspections. He summed up the official score of damage as follows: Sunk: Arkansas, battleship; Saratoga, aircraft carrier; Cement Yard Oiler 160; two landing craft tanks and; of course, the LCM in which the bomb was planted. Possibly sunk: Five submarines, the Pilotfish, Apogon, Skipjack, Sea Raven and Dentua. But there is conflicting evidence on the subs, he said. In the case of the Apogon, there have been air and oil arising from her and she is undoubtedly on the bottom. The others have cut loose from their buoys and are presumed to be on the bottom but no one knows if their seams have opened. The Skate and Parch remained on the surface. The Tuna, which had been submerged, has just been surfaced. In addition there was bad damage to the Hughes, the transport Fallon and the battleships Nagato and New York. The Fallon has also been beached.

Admiral Parsons reported that all preparations on the bomb had proceeded on schedule. It had been kept all night on LCM 60 and the "trigger" was set when the party finally left the ship at 0607 Baker Day. Bomb efficiency has not been calculated finally but preliminary estimate is that it was of about the same efficiency as all the others. Dr. Sawyer reported that the instrumentation appeared entirely satisfactory, that is, he believed that he would have measurements for all the efforts expended. Sawyer said that the size and height of the water columns were about as calculated by extrapolation from the TNT experiments conducted in the States. He guessed that nothing happened that was not predicted but admitted that many things predicted did not happen. Wave height was measured at 10 to 15 ft. at 8,100 ft. from point of detonation. Using accepted formulas for calculation of wave height, this meant that at 4,000 ft. from the center the wave was actually 200 ft. high. The first wave was not technically a gravity wave but rather an annulus of water driven out by the explosion. It is believed that the column of water may have been only about 5,000 ft. high rather than the 9,000 or 10,000 originally estimated. The explanation is that the soft bottom of the coral lagoon may have dampened the blow. We know from the green color that there must have been a large crater scooped out of the bottom and this will be measured by instruments as soon as the area "cools" down.

The captain reporting on safety said that the present situation requires serious study before permitting any more inspections. The most dangerous ("Geiger sour") area, also called "red", is now about 40,000 sq. yd. and included 31 of the target vessels. The next most polluted area, called "blue", covers 70,000 sq. yd. and includes almost as many vessels. So far "green" area is limited to vessels at extreme fringes and a few spots. The oil slicks that are occasionally seen still are often 1,000 or several thousand times more active radiologically than the water itself. Fortunately, there has been a good breeze that is having a purging effect in blowing the red area west and north of Bikini Island—between Bikini and Enu. Sawyer estimated that 25 percent of the radioactivity went into the water, mostly concentrated in top 25 ft. of depth. The heaviest contamination was within 2,000 ft. of the burst.

Captain Neskern reported that damage from wave action was considerable. A buoy now rests on the deck of the Nagato.

I'll sign off and get this on the boat now being lowered to go ashore at Kwajalein. It's 1045 and I've been to church in the meantime. Quite a bit of news after a day here at Kwajalein. We are still in the harbor but our orders came through last night and sometime during the day we shall weigh anchor and be on our way to the USA.

CHEMICAL ENGINEERING PLANT NOTEBOOK

THEODORE R. OLIVE, Associate Editor

\$50 CASH PRIZE FOR A GOOD IDEA!

Until further notice the editors of *Chemical Engineering* will award \$50 cash each month to the author of the best short article received that month and accepted for publication in the "Chemical Engineering Plant Notebook." The winner each month will be announced in the issue of the next month: e.g., the August winner will be announced in September, and his article published in October. Judges will be the editors of *Chemical Engineering*. Non-winning articles submitted for this contest will be published if acceptable, in that case being paid for at space rates applying to this department. (Right is reserved to make no award if no article received is of award status.)

Any reader of *Chemical Engineering*, other

than a McGraw-Hill employee, may submit as many entries for this contest as he wishes. Acceptable material must be previously unpublished and should be short, preferably not over 300 words, but illustrated if possible. Neither finished drawings nor polished writing are necessary, since only appropriateness, novelty and usefulness of the ideas presented are criteria of the judging.

Articles may deal with any sort of plant or production "kink" or shortcut that will be of interest to chemical engineers in the process industries. In addition, novel means of presenting useful data, as well as new cost-cutting ideas, are acceptable. Address Plant Notebook Editor, *Chemical Engineering*, 330 West 42nd St., New York 18, N. Y.

June Contest Prize Winner

HOW ELECTRICAL CONDUCTIVITY CAN AID IN SEPARATION OF IMMISCIBLE LIQUIDS

J. E. CORNISH

Beckers Pty. Ltd.
Dudley Park, South Australia

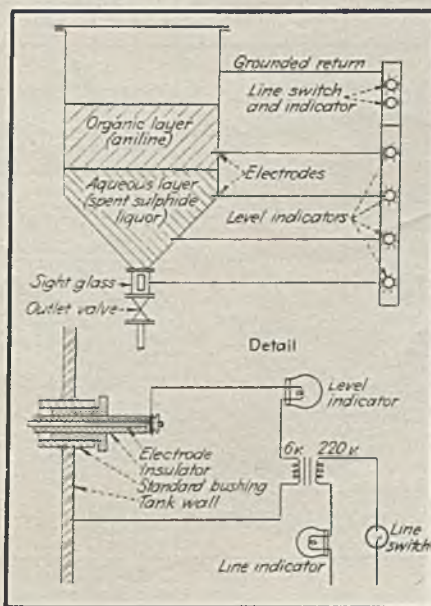
BATCH separations of two immiscible liquids can be easily accomplished in the plant when the two liquids vary in color or opacity, by means of a simple sight glass at the bottom of the settling tank. However, when the liquids are both deeply colored (or opaque), and the interface cannot be observed, such a procedure becomes extremely difficult if not impossible. In organic processes these two layers frequently consist of an aqueous solution and an organic liquid. It was to assist in the separation of such charges that the following device was used.

Electrical contacts or electrodes, somewhat similar to automobile spark plugs, were inserted through the wall of the settling tank at intervals down to the bottom valve. These were connected to small indicating light bulbs and also to a power supply of about 6 volts. The actual voltage was adjusted so that those plugs immersed in the aqueous solution conducted sufficient current to brightly light up the corresponding bulbs, while the bulbs corresponding to those plugs immersed in the non-conducting organic layer remained extinguished.

Using this device the path of the interface could be observed descending the tank as the liquids were run out. As the interface passed a contact, its bulb would either light up or be extinguished depending on whether the aqueous solution formed the top or bottom layer. The point of com-

plete separation was reached when the contact immediately over the valve indicated the presence of the interface.

Electrodes connected to indicating lights installed in the tank wall show the progress of the interface between conducting and non-conducting immiscible liquids; below, detail of connections



JULY WINNER!

A prize of \$50 in cash
will be issued to

WILLIAM O. ORDINANZ

Mechanical Engineer
Brasov, Rumania

For an article dealing with a simple method of siphoning tank cars without vacuum pump that has been judged the winner of our July contest.

This article will appear in our September issue. Watch for it!

This device has been used successfully for separating mixtures similar to aniline and spent sulphide liquors. Even when the aqueous solution contains a relatively weak electrolyte such as sodium nitrophenate the device has proved effective.

AMMONIA SCRUBBERS CONTROLLED BY SIMPLE FLOWMETER

FRANK GIBADLO
Metal Hydrides, Inc.
Beverly, Mass.

REGULATION of the flow of water through a set of ammonia scrubbers was solved by constructing a simple flow metering in the works' machine shop. It is simple in design, rugged and easily constructed. It consists of a steel pipe $1\frac{1}{2}$ in. in diameter and 1 ft. long. To one end is attached a hand valve (needle valve type) and to the other end is attached an orifice constructed from a pipe cap (preferably made from a corrosion resistant metal). Through the latter a hole $\frac{3}{8}$ in. in diameter was drilled. The approximate size was first determined by using the hydraulic formula, $V = \sqrt{2gh}$, as an aid to the cut and try method. About 1 in. above this orifice a tube $\frac{1}{4}$ in. in diameter was tapped on to the $1\frac{1}{2}$ in. steel pipe to which a pressure gage of range from 0 to 30 psi. ga. was attached. The gage was calibrated by measuring the amount of water flowing into a large bottle of known volume, the time of filling being measured by a stop watch. The arrangement appears in Fig. 1. The gage in this particular case, with no pressure exerted upon it, indicated a pressure of 0.5 psi. ga.

The water was obtained at approximately 80 psi. ga. from the city main and was fairly constant with some slight deviation in pressure during peak hours which did not materially affect the rate of flow. Any

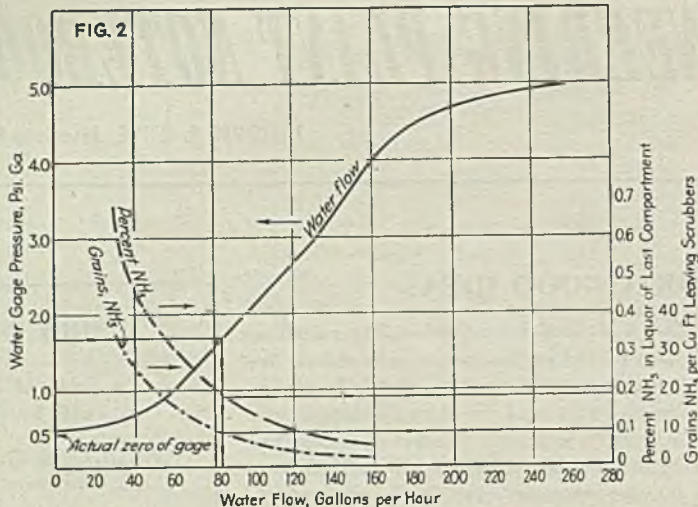
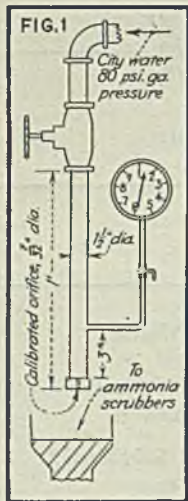


Fig. 1, Left—Orifice meter for regulating water to scrubbers. Fig. 2, Right—Calibration curve for water flow rate and supplemental curves correlating ammonia content of liquor and tail gas with water flow rate in a particular scrubber installation

adjustments of flow are easily made by the use of the needle valve. The orifice can be unscrewed easily for inspection and cleaning. During the months of operation with unfiltered water no obstructing material was found in the orifice.

The chart of Fig. 2 shows the calibration curve of the orifice, indicated by the solid line. This curve is augmented with additional complementary data secured by analysis on the particular installation and indicating the percentage of ammonia in the exit liquors and also the ammonia content in the exit gases.

In the installation for which this chart was drawn the curve showing percent NH_3 in the liquor from the last compartment (dash line) and that showing grains of NH_3 per cu. ft. of tail gas (dash-dot line) are both drawn for a temperature of 76 deg. F. With each increase or decrease of 1 deg. F., there will be a corresponding decrease or increase of about 5 percent in ammonia percentage of the liquor; or a corresponding increase or decrease of about 5 percent in ammonia content of the tail gas from the system.

TRUCK SPEED CHART FOR MATERIALS HANDLING

JOHN W. DERSCH
Engineer
Brown Co., Berlin, N. H.

DURING some recent production planning it was necessary to check the speed required for materials handling trucks. The time available for a given operation could be estimated readily and the distance to be covered could be computed or scaled from a drawing. Although the calculation of necessary truck speed from these data was not difficult, the accompanying chart was a valuable time saver since a considerable number of calculations would otherwise have had to be made.

The required average speed of the truck is determined immediately by the intersection of the ordinate of time available with the abscissa of distance to be covered. For example, as shown on the chart, where the

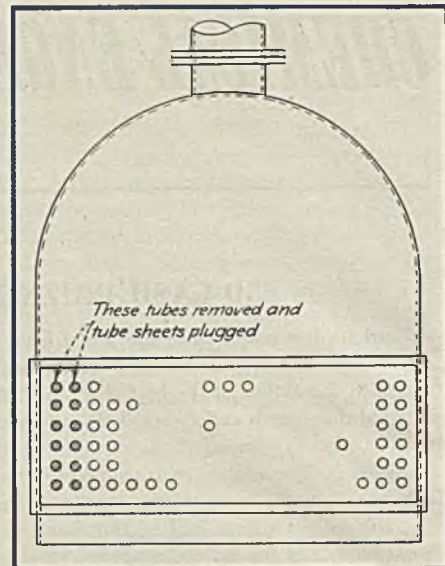
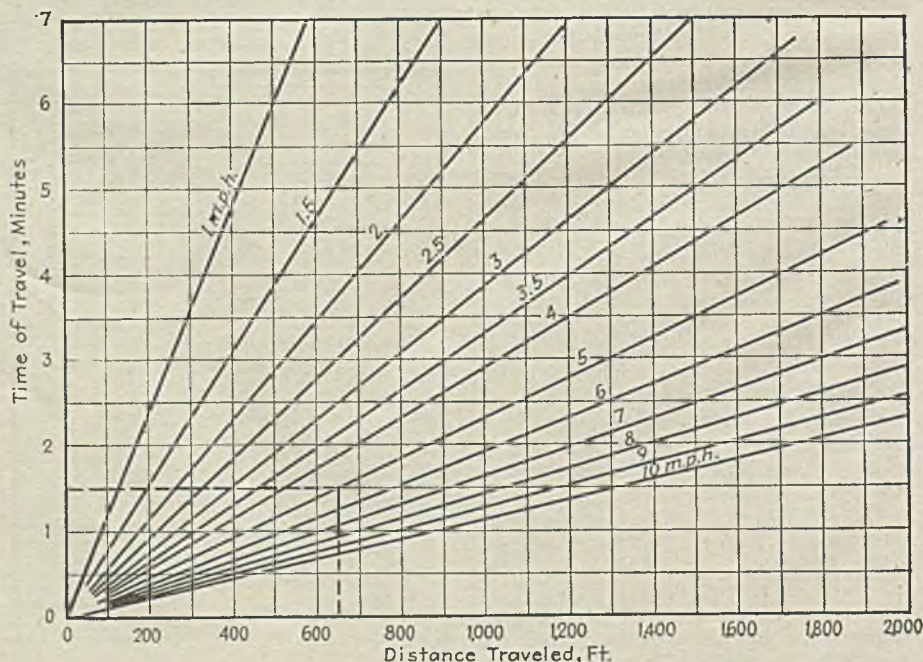
time is $1\frac{1}{2}$ min. and the distance is 650 ft., the average speed must be at least 5 m.p.h. Electric truck specifications usually include the speed of the truck so it can quickly be determined whether or not the truck can do the work in the required time.

DEVELOPING CIRCULATION IN AN EVAPORATOR

CHESMAN A. LEE
Engineer
Darling & Co., Chicago, Ill.

A SMALL evaporator was required for some pilot plant work. We located one that seemed to be about the right size and installed it, only to find that there was trouble with "priming" or foaming over. The evaporator was second-hand, to say the least, and was of an out-moded design. The foaming was doubtless caused by pushing it beyond

Truck speed required to cover a given distance in a given time can be determined immediately with this chart



How tubes were removed from evaporator to increase its capacity

its rated capacity, but we would not have been satisfied with a slower rate of operation.

Inspection showed that the nest of tubes completely filled the width of the body. Although this made possible the maximum available heating surface, it provided no definite path for circulation, and the charge seemed to bounce up and down.

Correction of the trouble was simple and may provide a clue for the improvement of other similar evaporators. We removed two vertical rows of tubes along one side and thus afforded a clear return path for the liquid to reach the under side of the tube bank. Of course, the holes in the tube sheets were plugged off. This enabled us to maintain the desired rate of operation despite the reduced heating sur-

face, and also insured smooth operation of the evaporator.

LIQUID LEVEL GAGE GIVES CONTINUOUS READINGS

H. F. REICHARD
Chemical Engineer
Milltown, N. J.

THERE was a need for a cheap, simple means for continuously measuring liquid level in a process tank. Rapid agitation and the presence of coarse crushed ice on the liquid surface made an inside float gage impractical. A float gage in an external tube or a sight glass were also unsuitable because of plugging and the fact that one of the several liquids mixed in the tank might become isolated in the tube and give a false reading. A commercial liquid-head gage with hand pump would have required too much of the operator's attention.

The system shown on the accompanying diagram was developed, using compressed air from plant lines (40-50 psi.) reduced to a constant 10 psi. Through a needle valve the low pressure air was bubbled into the tank. An open-end manometer connected as shown measured the pressure required and was calibrated in feet of liquid. Carbon tetrachloride was used as the manometer fluid although any liquid whose specific gravity would give a convenient and accurate reading could be used.

Equipment as follows was required: A 1/2-in. steel pipe from air line to bubble bottle; a 1/4-in. lead tube from bubble bottle to tank; a pressure reducing valve (cost only partly chargeable to this installation); a needle valve; glass tubing, bottles, and stoppers.

The lead line extending to the top of the tank prevented accidental backing-up of corrosive liquid. The bubble bottle permitted control of the air rate. The reducing valve prevented rupture of the apparatus.

An inert gas such as nitrogen could be used in place of air. For a metal kettle, entrance could be made through a tee at the bottom outlet.

Plant air supply gives continuous readings on liquid level gage

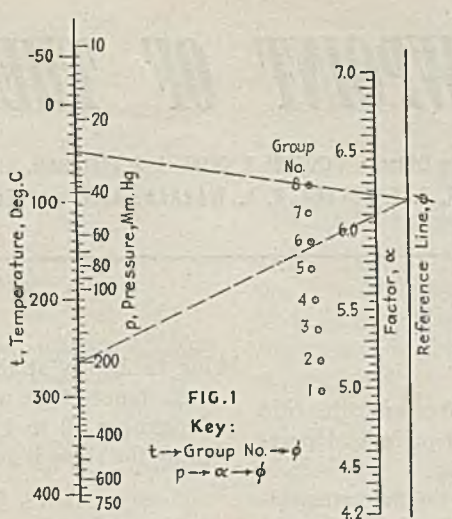
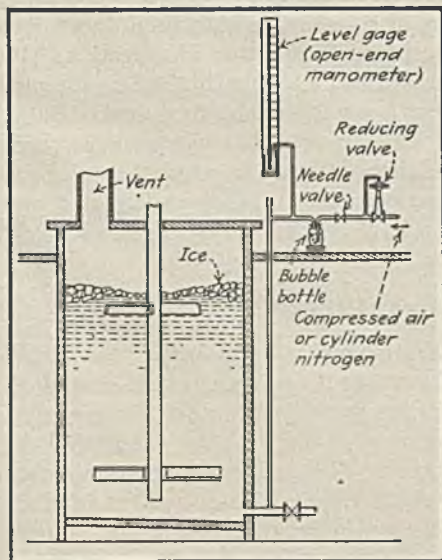


Fig. 1—This chart solves for the term α in Equation (1)

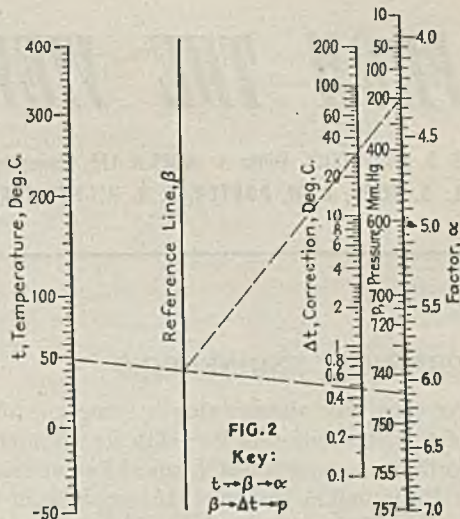


Fig. 2—With α from Fig. 1 this chart gives temperature correction

NOMOGRAPHS FOR CORRECTING BOILING POINTS

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Office of Rubber Reserve
University of Akron
Akron, Ohio

BOILING POINTS are frequently determined at pressures far below atmospheric. Correction to 760 mm. of mercury can be made by means of equations, attributed to Hass and Newton²:

$$\alpha = \phi + 0.15(2.8808 - \log p) \quad (1)$$

$$\text{and } \Delta t = \frac{(273 + t)(2.8808 - \log p)}{\alpha} \quad (2)$$

where ϕ = a linear function of the boiling point at standard pressure as defined by a plot reproduced in the reference and dependent upon the group to which the compound belongs; p = observed pressure, mm. of mercury; t = boiling point, deg. C., at the observed pressure; and Δt = correction to be added to the observed boiling point, deg. C.

Equations (1) and (2) may be solved conveniently and accurately by means of the nomographs of Figs. 1 and 2, respectively,

which were constructed by methods described previously.¹ The use of the charts is illustrated as follows:

What is the boiling point of ethanol at 200 mm. of mercury if its boiling point at 760 mm. is 48.3 deg. C.? The accompanying table shows ethanol to belong to group No. 8. Following the key and index lines in Fig. 1, connect 48.3 on the t scale with the point corresponding to group No. 8 and note the intersection with the ϕ scale. Connect this point with 200 on the p scale and read the value of α as 6.095. Following the key and index lines in Fig. 2, connect 48.3 on the t scale with 6.095 on the α scale and note the intersection with the β scale. Connect this point with 200 on the p scale and read the correction as 30.6 deg. C. on the Δt scale. The corrected boiling point is, then, 48.3 + 30.6 or 78.9 deg. C., which is in fair agreement with 78.3 deg. C., the value reported in the literature.

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2. Hodgman, C. D., "Handbook of Chemistry and Physics," 29th ed., p. 1757, Chemical Rubber Publishing Co., Cleveland.

Groups in Which Various Compounds Belong

Compound	Group No.	Compound	Group No.	Compound	Group No.
Acetaldehyde.....	3	Cyanogen chloride....	3	Methyl ether.....	3
Acetic acid.....	4	Dibenzyl ketone.....	2	Methyl ethyl ether....	3
Acetic anhydride.....	6	Dimethyl amine.....	4	Methyl ethyl ketone...	2
Acetone.....	3	Dimethyl oxalate....	4	Methyl fluoride.....	3
Acetophenone.....	4	Dimethyl silicane....	2	Methyl formate.....	4
Amines.....	3	Esters.....	3	Methyl salicylate....	2
n-Amyl alcohol.....	8	Ethanol.....	8	Methyl silicane.....	1
Anthracene.....	1	Ethers.....	2	α, β Naphthols.....	3
Anthraquinone.....	1	Ethylamine.....	4	Nitrobenzene.....	3
Benzaldehyde.....	2	Ethylene glycol.....	7	Nitromethane.....	3
Benzoic acid.....	5	Ethylene oxide.....	3	<i>o.m.p.</i> Nitrotoluenes...	2
Benzonitrile.....	2	Formic acid.....	3	<i>o.m.p.</i> Nitrotoluidines..	2
Benzophenone.....	2	Glycol diacetate....	4	Phenanthrene.....	1
Benzyl alcohol.....	5	Halogen derivatives..	*	Phenol.....	5
Butylethylene.....	1	Heptylic Acid.....	7	Phosgene.....	2
Butyric acid.....	7	Hydrocarbons.....	2	Phthalic anhydride....	2
Camphor.....	2	Hydrogen cyanide....	3	Propionic acid.....	5
Carbon monoxide.....	1	Isoamyl alcohol.....	7	n-Propyl alcohol.....	8
Carbon oxysulphide...	2	Isobutyl alcohol.....	8	Quinoline.....	2
Carbon suboxide.....	2	Isobutyric acid.....	8	Sulphides.....	2
Carbon sulfoselenide...	2	Isocaproic acid.....	7	Tetramitromethane...	3
<i>m.p.</i> Chloroanilines....	3	Methane.....	1	Trichloroethylene....	1
Chlorinated derivatives	*	Methanol.....	7	Valeric acid.....	7
<i>o.m.p.</i> Cresols.....	4	Methyl amine.....	5	Water.....	8
Cyanogen.....	4	Methyl benzoate.....	3		

* Same group as though halogen were hydrogen.

FROM THE VIEWPOINT OF THE EDITORS

S. D. KIRKPATRICK, Editor • JAMES A. LEE, Managing Editor • THEODORE R. OLIVE, J. R. CALLAHAM, Associate Editors • HENRY M. BATTERS, Market Editor
L. B. POPE, R. W. PORTER, J. V. HIGHTOWER, E. C. FETTER, R. F. WARREN, Assistant Editors • R. S. McBRIDE, Consulting Editor

CHEMICAL ENGINEERING

AT THIS time another step is being taken to bring the title of this publication in line with its editorial policies. Henceforth, its name will be *Chemical Engineering*.

Beginning in January 1910, emphasis in the magazine was on metallurgy, but by July 1918 the rapid development of chemical engineering brought about a change in editorial emphasis, and likewise in the title of the publication, which became *Chemical & Metallurgical Engineering*. Webster defines metallurgy as "The science and art of extracting metals from their ores, refining them and preparing them for use. It includes various processes as smelting, amalgamation, electrolytic refining, rolling, heat-treating, etc." According to this definition metallurgy has reached the vanishing point in the pages of this publication.

Since metals and alloys are used so extensively for equipment by chemical engineers, we shall continue the reports on Materials of Construction, with the twelfth in the series in November. The more recently established Corrosion Forum will appear monthly as usual. Major emphasis will continue to be on chemical engineering as in the past quarter century. In other words, while no changes will be made in editorial policies, the title of the magazine has been slightly modified so that it will be more descriptive of the contents.

CHICAGO CHEM SHOW

A FEATURE of this issue of *Chemical Engineering* is a review of recent developments of chemical engineering interest in the Middle West. The special section has been designed for the benefit of those chemists and engineers who are planning to attend the Fourth National Chemical Exposition at the Chicago Coliseum next month.

A telegraphic survey among some of the leading chemical engineers in the Midwest reports the outstanding economic and technical developments affecting their process industries since the last Chicago Chem Show. Then follow several articles. The first is on how the Midwest Research Institute at Kansas City is spearheading a movement to industrialize the mid-continent. This region, ordinarily thought of as America's breadbasket, is ripe for an industrial flare-up, and the Institute is doing its best to strike the sparks that will touch off the blaze. Next follow a pair of articles which deal with the recent formation in Chicago and Cincinnati of technical society councils that bring together all of the various engineering, scientific, technical and professional activities of the areas. These organizations are setting up patterns for decentralizing society activities and building strength and influence into combined work of all technical men. They can prove exceedingly important.

Finally, an editorial staff survey presents a preview of the new equipment and materials that the exhibitors are prepar-

ing to display at the Chem Show. This should be of first importance to the man participating in the show at Chicago, September 10 to 14. And if present indications mean anything the show is going to be well worth attending.

PERENNIAL PROBLEM

ONCE a year we attempt to estimate production of each of the most important synthetic resins for the previous calendar year. This pastime is not peculiarly ours for various government agencies report figures of their own compilation. Unfortunately, for the chemical engineer concerned with the use of these data, there are wide discrepancies which necessarily leave him greatly bewildered.

Some uniform method of reporting statistics for the plastics industry is highly desirable. Probably the most comparable figures would be based on resin content, omitting fillers, solvents, plasticizers and other compounding ingredients. Often these additives weigh more than does the resin base. When this method of reporting is impossible full explanatory information should accompany the data if they are to have any real significance.

CWS NEEDS FRIENDS

CHEMICAL industry and the chemical profession now have a special task that urgently needs doing. This is the selling of Chemical Warfare Service to Congressmen and the rest of official Washington. Perhaps never before has it been so urgent that we make clear the long-time fundamental importance of CWS as a unit of military preparedness.

This new need arises from the fact that several important commissioned officers of that Service have been drawn into various phases of the Mead Committee investigation. We do not pretend to know, or to interpret, the real significance of those matters. That is a job for the investigators. But it is our task to point out the fact that whatever has been done by individuals, there is nothing which has changed the fundamental importance of chemical warfare as a part of military research and of the United States Army.

ENTERPRISE VS. YARDSTICK

AGAIN this summer the issue between privately-owned business and TVA as a government corporation has been raised. Again the "yardstick" has undertaken to become a competitor of chemical enterprise in the fertilizer industry.

This is very unfortunate. TVA rendered certain important services. It has stimulated certain divisions of the fertilizer business into aggressive and progressive action which might not otherwise have developed. But this does not excuse

TVA for seeking to build and operate a fertilizer factory at Mobile.

The New Deal philosophy is not conspicuous, but it is evidently importantly supported in certain of the government agencies. Chemical enterprise and the chemical profession will do well to watch for and to condemn such efforts as TVA recently made to become a competitor of the enterprise system.

WHERE IS THE CLOCK?

A new philosophy of "time worked" is now fixed in the law and regulations by a decision of the U. S. Supreme Court. That final tribunal has ruled regarding certain activities which often were previously not included in work time.

The Court says that a man is at work if he has punched the time clock at some distant gate and is walking to his job. Also he is on work time while dressing, tool sharpening, lighting up, or opening windows of his working place. The Court thus materially extends the time for which payment must be made, and for which calculation must be included when determining the end of regular working time and the beginning of overtime.

Technology is not going to be changed by this ruling. But the technical planning of works and the assignment of duties may be. Certainly we can not have expensive specialists doing routine tasks at high hourly rates. Preparing the work place and doing all routine minor jobs will certainly have to be assigned to other persons under this new wage-hour interpretation made by the Court.

TWENTY DAYS A MONTH

MECHANIZATION in many process industries will be strongly accelerated by the continuing trend to shorter hours and higher wages. It is evident that before long the average employee is not going to work more than five days per week without greatly increased rate for "overtime." This fact, and the frequency of holidays, means that the average employee now works only about twenty days a month for full-time employment and full-time pay.

This fact has large chemical engineering significance. It means at once that the chemical engineer in making plans must arrange for almost five employees for each station in continuous process industry. Sometimes even a sixth will be needed in order to provide for vacations and the exigencies of accident, illness, and various other complications which are inevitable in a continuous process. Thus we must train many more workers up to the minimum acceptable skill for each job to be filled.

The hourly rates for these skilled workers will gradually climb higher. As a contribution to a higher standard of living, that is a desirable thing. As a contribution to higher unit cost for direct labor in goods manufacture, it poses a new sort of engineering problem. We must use new factors in our calculation as to when further mechanization for labor-saving becomes profitable, and in this calculation it is not unusual to find that one must use a minimum wage of nearly a dollar an hour for anything but the most menial of unskilled tasks. Skilled operatives will command much more than that, of course.

While we wait for the time when we can get prompt deliveries of wanted machinery and materials of construction

we can all profitably get out and restudy our old cost estimates for expansion plans and modernization programs. Some which were rejected by top management when old-time cost units prevailed may now deserve approval when recalculated with the new unit figures now applicable.

SURRENDERING PATENTS

THE Department of Commerce has recently spotlighted the dedication to the public for free use of 12 patents formerly owned by two American corporations. These two companies which are active in the fields of interest to chemical engineers have decided that they wish to make these patents available to all without charge. In this they imitate voluntarily what seems to have been a forced dedication of patents by the Aluminum Company of America.

One wonders how far this trend in relinquishing of patent rights is going to go. Some, perhaps much, is fully justified both in the public interest and for the good of the companies involved. But the trend can go too far, or become too rapid. If a board of directors or a banker is going to appropriate large sums in the hope of profit, he often must be assured that the company investing the money will be protected against excessive competition at the early stages of development. We can hope, therefore, that companies are not going to be too rapidly stimulated in surrender of patents that they may need for the protection of new investment.

An alternative that may sometimes serve all purposes is to announce a willingness to license patents on a basis of nominal royalty so that development by others may be stimulated. That practice is particularly good when the result is the stimulation of customer industries. Patents may no longer be as important as they once were. But they still have great potential importance that deserves careful analysis by each patent owner and licensee.

SELF-DEFEATING LEGISLATION

PRESIDENT TRUMAN did well to criticize certain features of the new law providing for the stockpiling of strategic and critical materials. When he signed that measure as passed by Congress, he sharply criticized the section which represented an effort of western legislators to compel the building of stock piles substantially from domestic sources.

The President says that this "Buy American" feature definitely conflicts with other provisions of the same law. He points out that it will increase the cost of the stockpile to the taxpayer. He makes clear that it tends to deplete national underground resources of scarce materials. That in turn makes it necessary to build a still greater stockpile.

It is most unfortunate that this important measure of national preparedness should be weakened by this Buy American feature. Those who support that feature are clearly ones who seek immediate personal political gain in their states or districts by voting new business for their constituents at the expense of a sound program.

This is a technologic matter that laymen, and even politicians, do not always understand. It is a question which can well be spotlighted and argued frequently until the Buy American feature is eliminated, for that is certainly an unwarranted part of the law that tends to defeat the preparedness measure as a whole.

PROCESS EQUIPMENT NEWS

THEODORE R. OLIVE, Associate Editor

DUPLEX STRAINER

TRANSPARENT Lucite, which permits visual inspection, is used in the casing of a new duplex pipeline strainer offered by J. A. Zurn Mfg. Co., Erie, Pa. The transparent feature permits the operator to determine readily when the strainer unit needs cleaning without in any way disturbing its operation. When cleaning is required, flow can be diverted instantly into the second chamber of the unit without loss of pressure. Thus the filled chamber can be cleaned while the pipeline maintains normal flow. As will be observed in the accompanying illustration, the flat, horizontal design makes this strainer particularly adaptable to any low, close-quarter installation. Strainers are made with bodies and other metal parts of bronze, with brass, Monel or other metal employed for the strainer basket.

LIQUID TREATER

VERSATOR is the name of a novel new machine for a variety of liquid treatments that has been introduced by the Cornell Machine Co., 101 Park Ave., New York 17, N. Y. For example, the device may be used for vacuum treatment, homogenizing, emulsifying, dispersing, degassing, deaerating, evaporating, dehydrating, distilling, chemical reactions and a variety of other purposes. It operates primarily to reduce any flowable material—from the most fluid to the most viscous—into a film of micro- or mono-particle thickness without the application of mechanical pressure and without temperature rise.

How this is done will be evident from an examination of the accompanying illustration which shows a stationary casing containing a rotating open bowl of 26 in. diameter, designed to operate at high speed and provided with a feed pipe at the center and a draw-off pipe at the periphery. Material to be processed is fed on to the spinning disk at its center so as to form an exceedingly thin film by centrifugal force. The turbulence of this film and its extreme thinness provide, it is claimed, an ideal state for the application of vacuum or pressure, heat or cold, diffusional processes, or irradiation.

Versatility of the new machine is said to make it a valuable tool for users of ball mills, colloid mills, conventional homogenizers, emulsifiers, evaporators and similar equipment. For viscosities no greater than those of heavy lubricating oils the power consumption at capacities ranging from 10 to 100 g.p.m. is said to be no greater than $7\frac{1}{2}$ hp. Disk speed may be as low as 900 r.p.m. but for most purposes the optimum speed is about 1,800 r.p.m. The equipment can be supplied in a variety of corrosion resisting metals and can be rented for a

full year for experimental or production runs.

ROTATING SEAL

ROTATING shafts of all kinds may be sealed against leakage and ingress of foreign material by means of a new rotating seal known as Sealol CB, that is manufactured by Sealol Corp., 45 Willard Ave., Providence 5, R. I. The new unit is now available in corrosion resisting construction for shaft sizes from $\frac{1}{4}$ to 1 in., with other sizes built to order. As shown in the accompanying illustration, this seal is a complete unit without loose parts that needs only to be slipped on to the shaft with the rubber seal face (at left in illustration) pressed firmly against a stationary flat surface. The seal is then locked in place by tightening two set screws on the shaft. The only relative movement in the seal occurs between two lapped metal faces. No special tools are required for installation and it is claimed that the unit is suitable for long continued service.

NOVEL FILTER ELEMENT

EXTENSIVELY used during the war on many thousands of aircraft, land vehicles and naval units, the Skinner gasoline purifier made by Skinner Purifiers, Inc., Detroit 11, Mich., is now available for civilian applications. Although intended primarily for use in automotive applications, the filtering element is of extremely novel type and

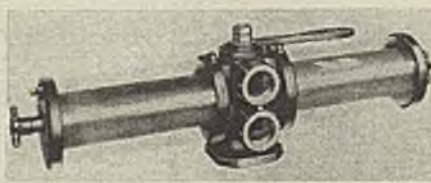
would appear to have many applications outside the filtering of gasoline.

This new unit, shown in an accompanying illustration, filters material by passing it between layers of helically wound ribbons made from an impervious material. Thus the device operates on the principle of edge filtration, the particles being stopped at the outer edge of the ribbons so that they can fall into a sediment chamber. After long use, any accumulation on the surface can be easily cleaned by blowing compressed air backward through the unit. In addition to its ability to remove solid particles, the purifier is said actually to separate free water from hydrocarbon liquids such as gasoline owing to the fact that it presents a filtering surface consisting of innumerable orifices of a few microns in size to the passage of liquids differing widely in surface tension and specific gravity.

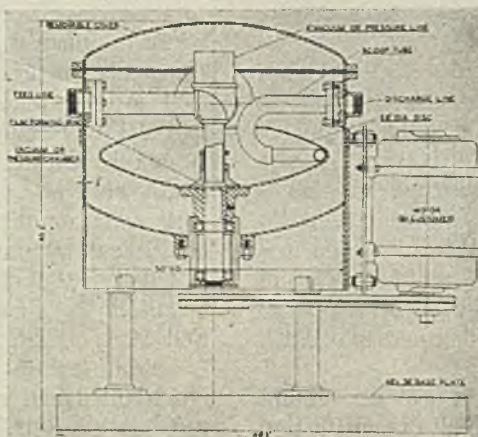
FUEL OIL CONTROLLER

TO PERMIT accurate measurement and control of the flow of heavy fuel oil, Askania Regulator Co., 1603 South Michigan Ave., Chicago, Ill., has developed the Transometer which is capable of controlling, integrating, remote indicating and recording. The device employs a combination of a

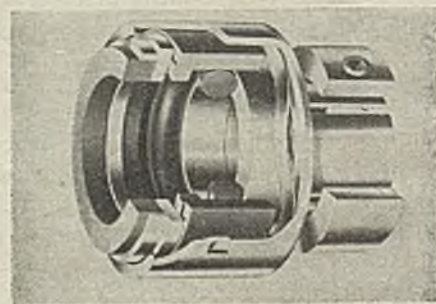
Visible-flow duplex strainer



Cross section of new centrifugal treater

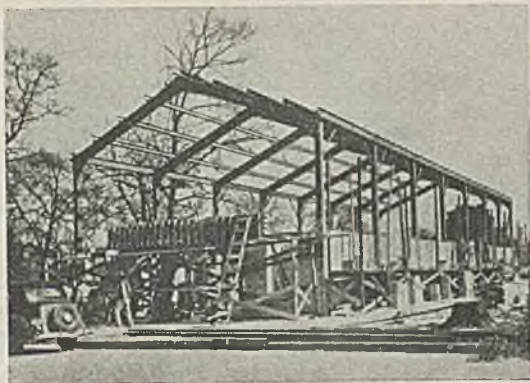


Cutaway view of shaft seal

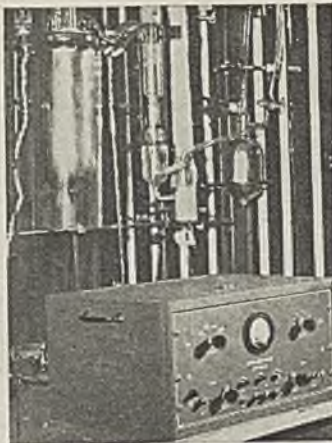


Novel filter cartridge for hydrocarbon purification





New trussless building frame



High vacuum ionization gage



Fork truck with side-mounted motor



Single-spring preloaded sway brace

piston type positive displacement meter and a pneumatic signal transmitter. According to the manufacturer, the measurement of highly viscous materials such as fuel oil can best be handled with a positive meter since accuracy with an orifice depends on constant viscosity and since the flow coefficient at high Reynolds numbers is not constant but is a function of the flow rate.

A novel means has been employed for converting the rate of rotation of the meter into an air impulse which changes with the square of the meter speed. This is accomplished by having the meter drive a fly ball governor, the centrifugal force of which is balanced by a diaphragm under air pressure. The vertical force of the governor is transmitted through a stem to a swing jet pipe from which air under pressure issues to a receiving nozzle communicating with the diaphragm that sets up a counterforce on the jet pipe. Consequently, the position of the jet pipe will always be such that the air pressure on the diaphragm balances the centrifugal force of the governor. As a result, the air pressure thus created is in direct proportion to the speed of the governor and therefore a square function of the oil flow through the displacement meter. It is this pressure which is communicated to and measured by the recording instrument.

TRUSSLESS BUILDING FRAME

KNOWN as Rigidsteel construction, a new development in the prefabricated steel building field has been introduced by McCloskey Co., 313 Sixth Ave., Pittsburgh 22, Pa. Buildings produced by this method are stiff-jointed structures made up of a system of

beams, rigidly joined together to form a rigid frame that eliminates space-consuming trusses. Secondary bracing is relegated to the building contours. Compact, simply designed ridge and eave joints replace the usual gussets. This simplicity of construction permits a greater area of usable interior head room, in addition to added simplicity and ease of field erection, and portability. Lower maintenance costs and greater ease of alteration are also claimed.

As shown in the accompanying illustration, each bent for a complete steel building unit consists of only four members, two columns and two rafters. Connections are field bolted and erection, dismantling or reconstruction cost is thus considerably reduced. The beam sections themselves are lower in total cost than a multiplicity of light and highly fabricated sections. An important advantage is that every square inch of a Rigidsteel building can be reached by a paint brush. Furthermore, overhead loads can be installed on the rafters at any point without structural alterations. The structures are available in a variety of building cross sections including sawtooth, multiple aisle, monitor roof and lean-to, to permit any desired type of single-story industrial building.

COMPACT FORK TRUCK

DECREASE in wheelbase length to 35 in. for extra compactness has been secured in the new Model LT-35 Towmotor by placing the motor at the side of the unit, rather than in front of, or behind the operator. This new development of the Towmotor Corp., Cleveland, Ohio, results in a substantial decrease in over-all length without sacrificing strength. The new model weighs only 2,800 lb. but will lift, carry and stack a 1,500 or 2,000 lb. load in areas previously

inaccessible to lift truck operation owing to tight aisles, elevators or other congested spaces. The new design places the operator in a comfortable, fully protected position while adjustments, maintenance and inspection of the engine and other operating parts are said to be facilitated by the new arrangement.

IONIZATION VACUUM GAGE

HIGHEST VACUUM normally encountered in factory or laboratory processes may be measured continuously with a new ionization gage that is now being offered by General Electric Co., Schenectady, N. Y. The instrument measures pressures as low as 10^{-7} mm. of mercury and reads directly in millimeters. The continuous pressure indication feature permits the detection of small pressure changes as well as the measurement of slow pressure drifts without the need for continual adjustment. A protective circuit is provided to turn off the gage tube filament automatically at pressures above 10^{-4} mm. This prevents the possibility of burning out the tube. The control regulates filament emission against line voltage and pressure changes, thus assuring stable and accurate operation. As shown in the accompanying illustration, the instrument consists of a special glass triode which is sealed to the high vacuum system and a gage control unit incorporating the indicating electronic microammeter, filament protective relay, stabilized voltage supply and emission regulator circuit.

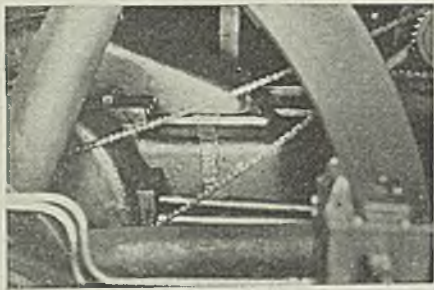
PIPE SWAY BRACE

SWAY and undesirable movements in piping systems can be prevented by the new pre-engineered sway brace recently announced by Grinnell Co., Providence 1, R. I. The brace does not anchor the piping rigidly but permits movement of the piping out of its normal position whenever the force is large enough to overcome the restraining thrust of the brace's single preloaded, two-way-acting spring. In the normal position no forces are exerted on the piping. The controlling action serves to bring the piping back to normal position in the plane of control whenever displacement occurs.

The device employs a single spring which is precompressed between opposed thrust plates. The thrust rod acts on the thrust plates and the spring so that either a pull or a push on the rod is resisted by the spring. How much initial resistance is afforded to movement of the piping is determined by the degree of preloading of the spring, which can be set to customers' specifications. The design, employing a single spring instead of two, saves space, simplifies construction and permits a simplified inclosure that excludes dirt from the working parts and presents a compact, clean appearance.

LEVEL CONTROLLER

WHAT IS SAID to be the only floatless level control employing no vacuum tubes and operating with low-voltage in the probe circuit is the new Series 10 control offered by Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass. This device is designed for use with all electrically conductive liquids, contact with the liquid being made only by



Ni-Rod weld in compressor casting

a stainless steel probe. With alternating current in the probe circuit, it is impossible for electrolytic action to take place. The liquid to be controlled makes or breaks contact with the probe and transmits to the control a minute electrical current at low voltage which by means of a sensitive relay controls a second circuit capable of actuating a signal, valve or pump. The device consumes $\frac{1}{2}$ watt, operates on 115 or 230 volts, 50-60 cycle a.c., making use of a single-pole, double-throw relay. The probe circuit will carry a resistance as high as 3,500 ohms.

ELECTRODE FOR CAST IRON

PREHEATING of iron castings that are to be welded can often be avoided (except where a high degree of machinability is necessary or where structure and shape of the casting are likely to develop high internal stresses) through the use of the new Ni-Rod electrode developed by the International Nickel Co.'s Bayonne research laboratory, Bayonne, N. J. Cast iron is a brittle and heat-sensitive metal, the welding of which has often been difficult in the past. Consistent weld deposits were sometimes difficult to secure and the required preheating and other special treatment of the casting was often troublesome and more difficult than the actual welding.

The new rod, which is nickel, is actually much stronger than the cast iron itself and the fusion of parent metal and rod is so thorough that it is claimed to be virtually impossible to knock loose the weld or overlay. Furthermore, the new rod is said to weld readily in all positions without undercutting or slag inclusions. The rod is recommended by the manufacturer for the three main fields of cast iron welding: General repair and maintenance; repair of minor flaws in new castings; and as a production tool, for example, in welding steel bars to castings.

IMPROVED PURITY METER

SEVERAL improvements have been incorporated in the latest model of Purity Meter offered by Barnstead Still & Sterilizer Co., 2 Lanesville Terrace, Forest Hills, Boston 31, Mass. Like the earlier models, the new instrument measures electrical conductivity of distilled water, reporting the total solids as parts per million of NaCl, but the instrument has attached to its side a new conversion table that enables the reading to be converted directly into any standard units normally used, without calculations on the part of the operator. In addition the instrument employs a much higher resistance basis for the theoretical zero of the scale than formerly, making



New model Purity Meter

readings more accurate, while the low-figure range on the scale has been widened, making the instrument more delicate in fine measurements.

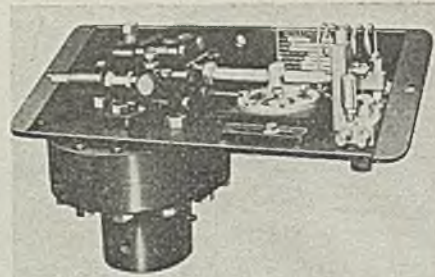
FLOW TRANSMITTER

TO PERMIT the pneumatic transmission of flow measurements on liquids which are so viscous at room temperature that they must be heated considerably to prevent congealing in the lead lines, Republic Flow Meters Co., 2240 Diversey Parkway, Chicago 47, Ill., has introduced a modified pneumatic instrument employing a piston instead of the usual diaphragm. The purpose of this change is to avoid the effect of hot liquids on diaphragms. It is pointed out by the manufacturer that non-metallic diaphragms are not usable above 200 deg. F., while metallic diaphragms might give erratic results at high temperatures.

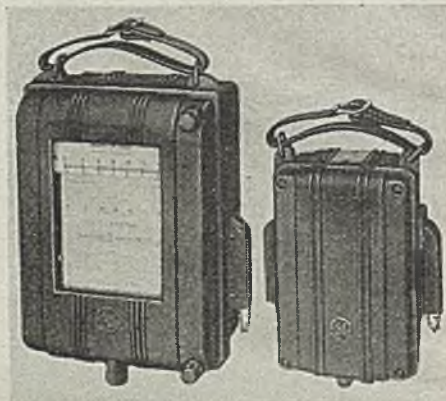
The transmitter is designed for installation in a manner to keep the measuring chambers hot enough to prevent the measured fluid from congealing in the transmitter chambers and lead lines. The piston and cylinder are made of steel of the same composition so that clearance is maintained regardless of temperature changes. Transmitters of this type are now being used for the measurement of coal-tar pitch at a flowing temperature of 550 deg. F. and petroleum tar at 600 deg. F.

EXPENDABLE PALLET

COST so low is claimed for the new "X-1" expendable pallet offered by Techtman Industries, 714 West Wisconsin Ave., Milwaukee 1, Wis., that the pallets can be discarded after a single trip. This new four-way pallet is said to achieve a 60 percent reduction in weight by the use of a double corrugated board top, supported on square or round wood blocks. The entire top and the block ends are dipped in a water-resistant adhesive which seals off moisture from the load. These pallets are said to be capable of carrying 4,000-lb. loads without failure. Furthermore, they are said to survive a number of trips without appreciable damage under normal shipping conditions by rail or truck. The standard 42x48 in. size achieves maximum stowage since multiples of these dimensions equal very nearly the width of truck and box car bodies. Other sizes, however, and double faced pallets are also available with block spacings to



High-temperature pneumatic transmitter for flow measurements



Inkless temperature recorder and power unit

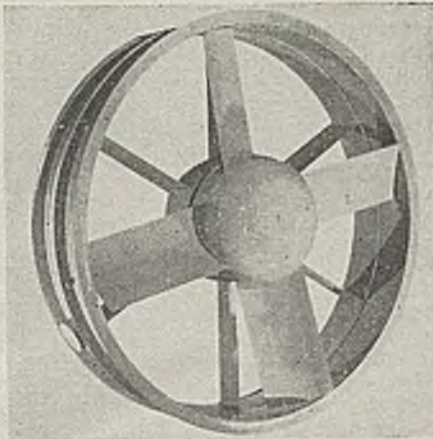
suit users' lift equipment. It is claimed that over 1,300 empty pallets, weighing approximately 30,000 lb., can be nested in a 50-ft. box car, using a lift truck for handling.

INKLESS RECORDER

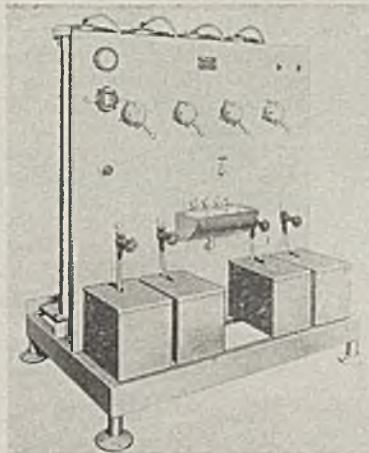
TEMPERATURE records of all sorts, where the temperature is measured by a resistance thermometer, can be made with the new 'Type CF-2' inkless temperature recorder offered by General Electric Co., Schenectady, N. Y. This is a portable instrument with an external power supply. The equipment records by means of a special inkless recording mechanism on a 4-in. strip chart and has a range from 20 to 140 deg. C. With a chart length of 65 ft., the driving motor can be adjusted to provide a record length of from eight days to two years on a single chart. The recorder weighs 11 lb. and the external power unit 5 lb. Both units are mounted in die-cast aluminum housings gasketed for weatherproofing, and each equipped with a leather carrying handle.

HIGH VISCOSITY METER

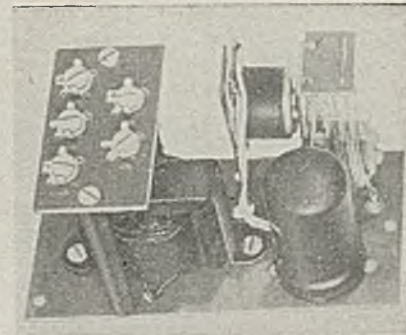
SPECIAL requirements of the chemical and petroleum industries, particularly for the measuring of flow of viscous liquids that must be heated to permit pumping, may be met with a new electric meter body with sealed armature recently introduced by the Brown Instrument Co., Wayne & Roberts Aves., Philadelphia, Pa. It is claimed that satisfactory operation is obtained when metering fluids that are highly viscous at normal temperatures. Meter response is said to be improved, and when fluid is placed directly in the meter body, neither seal pots nor liquid purging are required. The meter is essentially self-venting. The armature as-



New axial-flow type ventilating fan



Double-action water demineralizer



Super-sensitive electronic relay



5-kw. preform preheater

sembly is sealed, protected, and lubricated by a mercury fill. In addition to its use for high viscosity liquids, the new meter is said to be suitable for measuring hydrofluoric acid, mixtures of hydrofluoric acid and hydrocarbons, and a variety of volatile fluids.

DIELECTRIC HEATER

HEATING of plastic preforms is the function of a new 5-kw. output dielectric heater announced by the Industrial Heating Division of General Electric Co., Schenectady, N. Y. Designed for operation at 40 megacycles, using a water-cooled oscillator tube, the device is said to feature fast heating, simple operation and sturdy construction. Since the tube has a generous short-time overload capacity it is said to be possible to use an average full-power, 5-kw. output during the entire heating cycle. When the machine is loaded, it is started by a push-button, after which it operates entirely automatically. The heater is rapid enough to accommodate the alternate operation of two molding presses.

AXIAL VENTILATING FAN

BOTH CORROSION resisting construction (employing Monel metal) for handling damp or corrosive vapors, and ordinary cold rolled steel construction for the usual exhaust ventilation problems, can be handled with the new axial-flow type ventilating fan offered by the Moore Co., 544 Westport

Road, Kansas City 2, Mo. Made in 3- to 5-ft. diameters, the fan employs a special high-slip, slow-speed direct drive motor equipped with permanently greased steel ball bearings, enabling the fan to be mounted in any position. The input is 700 watts and the motor is internally cooled by circulating air within the hub of the fan without drawing in outside air that might be contaminated. Guide vanes on the inlet side of the fan reduce the tendency of air to corkscrew with the rotation of the blades. Blade tips revolve within a ring that reduces tip losses and a large hub eliminates that portion of the blade that has a low peripheral speed, thereby avoiding the possibility of back flow through the center of the fan.

DEMINERALIZER

NEW FOUR-BED water demineralizers designed to give purer water at lower cost have been announced under the designation of Double-Action Type by Barnstead Still & Sterilizer Co., 2 Lanesville Terrace, Forest Hills, Boston 31, Mass. This development, following five years of experimental engineering, encompasses a range of six models, from 3 to 1,000 gallons capacity per hour. The four-bed units employ two cation beds and two anion resin beds, so hooked up that the water passes through two complete ion exchange cycles, thus increasing its purity greatly. Furthermore, the double-action feature allows the demineralizer to stay on the line longer between regenerations, decreasing operating labor lowering the cost of demineralized water per gallon. It is claimed that the cost of operating a demineralizer lies largely in the labor spent in regenerating. The company is also producing two-bed models in the same capacity ranges.

HOT CATHODE RELAY

WHAT IS SAID to be an entirely new principle in electronic relays is employed in a new super-sensitive relay device offered by Automatic Temperature Control Co., 34 East Logan St., Philadelphia 44, Pa. The new principle employs the hot-cathode Thyatron which has characteristics said to be advantageous compared with ordinary vacuum-tube and cold-cathode devices. The relay gives snap action, high load contact

capacity and may be tripped either by an external contact carrying only three microamperes or by any external circuit whose value drops to one megohm pure resistance.

According to the manufacturer, the device is recommended for use in photocell circuits for direct control of motors, valves and alarms; for motion control applications as in winders; for tear detection on paper machines; for converting delicate contact making instruments such as thermometers and electrical flow meters into positive control devices; and for liquid level control by the conductivity method.

FOG FIRE FIGHTER

PRODUCTION of fog for fire fighting within four seconds after reaching for the hose is claimed for a new fog producing fire fighting unit announced by Bowser, Inc., Fort Wayne, Ind. The unit is connected directly to a water line, a swing-joint mounting on the wall or on a standpipe making it possible for the cabinet to revolve in alignment with the direction of the hose pull. A valve actuating fixture holds the fog nozzle ready for instant use. The automatic valve releases the spray to full capacity instantly upon removing the nozzle from the cabinet fixture. It is claimed that the unit is unusual in the fact that the special nozzle plays a finely atomized fog with only a medium pressure such as is normally provided by the water system. The unit has been tested and is approved, it is claimed, for use on oil, paint and solvent products. In addition to the fog nozzle the unit is equipped with a standard solid stream nozzle to provide protection in cases where fog cannot reach the flame.

SOLENOID OPERATING VALVE

ABILITY to operate against high differential pressures, as high as 150 lb., is incorporated in the new direct-acting solenoid valve recently developed by the Johnson Corp., Three Rivers, Mich. The operation of the solenoid in controlling the globe type valve is direct, not pilot operated. Power is applied to the valve disk through an ingenious lever arrangement said to insure positive opening. The single-seated valve enables hot liquids and steam up to 365 deg. F. to be handled. In normal position the valve is closed, but opens instantly to full capacity when the solenoid is energized. Thus wire drawing is said to be avoided and trouble-free operation over a period of years is claimed. The valve can be used for all types of liquid level control, with hot and cold water, steam, oil or other

process liquids. Types are available for sizes from $\frac{1}{2}$ to 3 in. and for various power supplies.

SWITCHBOARD TACHOMETER

AN ENTIRELY new principle in speed measuring equipment is incorporated in the new line of electric switchboard tachometers introduced by The Metron Instrument Co., 430 Lincoln St., Denver 9, Colo. These tachometers are not of the generator type. The head consists merely of a simple contact mechanism which is connected by an electric cable of any length up to 1,000 ft. with the indicating unit. The oscillating contacts periodically charge a condenser through a d.c. milliammeter. The circuit constants are chosen so that the milliammeter does not correspond to each charge but reads the average current. The circuit has been designed so that the current is exactly proportional to the speed of rotation of the contact mechanism. Depending on the model, guaranteed accuracies range from $\frac{1}{4}$ to 1 percent. A variety of contact making heads can be secured to fit any type of machine, while the indicating instrument can be either single or multiple range.

ELECTRIC HAND TRUCK

MORE THAN 20 major improvements, developed during extensive wartime application of the Transporter made by Automatic Transportation Co., 149 West 87th St., Chicago 20, Ill., have been announced in the postwar model now put on the market by this manufacturer. This electrically propelled hand truck, which is produced in both skid and pallet lift types, is now in actual production in the improved model.

The manufacturers claim that the new Transporter will have a potential service life double that of its predecessor and that the maintenance costs will be halved. The appearance has been largely unchanged but important improvements have been made in many of the mechanical parts. For example, a new hydraulic pump used to lift the pallet or skid off the floor is said to reduce by nearly 80 percent the number of strokes formerly required to engage the load, at the same time requiring 25 percent less lifting effort. Only one stroke is necessary to engage a loaded skid with standard 1-in. clearance. This result is achieved by combining a low-pressure, high-speed cylinder

with the load, with a high-pressure, low-speed cylinder for raising the load. Transfer from one cylinder to the other is accomplished automatically as the platform encounters load resistance.

The new brake, which is applied automatically by release of the guide handle, is said to be four or five times as powerful as the one used on the old model, immediately stopping a fully loaded machine even on grades up to 10 percent. Numerous improvements have been made in the truck-type, series-wound d.c. motor while structural changes have involved a complete redesign of the driving unit. These result in freer access for maintenance and greater durability of working parts. The driving unit, shown stripped of its inclosures in the accompanying view, is the site of most of the design improvements.

FLARELESS FITTING

ALL TYPES of metal tubing may be joined with a new flareless fitting for hydraulic and other fluid conveying systems, announced by the Parker Appliance Co., Cleveland, Ohio. The new fitting incorporates a steel ferrule which, when body and inclosing nut are tightened up, acts to cut a shoulder in the tubing itself, thus providing a strong, tight sealing grip for the assembly. This feature is clearly shown in the accompanying illustration. When body A and nut B are tightened, the confined ferrule C is forced forward. The cone angle of the body contacts the ferrule and directs its sharp edge downward, reducing its section and forcing it into the tube so as to produce a shoulder which resists pull-out when pressure is applied to the system. The actual fluid seal, however, is accomplished by the compression of the ferrule which has a negligible effect on the internal diameter of the tubing. Also a second grip is generated at the rear of the ferrule for damping possible vibrations in the system and preventing shortening of the life of the front seal.

EQUIPMENT BRIEFS

TO ENABLE electric heat to be applied to fluids handled in ducts, at the same time

reducing duct resistance, Industrial Chamberheat Laboratories, 2103 Center St., West Roxbury, Mass., has developed the Turvane electric heating unit. The method of use consists in building electrically heated turning vanes into an elbow of the duct system. Heat is imparted to the fluid as it is wiped over the turning vanes, thus resulting in efficient heat transfer, at the same time reducing pressure loss at the duct corner by the vane action of the heating elements. Various heating capacities are available from 15,000 to over 1,000,000 B.t.u. per hr.

Low cost for a continuous indicating, direct-reading pH meter is claimed for a new instrument introduced by Pfaltz & Bauer, Inc., Empire State Bldg., New York, N. Y. The instrument is line-operated, requiring no dry cell batteries. The accuracy claimed is 0.1 pH, and the sensitivity, 0.5 pH. Certain adjustments are eliminated by the direct reading feature and frequent buffer standardizations are also eliminated. A variety of electrodes can be used.

CAST MAGNESIUM alloy is used in the construction of a new general-purpose hand truck so light that a child can carry it. Weighing only 26.6 lb., the Zephyr hand truck made by Magnalux Manufacturing Co., 321 East 4th St., Los Angeles 13, Calif., is equipped with ball bearing wheels, Zerk lubricated, with a molded-on rubber tread. Rust-proofed steel is used for the nose.

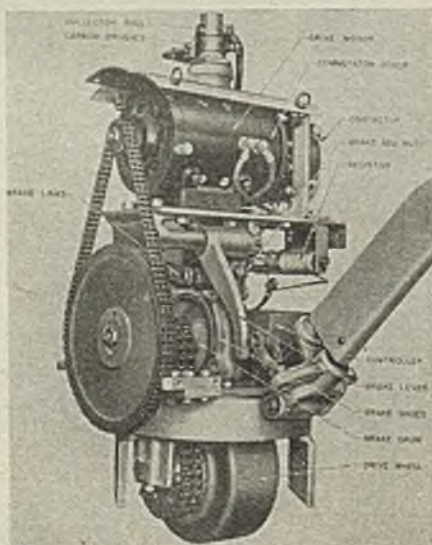
A SIMPLE method of lighting the tubes of rotameters has been announced by Schutte & Koerting Co., 12th and Thompson Sts., Philadelphia 22, Pa. The device is a baked enamel metal back hood with a narrow frontal opening that fits against the back of the rotameter tube and directs a beam of light through the glass toward the operator.

PRECISION of a 12 in. slide rule, combined with pocket-size convenience, is claimed for the $4\frac{1}{2}$ in. diameter circular slide rule introduced by American Hydromath Co., 145 West 57th St., New York, N. Y., under the name of Calculaide. The most used scales are located close to the edge. The rule carries the usual C and D scales, plus a log-log scale suitable for the solution of many engineering problems. The latter, ranging from 1.01 to 100, forms three turns of an inner spiral. Non-flammable plastics are used.

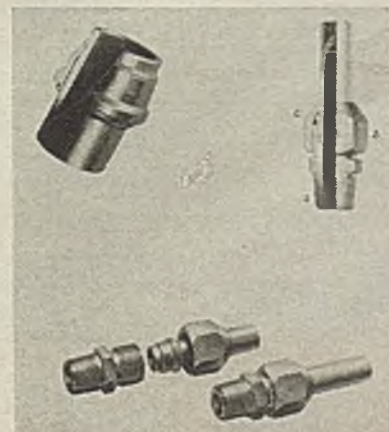
Tachometer using a new principle

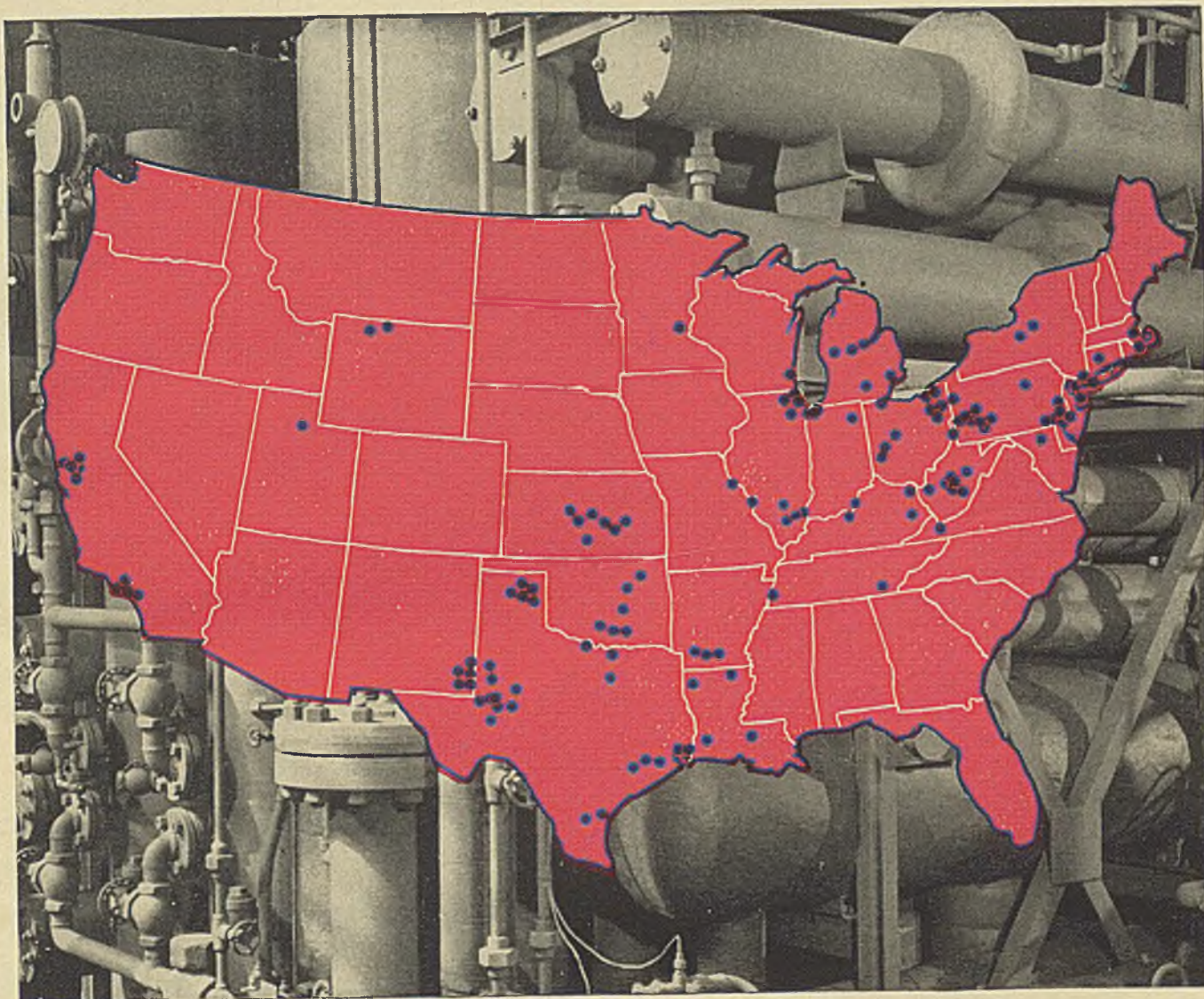


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PHTHALIC ANHYDRIDE

From

ORTHO-XYLENE

FOR almost three decades, phthalic anhydride has been produced commercially from naphthalene derived from coking operations. The first plant to become independent of the byproduct coke oven industry for its source of raw material is the new unit operated for Oronite Chemical Co. by Standard Oil Co. of California at Richmond, Calif. This plant began commercial operations in the spring of 1946.

Raw materials for the Oronite plant is ortho-xylene supplied by the hydroformer unit in the adjacent refinery of Standard of California. The xylene feed is pumped from storage tanks into the converters after being vaporized and mixed with preheated air. Rate of feed, temperature and air ratio are carefully controlled so as to give optimum yields and to prevent a condition of uncontrolled oxidation that might result from an over-rich xylene feed. In actual operations, about 10 times the theoretical air requirements are used to avoid operating within explosive limits.

In the converters, the air-xylene vapors pass through bundles of tubes filled with a V_2O_5 -base catalyst where oxidation to phthalic anhydride takes place at a relatively high temperature. The period of contact with the catalyst is less than one second. The heat of reaction, considerably higher than theoretical because of side reactions, is removed by circulation of molten salt outside the tubes.

The reacted vapor mass leaves the bottom of the converters and is pulled through vertical heat exchangers to cool the phthalic anhydride vapors. The gases then go through a series of box-like compartments where the crystals of phthalic anhydride collect and are periodically dumped. These crude crystals are melted in an underground tank heated by steam coils. The spent gases from the tops of the condensers are burned in stack furnaces so as to eliminate any fume nuisance.

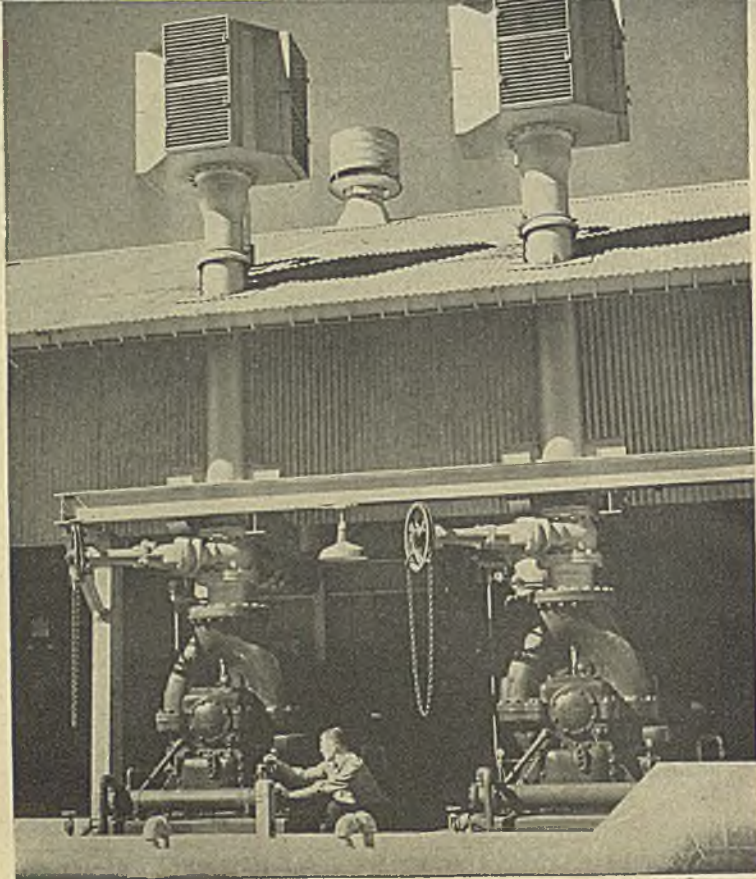
Molten anhydride is pumped from the melt tank to a primary still. Heart cut from this column goes to a secondary still heated with 450-lb. steam and provided with a fractionating column. The purified, distilled product goes to an aluminum storage tank blanketed with inert gas. From here it is fed to a water-cooled chilling machine which solidifies the product and chips it off into the proper physical form. The phthalic anhydride product is automatically weighed into bags and stored for shipment. The Oronite product analyzes 99.7 percent minimum phthalic anhydride.

For a more detailed description of this process, refer to the article on pp. 116-119 of this issue.

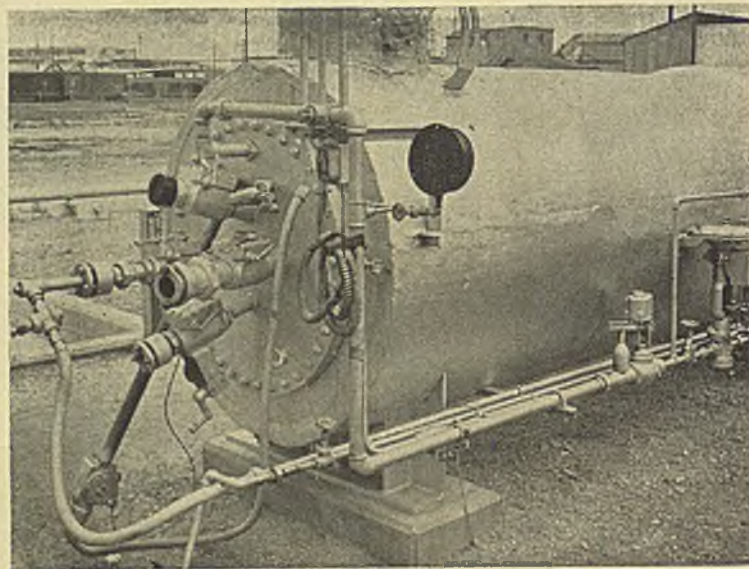
CHEMICAL ENGINEERING

August, 1946

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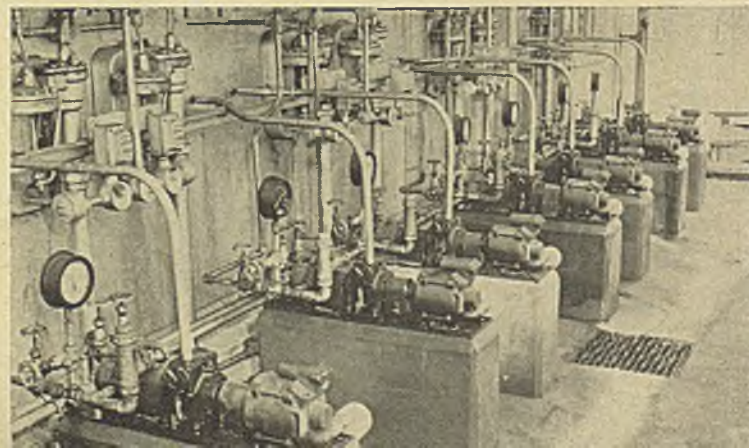


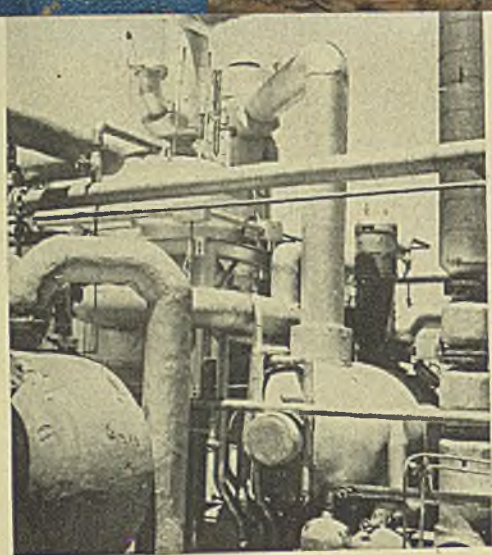
1 Intake filters and centrifugal compressors which supply air to the converters for oxidizing the ortho-xylene



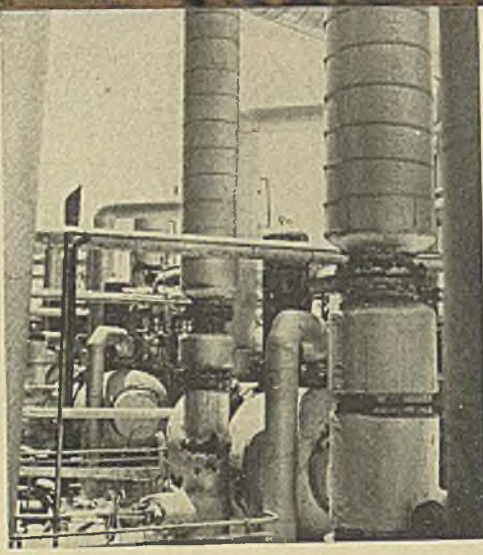
2 This muffle-type gas burner is used for preheating the air feed; spent gases from this burner join the air stream

3 Battery of gear pumps feeds liquid ortho-xylene into vaporizers, after which it is fed with air into converters

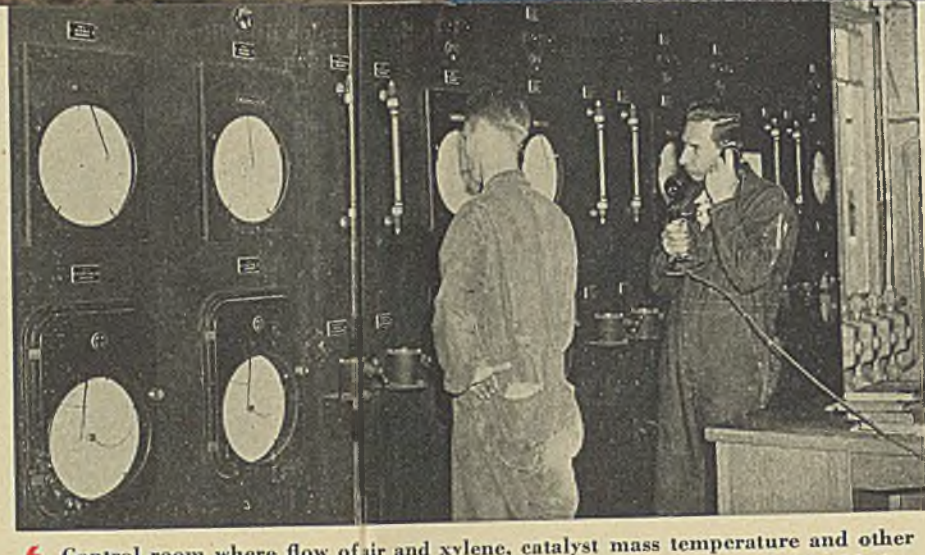




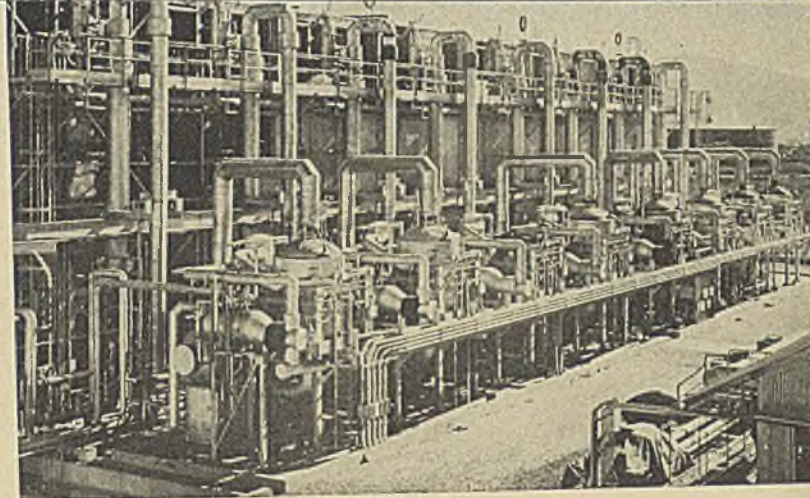
4 Converter accessories includes molten salt cooler and circulation system



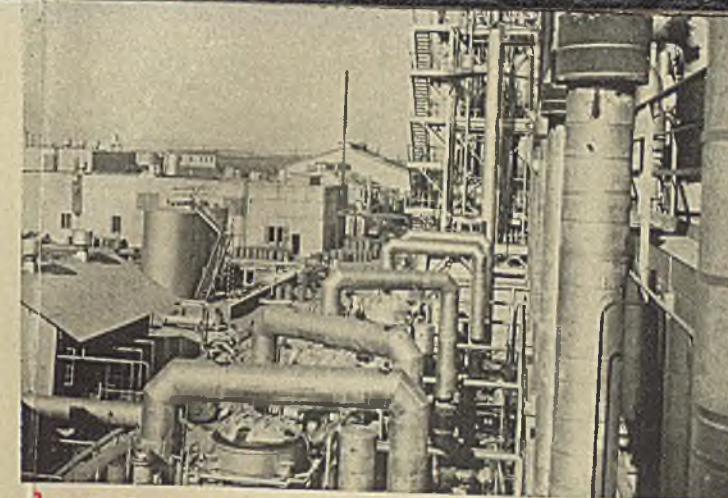
5 Overhead lines feed vaporized ortho-xylene and air mixture to converter



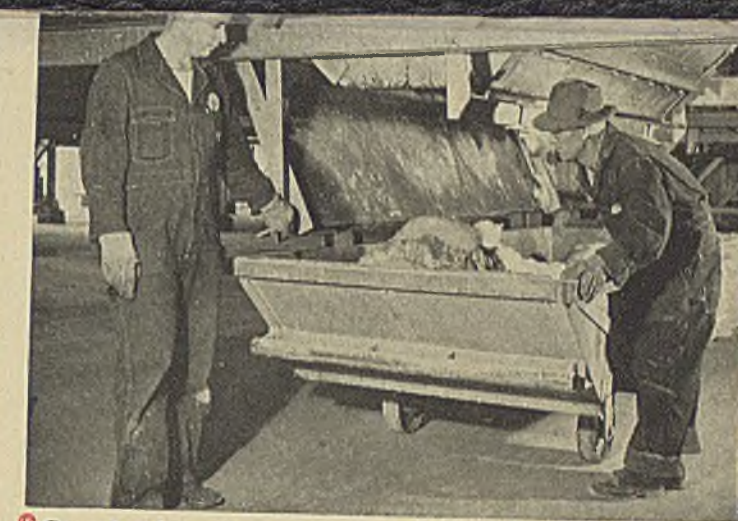
6 Control room where flow of air and xylene, catalyst mass temperature and other variables are regulated to give maximum yields and prevent uncontrolled oxidation



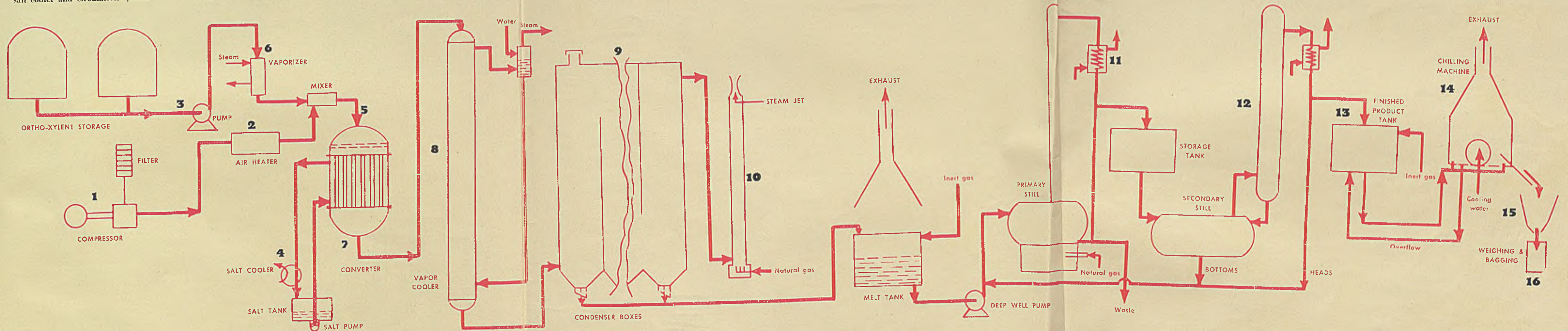
7 Each of the converters has a vapor cooler heat exchanger, behind which are located the condenser boxes, tall structures in background



8 In the foreground are shown feed lines entering the tops of the converters; on the extreme right are the vapor coolers



9 Crystals of crude phthalic anhydride are dumped periodically from condenser boxes into carts



10 Spent gases from condensers are burned in furnaces to eliminate fume

11 Distillation set-up for purifying crude melt, primary still at left

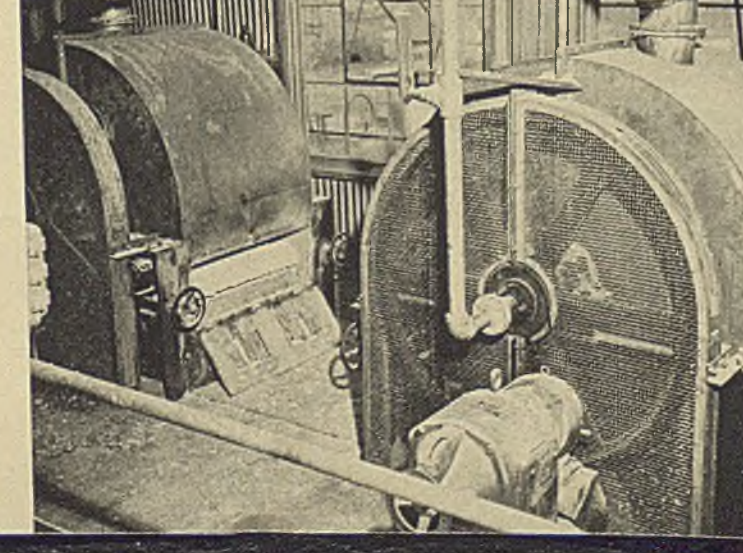
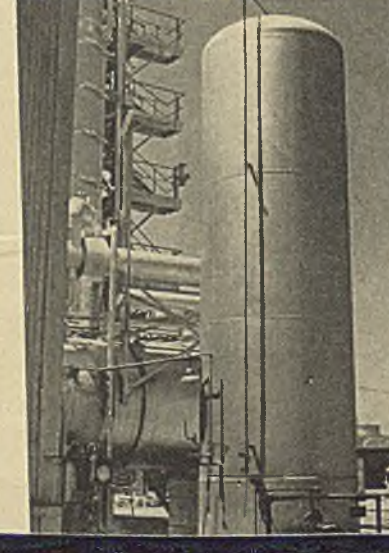
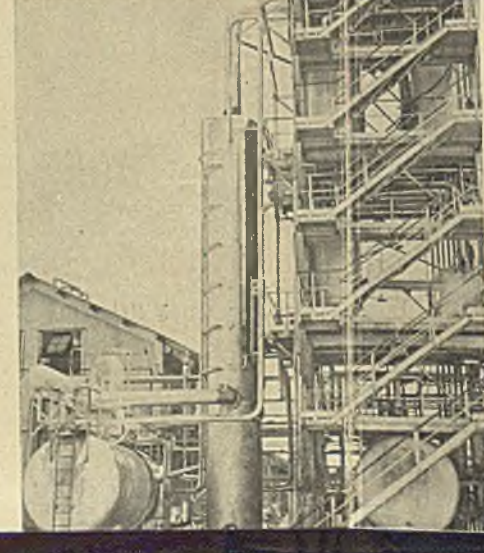
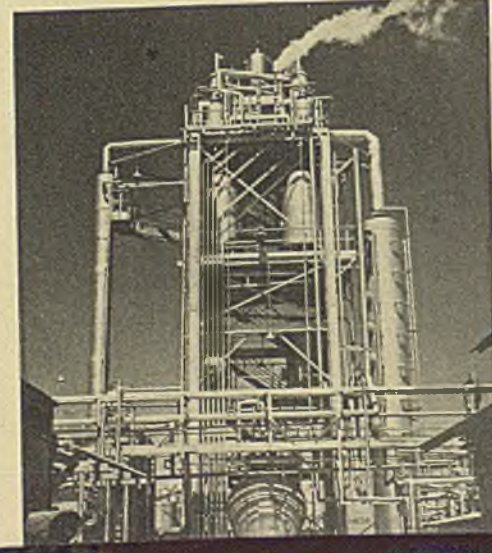
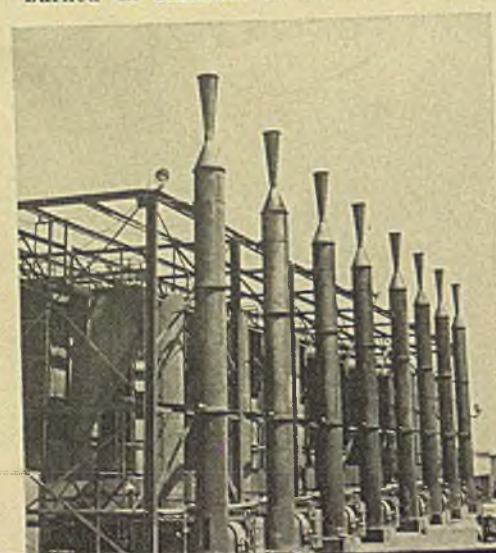
12 Finishing still with column which receives heart cut from primary still

13 Molten anhydride is pumped to aluminum storage tank

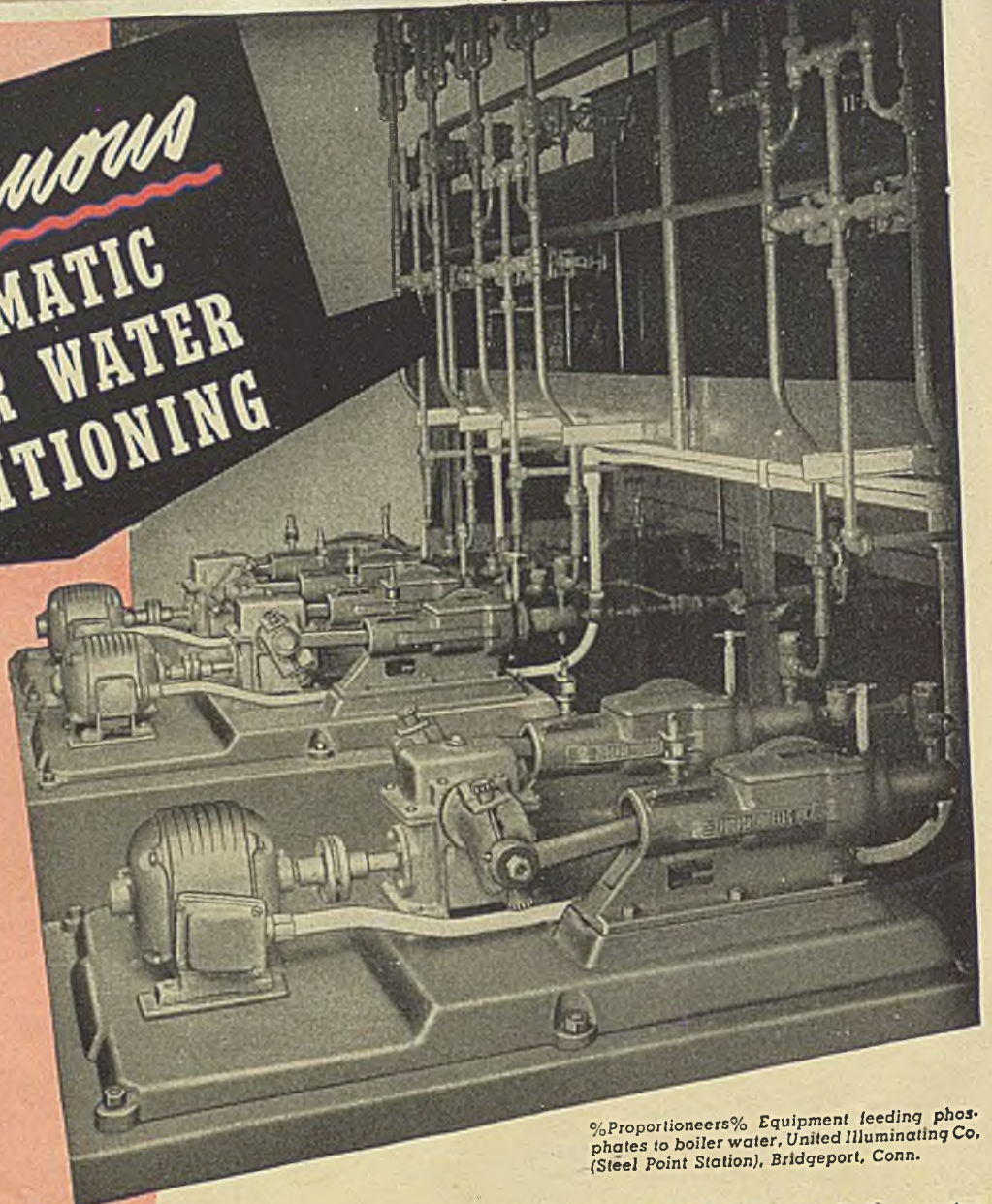
14 Molten anhydride is fed to two stainless steel, water-cooled chilling machines; at this stage product looks like soap chips

15 Autoweighing and packaging of the final product into paper 50-lb. capacity

16 The final product is a uniform, white granular material that analyzes 99.7+ percent minimum phthalic anhydride



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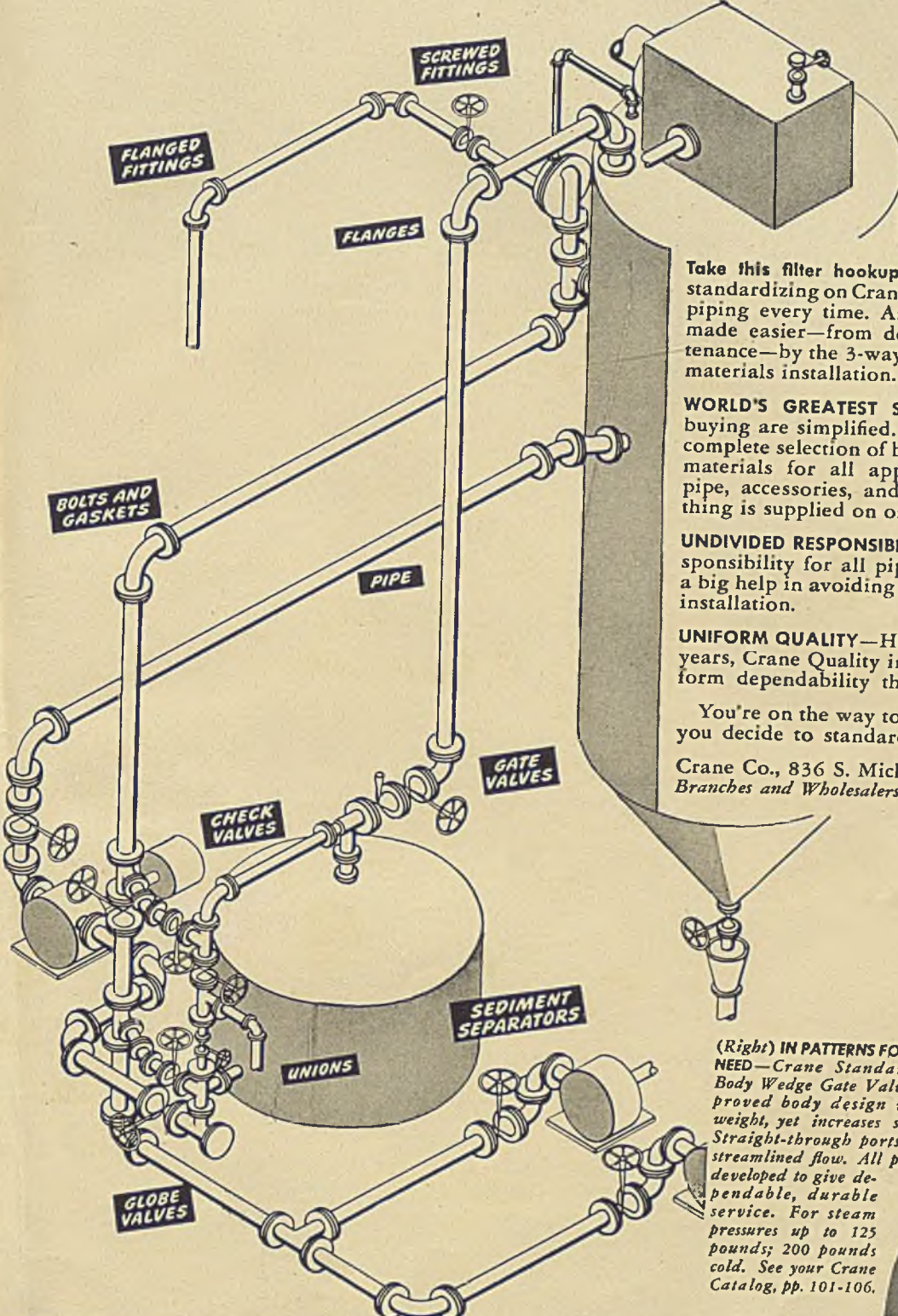
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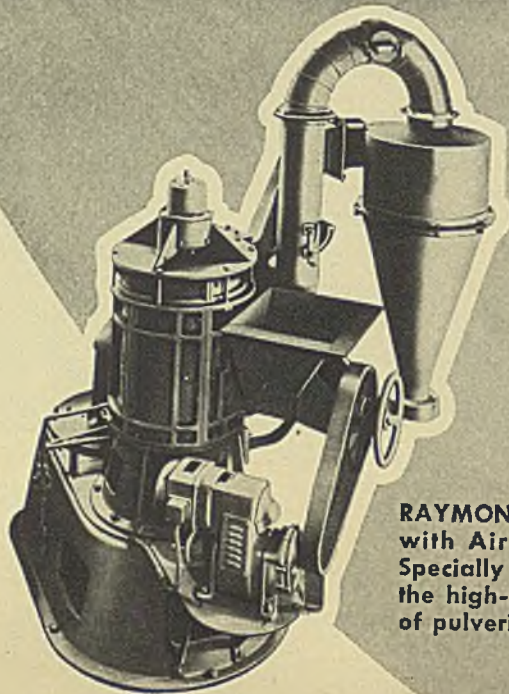
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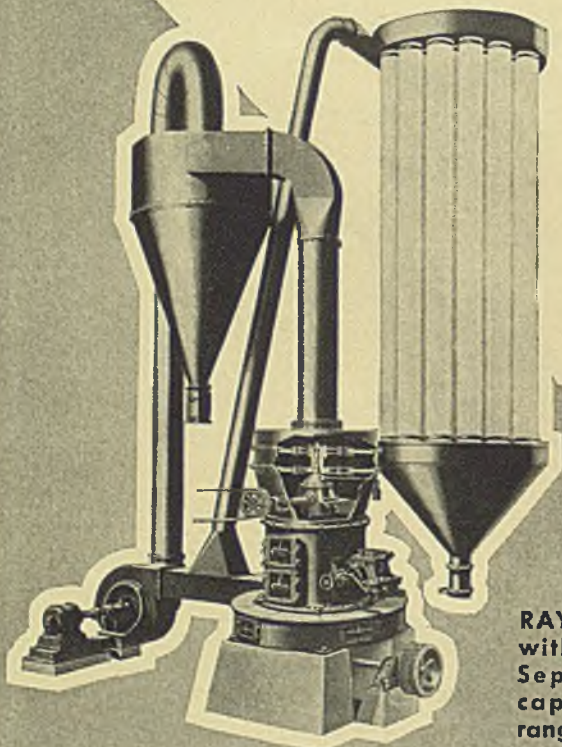
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NEW PRODUCTS AND MATERIALS

R. W. PORTER, Assistant Editor

FISH NET PRESERVATIVE

A PLASTIC-BASE fish net preservative dip that is easy to use, dries quickly and increases the net's strength by approximately 10 percent has recently been announced as commercially available by General Plastics Manufacturing Co., Tacoma, Wash. In addition, the new fish net dip, known as Dura-Nett, is claimed to increase the net's abrasion resistance threefold, afford excellent resistance to fungi growths, and provide protection from the harmful rays of the sun. Designed primarily to provide Pacific Northwest fishermen relief from the economic losses resulting from the high deterioration rate of fish nets, the new plastic-base dip is claimed to increase the average life of nets under normal exposure conditions by at least one season. Nets treated will be neither greasy or sticky, and therefore will not foul rollers or winches and will not be dirty to handle. Application is made in a similar manner to other such cold dips. Complete immersion is required, with the weight of the web being the determining factor for the immersion time. This should vary from a few seconds to one or two minutes. After dipping, the surplus plastic solution should be wrung off or drained before the net is laid out to dry. Depending upon drying conditions, the nets treated with Dura-Nett will be dry within 5-10 hr. The nets may be used 24 hr. after drying. It is claimed that no other preservative will enable nets to be used so soon after treating. The idea of such a fish net preservative came to General Plastics Mfg. Co. after a similar product had been used for over 5 years as a preservative of canvas, rope and cotton-jacketed fire hose. Dura-Nett I is formulated for drag nets and trawls that get hardest wear, while Dura-Nett II is recommended for seines. Dura-Flex I, dark green in color, is very flexible and is recommended for gill nets; Dura-Flex II, brown in color, is recommended specifically for gill nets used in very cold water. Compared with other treatments, this material is claimed to be far less flammable.

ZINC STEARATE WATER DISPERSION

RECENTLY announced by the Beacon Co., 97 Bickford St., Boston 30, Mass., Aquazinc consists of zinc stearate dispersed in water and is claimed to have advantages to users of zinc stearate. This dispersion takes place with the aid of a wetting agent which volatilizes at or below the temperature of boiling water. Uses of zinc stearate are expected to be broadened because of its water dispersibility. Aquazinc can be used to advantage in the manufacture of cement, neoprene, adhesives, coated paper, butyl rubber, and all types of rubber

latex. It is claimed to offer a convenient method of applying zinc stearate to molded goods. Aquazinc can be diluted with water and sprayed on molded goods before curing. It is claimed to have an advantage over the use of powdered zinc stearate since there is no dust, fire hazard, and other difficulties usually experienced with the powdered material. It is said to be economical to use because it can be applied uniformly and with very little loss.

LIQUID UREA RESIN GLUE

MARKETED under the brand name of Casco-Resin 135 by the Casein Co. of America, Division of the Borden Co., 350 Madison Ave., New York 17, N. Y., a new type liquid urea resin glue is claimed to be valuable as a replacement for the currently short animal and casein glues. This new product is a craze resistant joint glue, especially made for edge glueing, assembly and dowel work. Casco Resin 135 is a free flowing liquid resin of the urea-formaldehyde type, easy to handle and use. It was developed primarily for cold glueing at room temperature. Setting or curing of the adhesive is accomplished by the addition of a catalyst. It is compounded to minimize the crazing tendency of urea resin, and it provides a more durable bond than conventional adhesives. It is also claimed to make an excellent bond on certain woods that are not easily glued with urea resin. It is suitable for low pressure glueing and in bonding of imperfectly fitted joints and general assembly work. Resulting glue lines even in measurable thicknesses are claimed to be craze resistant, water resistant, mold or fungi resistant, and on most species of wood the glue-line strength exceeds the strength of the wood. It is now commercially available in 1 and 5 gal. cans and in 30 and 55 gal drums.

TEXTILE CHEMICALS

THREE new wool treating chemicals have been recently announced by the Textile Chemical Div. of the Dexter Chemical Corp., New York, N. Y. A sodium salt of an alkyl naphthalene sulphonic acid, under the brand name of Dexolene is a wetting out agent particularly useful in acid conditions which are encountered in wool processing. It is furnished in liquid form and is readily soluble in water at all concentrations and is claimed to speed production and improve the handle of finished goods. In woolen mills it is recommended in the following operations: carbonizing, dyeing, fulling, and bleaching. In carbonizing of wool Dexolene, a penetrant which is stable in the strength of acid used in the carbonizing bath, effectively wets out the cloth and carries the acid into the

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burrs and vegetable matter to be burned out. Tests have shown that vegetable matter is saturated with more acid where Dexolene is present, than where acid alone is used. By use of this chemical, goods are claimed to be more readily neutralized requiring less time and lower concentrations of acid.

Another new product is a protective agent and dyeing oil for wool and is designated as Maxitol No. 10. This is a highly sulphated oil which promotes level dyeing of wool and assists in penetration and protects the fiber in dyeing, bleaching, drying and after use. Maxitol No. 10 possesses the property of lowering the surface tension of the dye bath and affording protection to the wool fiber. It forms a stable compound with the basic groups of wool substances, forming a thin film of oil which cannot be rinsed off due to the fact that it is bound chemically to the wool. This is claimed to protect the fibers during mechanical treatment. It is claimed that wool dyed with the addition of Maxitol No. 10 is not as susceptible to injury from high drying temperatures as ordinary wool.

The third wool treating chemical is a scouring, emulsifying, dye dispersing and wetting out agent known as Oridex D. Oridex D is a smooth, cream colored paste consisting of synthetic detergents of the sulphated amide condensation type. It is resistant to hard water, acid, alkalis and salts and is readily soluble in water at 120 to 125 deg. F. This scouring agent is used in stock solutions of 5 to 20 percent pre-

pared with boiling water. They are then diluted as required for use. It does not hydrolyze to give an alkaline reaction and may thus be used on delicate shades where alkaline conditions must be avoided. If any of this material is left on the fabric or fiber it will not turn rancid nor develop any objectionable odor or color regardless of length of storage of the goods. It is claimed to be sufficiently stable to be used in solutions of oxidizing agents such as peroxide, bichromate, etc. Oridex D is claimed to have a wider application than soap because its efficiency is not impaired by hard water or acid conditions. It facilitates easy rinsing and can be removed from the fabric easier than soap.

WASHING COMPOUND FOR PAPER MILL FELTS

DEVELOPED during the war but unavailable because of raw material shortages, a new felt washing compound known as Syntergent K is now available from the Paper Chemicals Div. of National Oil Products Co., Harrison, N. J. This material is a light amber colored liquid which is less acid than a number of other felt washing compounds such as soda ash or trisodium phosphate. It is mild in its action and has no detrimental effects on felt, yet keeps them clean. Syntergent is claimed to bring about substantial reductions in clothing costs on paper making machines. It is one of the few cation active detergents used for this purpose.

ALL PURPOSE PLASTIC SEALING COMPOUND

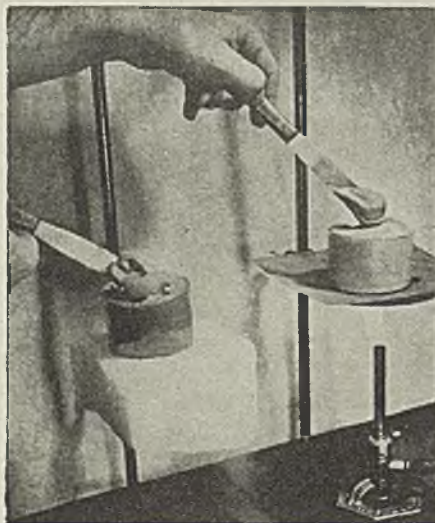
AVAILABLE to certain industrial users for some time, a plastic sealing compound under the brand name of Cauxeal is now being put on the general market by X-Pando Corp., 43-15 36th St., Long Island City 1, N. Y. Cauxeal consists of asbestos fiber with a small amount of mineral filler together with a vehicle composed of a mixture of mineral hydrocarbons and a small amount of non-drying vegetable oil. It is claimed to render joints or cracks watertight, fume-proof and acid and alkali-resistant. It retains its plasticity indefinitely and can be worked and shaped with ease. It will bond firmly to practically any material, expanding and contracting with the surface to which it adheres, thus maintaining the bond indefinitely. In application it does not stick to the hands or drag on tools. It is necessary to have the surface thoroughly clean and free from dust and other foreign material before Cauxeal is applied. Furnished ready for use in 1 and 5 lb. containers, it has been used and tested for sealing against water, fumes and air in electrical conduits or ducts of metal, tile or fiber, as well as soil pipe and glass block. It is suggested for use as a glazing or caulking compound in such applications as setting plumbing fixtures, setting sink strainers, for filling cracks and openings in solid walls, for caulking around window or door openings, and for sealing wood joints of all kinds. It may be used for expansion or other structural joints,

for laying or pointing tile, for cracks in floors under permanently wet or damp conditions and for other miscellaneous industrial uses.

SYNTHETIC LOW TEMPERATURE GREASE

DEMONSTRATING a wide range of operating temperatures, a new synthetic low temperature grease has been recently announced by the Texas Co., 135 E. 42nd St., New York, N. Y. Under the brand name of Texaco Uni-Temp Grease, this lubricant will be used in various types of control bearings, actuators, propeller governors, aircraft instruments, aerial cameras, and fly-power motors used in radar equipment. It was developed for applications wherever extremely low temperatures are encountered and where satisfactory performance for short periods at temperatures as high as 300 deg. F. are also required. In the temperature range of -100 deg. C. to +300 deg. F. Uni-Temp grease does not lose its fundamental lubricating characteristics.

Uni-Temp is a lithium base grease in which a synthetic compound is employed as the oil constituent. It is light tan in



Uni-Temp withstands temperature extremes and retains its characteristics

color and has a texture resembling that of butter. Some forms of this new grease contain rust inhibitors for use where excessive moisture or salt sprays may be encountered. In the ASTM worker it showed no change in penetration even after 100,000 strokes, giving assurance that it will not break down and become a liquid which might leak out of bearings, gear boxes, etc.

RUBBERLIKE THERMOPLASTIC MATERIAL

AN IMPROVED variation of Duroflex has been developed by the Duorite Plastic Industries, Culver City, Calif. It is claimed to be better than the original Duraflex (recently described in these columns) because it has a longer life and because it can be melted and poured over plaster.

Duroplex is a soft, smooth surfaced, green colored material similar to rubber (it cannot be vulcanized) which is used for making molds in which other plastics, cements, wax, plaster, and related materials can be cast. Plastic molds are desirable because they can be stretched and may be used to cast objects with back-drafts and undercuts. Materials such as rubber are not desirable because they vulcanize and harden too readily. The new Duroflex can be poured over plaster for the purpose of making molds because it has no adhesive properties and does not cause bits of plaster to adhere to the mold. It can be applied even when the plaster model is not completely dry. Duraflex molds may be remelted and reused.

LOW TEMPERATURE SILVER BRAZING ALLOY

TWO NEW silver brazing alloys have recently been announced by Handy & Harmon, 82 Fulton St., New York 7, N. Y. Featuring low silver content these alloys are expected to find wide use due to the increasing price of silver. Under the brand name of Easy-Flo 45 and Easy-Flo 35, these new brazing materials have the advantage of alloys with higher silver content but, due to less silver in composition, provide an economy to help offset the increased price of silver. Easy-Flo 45 is a 45 percent silver alloy. It also contains copper, zinc and cadmium. It has a low melting range, namely 1,120 deg. F. to 1,145 deg. F., producing joints between ferrous, non-ferrous and dissimilar metals which are strong, ductile and leaktight. Easy-Flo 35 with a 35 percent silver content has characteristics quite different from the 45 percent alloy. It has a wider melting range of 1,115 deg. F. to 1,295 deg. F. and is free flowing at an exceptionally low temperature for an alloy containing only 35 percent silver. It produces joints which are high in strength and ductility and may be used in places where a higher working temperature than can be obtained with Easy-Flo 45 is not objectionable.

PLASTIC PLUGS FOR OIL WELLS

DEVELOPED to prevent gas infiltration in producing oil wells, a plastic sealing compound is now commercially available. The plastic, a Resinox phenolic resin has been used to seal welds against intrusion of natural gas by the Monsanto Chemical Co., St. Louis, Mo., and Oil Well Chemical Service Co., Fort Worth, Tex. After extensive tests in the west Texas area, it is claimed that this development will return the average well to its normal production after its allowable output has dropped because of the infiltration of natural gas. Unlike cement, which is made up of solids held in suspension, the resin is introduced into the shaft as a true liquid which permits maximum penetration and hardens after it permeates the porous rock through which the gases are filtering. Application of this sealing compound to a well can be completed in about 36 hours.

Briefly, this is accomplished as follows:

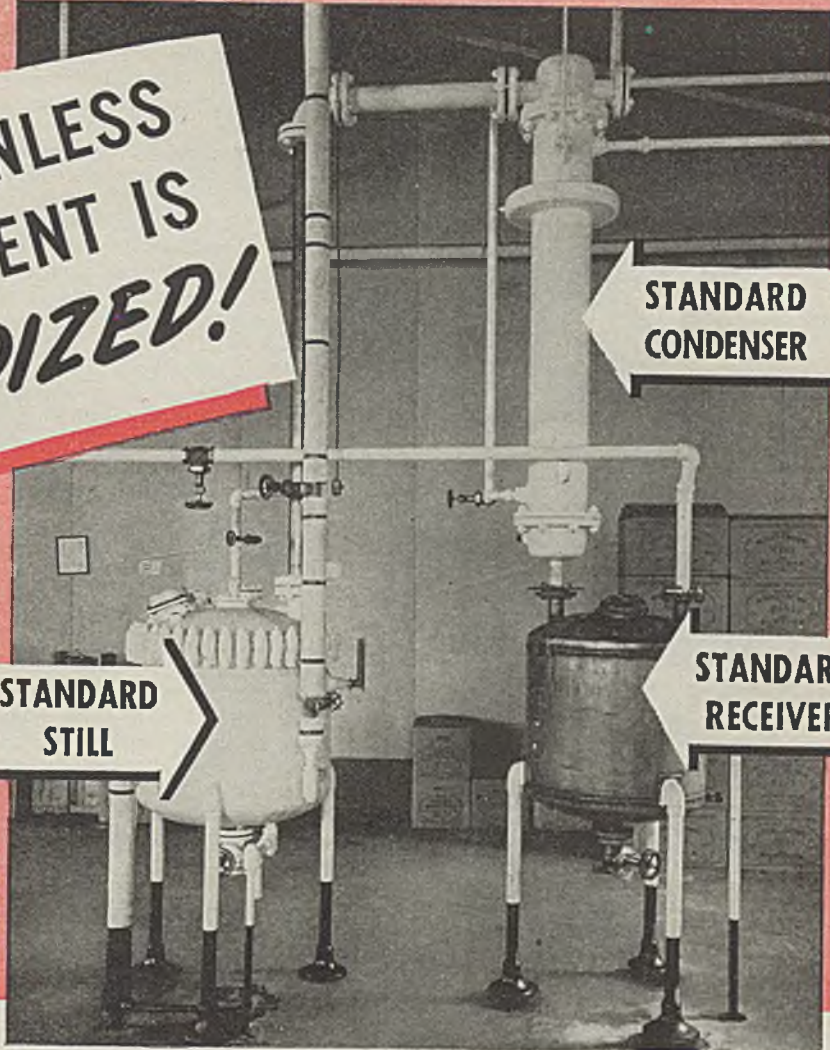
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If your problem involves cus-
tom-built equipment, Pfaudler
designs to your requirements

STANDARD
STILL

STANDARD
CONDENSER

STANDARD
RECEIVER



design procedure which has met a majority of process requirements for standard Pfaudler glass lined steel equipment, is now available in stainless steel. You may select *completely standardized* mixers, kettles, stills, reactors or receivers in capacities from 5 to 500 gallons to meet specific needs economically. To go with these, Pfaudler recently added a wide range of stainless steel tubular heat exchangers. So, if stainless steel is indicated, check these lines now!

These standard designs avoid special engineering. Each complete unit is fully identified and defined by a model number, with a consequent saving in time and cost!

In addition to design standardization, these units are available in several alternate types of stainless steel, mill finish or polished, and heat treated, if required.

Note these standard equipment features...

1. Top-head openings are adequate in number and size to meet the majority of operating requirements.
2. Agitators are available in alternative types to meet a wide range of operations, all the way from simple blending to gas absorption and emulsification.
3. Pfaudler spiral bevel gear drives of rugged construction accompany these agitators.

4. Stainless steel lined vessels are so built that there is no contact of carbon steel with stainless steel liners. Metal dilution cannot occur. Liner corrosion is eliminated.

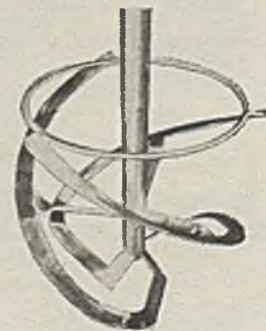
If, for any reason, standard equipment cannot be used, Pfaudler custom-built designs are sure to qualify. Regardless of what type you need, Pfaudler's fabricating know-how assures you of equipment that meets performance requirements.

Undivided responsibility for the complete job is assumed by Pfaudler, whether glass lined steel, stainless steel or other alloys are specified. How can we help you?

CUSTOM-BUILT STAINLESS STEEL



Left: One of the two 6,000 gallon stainless steel formaldehyde storage tanks used in plastics plant. Below: A special Pfaudler designed spiral agitator for mixing alginic acid, typical of the custom-built equipment Pfaudler fabricates.

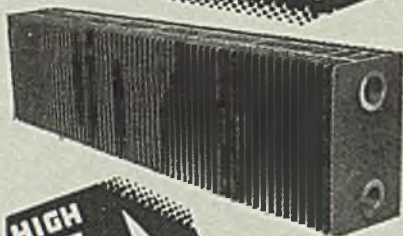


Pfaudler

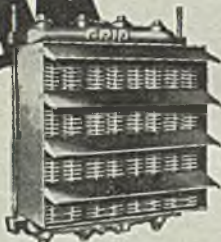


THE PFAUDLER CO., ROCHESTER 4, NEW YORK
 ENGINEERS AND FABRICATORS OF CORROSION RESISTANT PROCESS EQUIPMENT
 Glass-Lined Steel . . . Stainless Steels . . . Nickel . . . Inconel . . . Monel . . .

HERE'S WHY
GRID
 UNIT HEATERS
 WILL LAST AS
 LONG AS THE PIPES
 FURNISHING
 STEAM TO
 THEM..



HIGH
 TEST
 CAST
 IRON
 HEATING
 SECTIONS



★ One piece construction heating sections (patented) of high test cast iron and will withstand steam pressures up to 250 lbs.

★ No soldered, brazed, welded or expanded connections to become loose or develop leaks.

★ No electrolysis to cause corrosion, breakdowns, leaks, or heating failures.

That's why GRID Unit Heaters withstand the corrosive fumes in chemical plants without maintenance. In many plants where the corrosive fumes of HCl and Cl are prevalent GRID Heaters have been operating for 8 or 10 years without maintenance. Complete information upon request.



BLAST SECTIONS

The same one piece construction heating sections (patented) of high test cast iron as GRID Unit Heaters, GRID Blast Sections (coils) will withstand steam pressures up to 250 lbs... no tortuous air passages... complete absence of ruptures, strains and warping... compact... no electrolysis... no soldered, brazed, welded, or expanded connections... complete information upon request.

Send for booklet "Corrosion in Unit Heaters"—free upon request.

Send for booklet "Corrosion in Unit Heaters"—free upon request.

**D. J. MURRAY
 MANUFACTURING CO.**

WAUSAU • WISCONSIN

First the metal inner tube in which the oil is moved to the earth surface is removed from the well casing. Instruments are used to measure the exact location and extent of the area through which the gases are infiltrating. Then a drillable plastic "bridge" is lowered into the well which in effect interposes a stopper between oil bearing and gas bearing strata. Sirupy plastic resin is now introduced into the well and is forced under pressure against the plastic bridge with the result that it is squeezed into the porous rock through which the gas has been seeping. The plastic resin hardens in eight hours. Then the affected portion of the well is redrilled with the drill passing successively through the plastic resin and the plastic bridge after which the well is ready to return to production. This resin is now in volume production.

PROTECTIVE COATING FOR PAINT SPRAY BOOTHS

MANUFACTURED by Detrex Corp., Detroit 32, Mich., a new protective coating for spray booth side walls is now available. Under the brand name of Triad PR it is readily applied to the side walls of either wet or dry spray booths with brush or spray guns, and provides a light reflecting finish that withstands mild abrasion. The white brilliant surface improves visibility in the booth and is easily flushed off with water or steam carrying all surface deposits with it. It aids in the speedy stripping of paint from conveyor hooks and spray booth louvers. Triad TR permits easy removal of accumulated paint over-spray and greatly reduces cleanup time. Triad PR is a light cream colored semi-liquid paste similar to a heavy paint. It is readily thinned with water to the proper consistency for painting or spraying. After application, it dries in approximately one hour to a hard white light reflective non-flammable coating. It is easily removed by flushing with warm or cold water and can be scraped readily when wet. This semi-liquid paste contains 53.5 percent total solids, 46.5 percent total liquids, has a specific gravity of approximately 1.4 and weighs 11- $\frac{3}{4}$ lb. per gal. For spray applications, a concentration of two parts of Triad PR and one part of water is recommended. For brush applications, it is recommended to use three or four parts of Triad PR to one part of water.

TITRATION INDICATOR FOR ACID-ALKALINITY CONTROL

CLAIMED to overcome the lack of color sensitiveness of methyl orange and other indicators, a new sharp endpoint indicator has been developed by the Tritest Laboratories, Inc., 263 So. Third St., Philadelphia 6, Pa. Methyl orange is now most widely used because its endpoint lies close to the usually accepted proper pH value. However, it has an indistinct endpoint difficult to judge as to exact color change. The new indicator known as TruTest M-E-P indicator is claimed to meet all the requirements of pH control, is easy to use, and has a constant and sharp color separation so that even untrained personnel can use it with quick accuracy. This indicator changes from green on the alkaline side to an intermediate gray to a definite purple on the

WIRE CLOTH

IN
 BRASS
 COPPER
 BRONZE
 MONEL
 NICKEL
 ALUMINUM
 STEEL
 TUNGSTEN
 MOLYBDENUM
 STAINLESS
 AND
 SPECIAL
 ALLOYS



IN ALL MESHES

Jelliff Wire Cloth is made in all commercial sizes, standard lengths of 100 feet, 24-72 inch widths; special widths and cutting to specification. Available in all common and special weaves, crimped, calendered, or rolled.

JELLIFF

COMPLETE
 FABRICATING

Jelliff maintains special facilities for fabricating wire cloth into strainers, filters, and other special wire-mesh fabricated parts.

DIPPING BASKETS

Jelliff dipping baskets are rugged and strongly-braced, of metals, alloys, and in sizes and mesh to meet your requirements.

THE
C. O. JELLIFF

MFG. CORP.
 SOUTHPORT, CONNECTICUT



NEW Monsanto Plasticizers



SANTICIZER 130 SANTICIZER 131

CLEAR and practically colorless

Both of these new Monsanto plasticizers — Santicizer 130* and Santicizer 131* — are clear and practically colorless liquids, have an exceptionally wide range of compatibility and are comparatively stable under heat.

Santicizer 130 and Santicizer 131 are suggested for use as plasticizers in cellulose acetate molding compositions; plasticizers in lacquer type coatings; plasticizers in paper coatings, to impart gloss and improved transparency. They are especially useful to modify shellac, zein and similar type products. In general, they impart toughness, high gloss and good flow.

(Both of these plasticizers are available in pilot-plant quantities only.)

For complete details, including compatibility data, ask for Technical Bulletins O-D-100 and O-D-101. Contact the nearest Monsanto Office, or write direct to: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

*Reg. U. S. Pat. Off.



CHEMICAL AND PHYSICAL PROPERTIES:

	SANTICIZER 130	SANTICIZER 131
REFRACTIVE INDEX AT 25°C.	1.5300 — 1.5310	1.5295 — 1.5315
SPECIFIC GRAVITY 25/25°C.	1.1760 — 1.1770	1.1680 — 1.1725
COLOR	APHA 40 Maximum	APHA 40 Maximum
ODOR	Very slightly fruity	Very slightly fruity
ACID (as H ₂ SO ₄)	.005 — .01	.005 — .015
CRYSTALLIZING POINT	Becomes a glass-like solid at -30°C.	Becomes a glass-like solid at -30°C.



CESCO Acitex Hood Proves Itself Again and Again

• Wherever acid-workers have used it they have consistently acclaimed the new CESCO Acitex Hood. They bear out the statement that it is made of the toughest acid-resistant material ever found. It provides safety with comfort, too—smooth fitting, well ventilated, and available with an air feed unit.

RESISTS THE 6 MOST INJURIOUS ACIDS

Tests and on-the-job experience prove Acitex's resistance to



Nitric Acid
Sulphuric Acid
Carbolic Acid
Acetic Acid
Hydrochloric Acid
Hydrofluoric Acid

Write today for full details about
this Acitex Hood

CHICAGO EYE SHIELD CO.

2342 Warren Blvd.
Chicago 12, Illinois



CESCO
FOR SAFETY

acid side or vice versa. The gray tint provides a convenient warning of the approaching endpoint. Its sensitivity is demonstrated by the fact that one drop of N/10 acid will carry 25 ml. of sodium bicarbonate solution from a green color to the warning gray color. A second drop will turn the solution to the ultimate purple endpoint. In unbuffered solutions, one drop of N/10 acid or alkaline will carry the color from green to purple or vice versa. One drop of this indicator is sufficient for each 25 ml. of titrating volume.

This indicator is a stable, aqueous solution containing no alcohol or other volatile liquids. Effectiveness is said not to be impaired by organic matter or phosphates in solution. It is economical to use and is said to be applicable with a greater degree of accuracy to all titrations where methyl orange is used. It is available in various convenient sized bottles with plastic closures and droppers.

SYNTHETIC SOAP

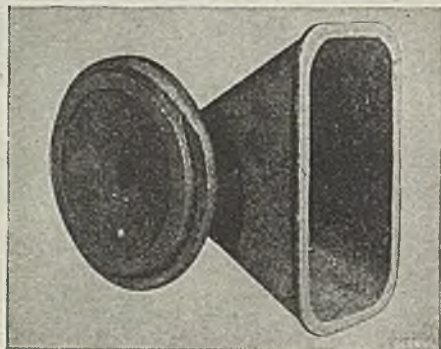
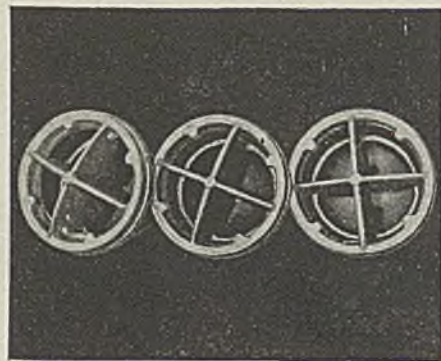
DEVELOPED by the Monsanto Chemical Co., St. Louis, Mo., a new type of sudless synthetic soap is intended for use in automatic home laundries as well as commercial and industrial use. Under the brand name of Sterox, this new detergent soap does not form suds, will cleanse clothes as easily in hard as in soft water and will not allow the formation of objectionable curds. Sterox now being manufactured commercially, is a non-ionic or non-curd forming detergent. It will not combine with metallic substances found in tap water to form insoluble curds, which normally cause the familiar greasy wash tub ring, leaving various deposits on rinsed clothes and frequently leading to clogged drains. In addition to this advantage, use of this new soap removes the possibilities of overflows caused by foaming of conventional laundry soaps and powders when excessive amounts are used. Sterox is suggested for use in textile cleaning, metal cleaning, and other industries in which quick, thorough, non-injurious cleansing operations are important to production.

GERMAN INSULATING MATERIAL

A NEW insulating material has been developed by the German cork board and insulation industry, according to reports Nos. PB-2580 and PB-1671, now available from the Office of Technical Services, Department of Commerce, Washington, D. C. under the brand name of Iporka which is made from a urea formaldehyde foam, it is claimed to be as good an insulator as cork board. This material weighs $\frac{1}{10}$ as much as cork board and has a load bearing strength of 0.2 kg. per sq. c. Its cost was about the same as cork board prior to the war.

SYNTHETIC RUBBER BASE ENAMELS

NOW BEING manufactured to meet peacetime production demands, Coprene enamels, formulated with a modified synthetic rubber base, are now available from Maas & Waldstein Co., 43 Riverside Ave., Newark 4, N. J. These coatings were produced only in limited quantities during the war because of restrictions on raw materials. Now available in most colors,



Stainless & Alloy Steel Castings for Modern Requirements!

Experience symbolizes progress. Atlas foundrymen having pioneered many of the revolutionary casting methods in use today, have the experience so necessary to meet modern requirements. Complete facilities for casting all analyses alloys for all purposes—under the direction of skilled metallurgists—assure you of the finest in stainless and alloy steel castings.

Our illustrated 8 page
bulletin 45 is available,
now. Write for it.



ATLAS STAINLESS STEEL CASTING
DIVISION

ATLAS FOUNDRY COMPANY

540 LYONS AVENUE IRVINGTON 11, N. J.

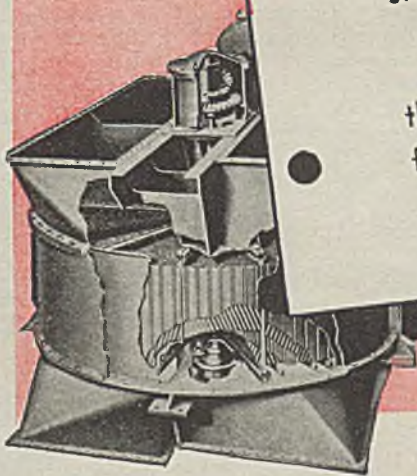
Measuring Air Flow Across a Ljungstrom

The more modern the plant, the more complicated becomes measuring air flow for combustion of fuel, particularly finding a satisfactory point at which to take measurements.

Draft losses across the superheater and economizer are, in many cases, disturbed by the laning of gases. Methods have been devised whereby the Ljungstrom air preheater provides a normal gas and air flow throughout the load range and it becomes the best place to measure the air and gas flow.

Tests of operation with our new Ljungstrom mass blower have proved its ability to eliminate deposits so that draft loss is stable, by blowing the surface at scheduled intervals. Application tests made on a number of different heaters show that friction losses across the heater are steady in relation to load.

A growing number of large utility companies are using this system of air-flow measurement, and their experience fully bears out the results obtained during these tests.



THE AIR PREHEATER CORPORATION

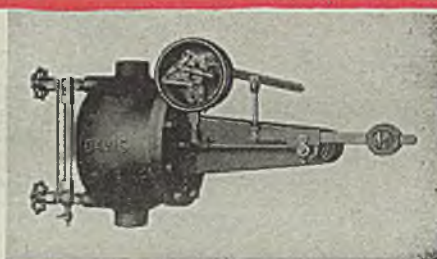
Executive Offices: 60 East 42nd Street, New York 17, N. Y. • Plant: Wellsville, N. Y.

DAVIS FLOAT BOXES for *Liquid Level Control* of:

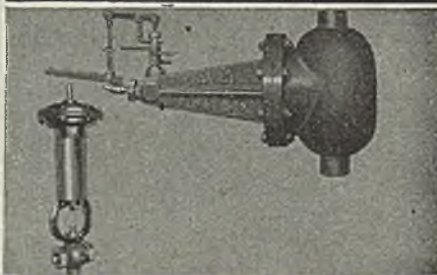
- TANK VALVES
- SIGNAL SWITCHES
- MOTORS
- OTHER EQUIPMENT

DAVIS Float Boxes are used in connection with closed tanks where fluctuation of the fluid level within the tank is the governing factor in the control of all types of electrical switches, control valves, pilot valves, (for operation of diaphragm motor valves), motors and other equipment. Davis fluid control equipment also includes internal float units for direct or pilot operation. Whatever your requirement may be, Davis can supply you with a combination of float box and control valve to make your control accurate, positive, and dependable.

Drop us a card today for detailed information on the Davis line. Ask for Bulletin 101AA. DAVIS REGULATOR COMPANY, 2539 S. WASHTENAW AVE., CHICAGO 8, ILL.

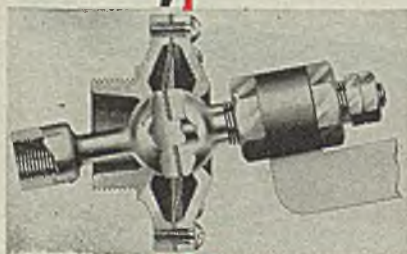


Davis No. 164 Float Box with Mercury Tube Switch.



Davis No. 162D Packless Float Box with Pilot Valve and No. 14 Diaphragm Motor Valve.

DAVIS DIA-BALL TRANSMISSION UNIT



A patented, leakproof, corrosion resistant packless assembly eliminating the packing box on Davis Float Boxes and Control Valves. Especially recommended for vacuum service or for use with volatile and inflammable fluids where a packing box is objectionable because of leakage. For pressures up to 300 lbs. and temperatures up to 450° F.



DAVIS REGULATOR COMPANY

2539 S. Washenaw Ave.

Chicago 8, Ill.

Coprene enamels are chemically resistant, air drying, and give high gloss finishes. They are recommended for use on steel and most other metals, wood cabinets and furniture, and various types of equipment and products requiring a chemical resistant air drying or baking finish. They are claimed to be tough, flexible and resistant to outdoor exposure.

RESIN GLUE

A new cold-run, fast-setting resin wood glue, under the brand name of Wood-Loc, has been developed for joint assembly operations by National Adhesives, 270 Madison Ave., New York. Wood-Lac is claimed to be the only type of resin glue that can be handled and machined after 20 to 30 minutes cleaning time, in contrast to the usual six or eight hours. Exhaustive tests in a wide variety of woodworking applications show that this glue produces a strong, resilient bond unaffected by humidity changes. This new material is a liquid ready for use. It remains liquid and does not harden in the pot. Its characteristics are claimed not to change during shipment, application and use and its storage and working life is greater than most of the other glues now in use. It does not become brittle nor does it form a hard abrasive film which dulls cutting tools. Its fast setting characteristics enable assembly line to be shortened. Wood-Loc glue is odorless and is available in colors ranging from uniformly controlled pure white to darker shades for special uses.

ORGANIC CHEMICALS

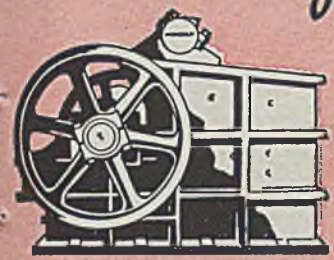
Now available in experimental quantities, ammonium-2-nitrobutane-1-sulphonate has recently been developed by the Visking Corp., 6733 W. 65th St., Chicago 38, Ill. This is the first of a series of aliphatic nitro-sulphonates produced by this company. It is believed that these materials will find utility as chemical intermediates in the synthesis of pharmaceuticals, dyes, detergents, and emulsifying agents. Nitro sulphonates are easily reduced to the amino sulphonic acids which are higher homologs of taurine. Tertiary hydrogen on the beta carbon is highly reactive and can be replaced by a wide variety of reagents. It thus offers a means of introducing this versatile group as a side chain on various nuclei to give new drugs of a more soluble character. It may be coupled with diazo compounds to introduce the solubilizing sulphonate group, thereby avoiding direct sulphonation on the nucleus. It is available in limited quantities now but increased production is indicated for the near future.

CORROSION INHIBITOR

DEVELOPMENT of a new brass corrosion inhibitor has been announced by Dr. Johan Bjorksten, Industrial Research Chemist, 185 North Wabash Ave., Chicago 1, Ill. Under the brand name of Brass Lyfe, this material is now being manufactured on a commercial scale by the Bee Chemical Co., 63 East Lake St., Chicago, Ill. Consisting of a 10 percent solution of the active agent in butyl cello-solve it is effective only on copper and copper alloys. It is miscible with and may be added to oils, lubricants and lacquers and will stop various types of corrosion.

NORDBERG PROCESS MACHINERY

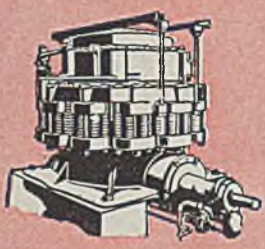
for the **HEAVY CHEMICAL INDUSTRIES**



JAW CRUSHERS



GYRATORY CRUSHERS



SECONDARY CRUSHERS



GRINDING MILLS



KILNS-COOLERS



DIESEL ENGINES

Greater Output—Lower Production Cost

Dependable Performance are assured when Nordberg machinery is used for processing operations of heavy chemicals, ores and minerals. This equipment is backed by a record of more than fifty years of building heavy machinery for many of our basic industries.

CRUSHING

Jaw, Gyratory and Cone Crushers built by Nordberg cover the entire range of primary and secondary crushing. Many Symons Cones are being used for crushing nitrate, carbide, potash, limestone and other materials used for the manufacture of chemicals. In addition, Cones are used for the crushing of ores of all metals, cement clinker, abrasives, slag, sinter, etc.

GRINDING

Nordberg Rod, Tube, Ball and Compartment Mills are available in a wide range of sizes for all grinding applications.

CALCINING—COOLING

Rotary Kilns and Coolers are built for any capacity and for any service.

SIZING—FEEDING

Symons Vibrating Screens installed in conjunction with crushers, materially increase capacity and insure uniformly crushed materials. Vibrating Bar Grizzlies and Apron and Table Feeders are furnished for any service.

POWER GENERATION

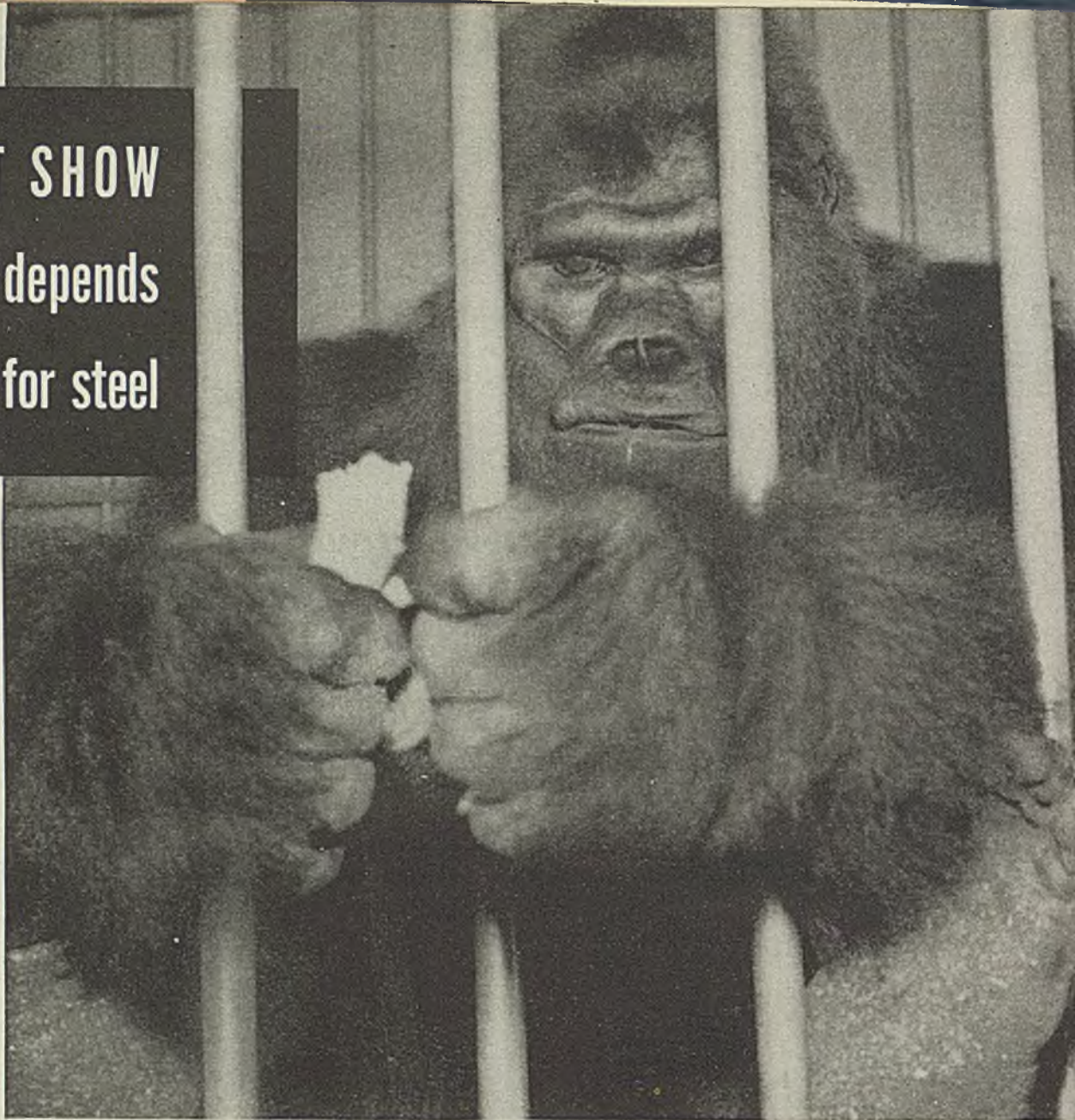
Nordberg Diesels and steam engines are generating power and specially designed compressors of large capacity and high pressure are being used for chemical operations.

When in need of any of the above heavy machinery, let our engineers acquaint you with what Nordberg has to offer.

NORDBERG MFG. CO. Milwaukee 7, Wis.
NORDBERG PROCESS MENT. DIVISION
60 East 42nd Street • New York City 17, N. Y.

NEW YORK • LOS ANGELES • WASHINGTON • LONDON • TORONTO • NARBOROUGH

**"GREATEST SHOW
ON EARTH" depends
on Ryerson for steel**



Photograph courtesy Ringling Bros. and Barnum & Bailey Circus.

Even the circus needs steel from stock, not only bars but structurals, tubing and reinforcing steel. All are products that Ringling Bros. and Barnum & Bailey secure from Ryerson stocks.

Whatever *your* business and whatever *your* requirements, you'll also find the nearby Ryerson plant a time-saving steel source. While many sizes are missing because of the steel shortage, stocks are improving daily. And often, when a needed steel is not available the Ryerson salesman can suggest a practical alternate.

Combined with growing stocks, Ryerson facilities for cutting, bending, threading, riveting and punching, help

to assure prompt delivery of steel exactly as needed. Today we cannot say, "every size of steel in stock for immediate shipment." But, all things considered, we can give surprisingly prompt, dependable service on many products.

Another advantage of Ryerson steel service is the strategic location of the eleven Ryerson plants. Steel needed for a distant operation can be ordered from the plant near your headquarters and shipped from the plant near your job. Why not take advantage of this extra service, at no extra cost, next time you need steel? Phone wire or write the nearest plant.

RYERSON STEEL

Principal Products: Bars • Structurals • Plates • Sheets • Tubing • Alloy Steels • Allegheny Stainless • Tool Steel • Inland 4-Way Floor Plate Reinforcing Bars • Babbitt • Metal Working Tools & Machinery, etc.

JOSEPH T. RYERSON & SON, INC.
Steel-Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston

CHEMICAL ENGINEERING NEWS

DUPONT CHANGES RESEARCH ADMINISTRATION SETUP

A PARTIAL reorganization of the research and administrative activities of the chemical department of E. I. du Pont de Nemours & Co. was made during July. The changes affect the laboratories at the Experimental Station, near Wilmington, where research activities of the chemical department and several other departments of the company are carried out. Dr. A. P. Tanberg has been appointed administrative director, and Dr. M. M. Brubaker, laboratory director. Both men will report to Dr. Cole Coolidge, assistant director of the chemical department. Dr. P. L. Salsberg has been made general assistant laboratory director reporting to Dr. Brubaker, and Dr. D. M. McQueen, an assistant laboratory director, reporting to Dr. Salsberg. J. A. Grady has been appointed plant manager, reporting to Dr. Tanberg. Dr. H. W. Gray has been appointed research supervisor, reporting to Dr. Paul R. Austin.

OIL CHEMISTS TO DISCUSS INDUSTRIAL PROBLEMS

MORE than one thousand chemists from the laboratories of the oil industry and the nation's technical schools will celebrate the twenty-fifth anniversary of the organization of the petroleum division of the American Chemical Society at Chicago during the week of September 9. Numerous addresses dealing with the problems of the industry will be delivered at sessions to be held in connection with the 110th meeting of the ACS. Bruce K. Brown, of Chicago, general manager of research and development of the Standard Oil Co. of Indiana, will speak on "Petroleum From 1921 to 1971," at a dinner on Tuesday evening, September 10.

CELANESE ANNOUNCES NEW PLASTIC TRADE NAME

IN ORDER to simplify the identification of the large number of cellulosic plastics, Celanese Plastic Corp. announced that their ethyl cellulose materials are now known as Celcon. Increasing diversification of formulations of each member of the Celanese family has made it necessary that separate names be applied to each chemical group to minimize the chances of error throughout the plastics industry. Celcon was formerly known by the name of Lumarith EC.

SHELL CHEMICAL BUILDS PLANTS AT HOUSTON

FIRST commercial production of glycerin epichlorohydrin, a petroleum-derived chemical expected to be used widely in manufacturing plastics, fumigants and industrial solvents, will begin soon. At an estimated cost of \$3,000,000, the Shell Chemical Corp. is building new plants at Houston, Tex., for the initial production

of the new chemical and for increasing its output of isopropyl alcohol by a total of 100 million pounds per year.

The Fluor Corp. is building the epichlorohydrin plant and C. F. Braun & Co. is the contractor for the isopropyl alcohol-acetone extension. These three chemicals are all derived from propylene gas.

CPA APPROVES DIAMOND ALKALI TEXAS PLANT

DIAMOND ALKALI Co. has received the approval of the Civilian Production Administration to construct a \$5,750,000 electrochemical plant at Houston, Tex., for the manufacture of chlorine, caustic soda and muriatic acid. Construction at the newly purchased 280-acre plant site will begin soon.

The new plant will include eight buildings, covering about 40 acres. The buildings will be constructed of steel with cement asbestos roofing and siding. Normal conditions would require 18 months for completion of the project, but present-day delivery conditions may alter these plans. The new Houston plant is expected to employ 200 persons for its initial operation.

AMERICAN CYANAMID COMPANY STREAMLINES ORGANIZATION

On July 31 the business of the American Cyanamid & Chemical Corp., a subsidiary, was consolidated with that of the parent company, American Cyanamid Co. This action is in line with the general plan for the simplification of the corporate structure of the Cyanamid organization. Henceforth, the business of the American Cyanamid & Chemical Corp. will be operated as

the industrial chemical division of American Cyanamid Co.

A similar consolidation is planned with regard to Lederle Laboratories, Inc., Pearl River, N. Y. This consolidation is expected to become effective in the near future.

FOURTH NATIONAL CHEMICAL EXPOSITION IN CHICAGO

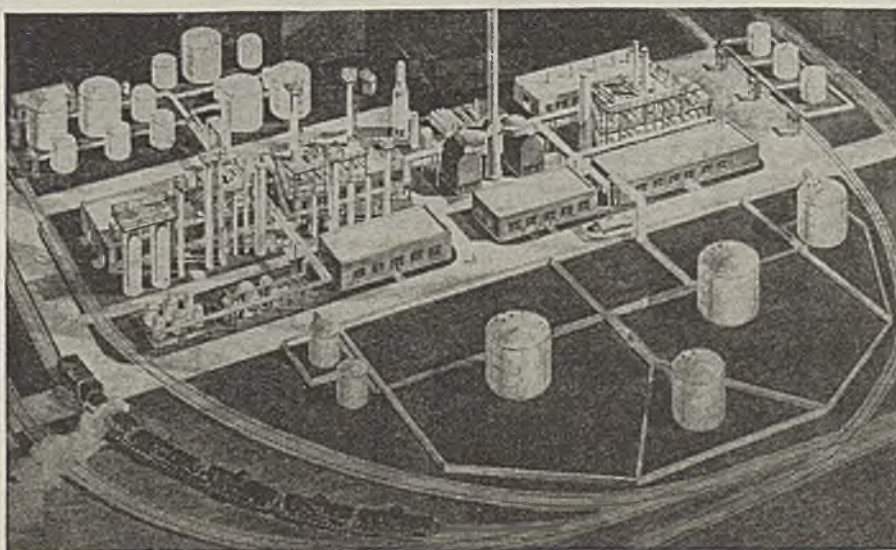
FOR THE week of September 10-14 the Fourth National Chemical Exposition will present the displays of approximately 200 exhibitors. The exposition, which deals with plant and laboratory equipment and chemicals, is sponsored by the Chicago section of the ACS and will coincide with the national meeting of the society.

AMERICAN CHEMICAL SOCIETY TO MEET IN SEPTEMBER

EIGHTEEN committees have been appointed by the Chicago Section of the American Chemical Society to aid in organizing the society's 110th national meeting, which will be held in Chicago September 9 to 13. Dr. Fred C. Koch, director of biochemical research at the Armour Laboratories, is general chairman of the meeting. Five vice chairmen will assist Dr. Koch in directing the various committees' preparations for the sessions, at which more than 8,000 chemists, chemical engineers and industrialists will participate in discussions of advances in virtually every major field of chemical science and industry.

Prof. Frank T. Gucker, Jr. of Northwestern University will supervise the work of the reception committee and committees on group meals, the convention's evening assembly, and women chemists. Dr. Walter

Sketch of the new glycol plant of the Wyandotte Chemical Corp. now under construction at Wyandotte, Mich. It is part of a \$25,000,000 expansion program and is scheduled to begin production in the spring of 1947. It will utilize a process not now in operation



HIGH ACCURACY pH EQUIPMENT



Single and Multi-Point pH Recorders and Direct-Reading Indicators

Cambridge design insures accuracy and trouble-free performance to a degree hitherto unknown. The Multi-Point Recorder provides on one chart records of pH at several sampling points in the plant. Also available are panel-mounted direct-reading pH Indicators that can be located at any reasonable distance from one or several sampling points. Electrodes (glass) are housed in non-clog continuous-flow type chambers. Both Recorder and Indicator are line operated. Send for Bulletin 910-T.

CAMBRIDGE pH METERS (Laboratory and Industrial models) provides continuous null indication. Sensitive to .005 pH, stable, rugged and portable. Operate from any convenient 110 volt AC outlet. Send for Bulletin 910-E.

CAMBRIDGE ALSO BUILDS:

- Recording Gas Analysers
- Fabric Permeameters
- Roll, Mold, and Needle Pyrometers
- Moisture Indicators and Recorders
- Instruments for Special Applications

Send for Bulletins on Instruments in Which Interested

CAMBRIDGE INSTRUMENT CO., INC.

3705 Grand Central Terminal, New York 17, N. Y.

FILTER CLOTH

FILTER PRESS SACKS ALL KINDS

Woven Glass and "Duraklad" Filter Fabrics

Made into all sizes and constructions for filter cloths, tubes, discs, gravity bags, centrifuge liners, rotary filters, flotation blankets, etc.

"DURAKLAD"

is acid and alkali resistant, has a smooth, hard surface, free from lint, made into a wide variety of weaves and widths. Can be fabricated to meet your requirements.

VACUUM BAGS & DUST ARRESTING TUBES

for all purposes

Send Sketch or Specifications
of Material Required

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M. Urbain of Swift & Co. is in charge of hotels and housing, meeting rooms, and accommodations for the society's Employment Clearing House. Dr. Erwin W. Hopkins of the Armour Laboratories will supervise convention financing, registration and tickets. Prof. Thomas F. Young of the University of Chicago is vice chairman in charge of equipment, personnel and related matters.

U. S. GRANTS BUILDING AID TO TOLEDO UNIVERSITY

AN ADVANCE of \$17,300 was granted to the University of Toledo by the Federal Works Agency in Washington in July for planning a \$369,000 chemical research building. Request for the funds was made early this spring, in line with the expansion of the university's new Research Foundation.

Although money for construction has not been appropriated by the university board of directors, preliminary plans have already been prepared for the structure. Dr. Archie Solberg, head of the Research Foundation, said the new building probably will house chemical and engineering laboratories of the University Science Department, as well as facilities for industrial research for Toledo area firms. The structure will be self-supporting inasmuch as industries employing aid of the Research Foundation pay for projects done for them. Forty-five research projects have been carried out since the foundation was organized in January 1945.

INORGANIC SOLIDS RESEARCH PROJECT AT NORTHWESTERN

NORTHWESTERN University has established an inorganic solids research project in the department of chemistry. The project will be directed by Prof. P. W. Selwood.

The work will be a fundamental study of inorganic solids such as manganese dioxide and related compounds. Particular attention will be paid to oxides of the transition group elements. These solids are of interest to the Signal Corps Engineering Laboratory in connection with the manufacture and properties of dry cells and other types of batteries.

The project will concern itself with the preparation of pure inorganic solids, the accurate characterization of these substances as to physical and chemical properties, and the behavior of such substances in catalytic and electrochemical changes. Heavy reliance is expected to be placed on the method of susceptibility isotherms recently discovered by Professor Selwood as one of the powerful tools at the disposal of the chemist interested in the structure of catalytically active solids.

MONSANTO LEASES CWS PLANT FOR PEACETIME PRODUCTION

MONSANTO Chemical Co. has leased the government-owned chemical warfare service plant at Monsanto, Ill., for the manufacture of a series of peacetime products. One million dollars will be spent on alterations and additions to the plant, where an estimated several hundred workers will be employed in the manufacture of products which have been under research study or process development. The lease specifies

that the company will keep the plant equipment intact and will ready the plant for wartime operation in case of a national emergency. The plant was constructed early in World War II and was operated by Monsanto for the Army throughout the war.

PITTSBURGH CORNING CORP. WILL BUILD TWO PLANTS

THE Pittsburgh Corning Corp. has announced plans to build two plants at Sedalia, Missouri, for the production of glass block and Foamglas, a cellular glass insulating material. Estimated cost of the expansion program is \$2,000,000, according to J. P. Staples, general manager for the concern. Preliminary survey work will be started at once by the building contractor, the H. K. Ferguson Co., on a 40-acre plant site located beyond the city limits on the west side of Sedalia. A plant for the production of glass block will be constructed first and facilities for Foamglas manufacture will be added as soon as building materials and equipment are available.

ARMOUR ISSUES LICENSE FOR FATTY ACID PREPARATION

ARMOUR and Co. has issued a license to General Mills, Inc., granting General Mills rights under Armour patents to operate a fats and oils chemical plant for the production of fractionated fatty acids from animal, vegetable and marine oils. The fractionating processes will be used at the new chemical plant which General Mills plans to build at Kankakee, Ill. General Mills is the first firm to enter the new field under the Armour license.

These processes enable the separation into their component parts of the mixed fatty acids present in oils and fats. After being separated, the fatty acids are converted chemically into new products for which wide use has been found in the manufacture of alkyl resins and other protective coatings, natural and synthetic rubbers, soaps and synthetic detergents, lubricating greases, flotation agents and intermediates in the chemical industry.

WESTINGHOUSE BROADENS RESEARCH PROGRAM

A BROAD program of research into nuclear physics and the problems associated with the conversion of atomic energy into a useful source of power for the peacetime world has been announced by scientists of the Westinghouse Research Laboratories. The program will be in the direct charge of Dr. W. E. Shoupp, manager of the electronics department, whose research into pure science before the war culminated in the co-discovery of photo-fission.

The first step in the new program is the modernization of the 65-ft.-high atom-smasher at the East Pittsburgh laboratory. No basic changes are being made in the apparatus, but improvements worked out in the past few years will make the atom-smasher more efficient, easier to run, and more automatic in operation.

This is not a commercial research program, although it is entirely possible that whatever new knowledge is acquired may point the way to improvements in materials

PENTEK* FOR IMPROVED PAINTS and VARNISHES

Paint and varnish coatings formulated with Pentek — a technical grade of Pentaerythritol — are faster drying, quicker bodying, more glossy, more durable and have greater resistance to moisture and alkalis.

Pentek consists of approximately 85% mono Pentaerythritol and 15% higher polymers such as Dipentaerythritol (Dipentek).

The Heyden laboratories are constantly experimenting with Pentaerythritols to develop new uses and applications in protective coatings. We shall be glad to have your inquiries relative to the use of Pentek in your processes.

* Trade Mark, Reg. U. S. Pat. Off.



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paint has to be tough



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Benzaldehyde • Benzoates • Benzoic Acid • Benzyl Chloride • Bromides • Chlorinated Aromatics • Medicinal Creosotes • Formates • Formaldehyde • Formic Acid
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GREASE OR OIL

The question of selection of the proper type and consistency of lubricants need offer no problem. LUBRIPLATE Lubricants are available from the lightest fluids to the heaviest grease types. All reduce friction and wear, protect against rust and corrosion, and are more economical than conventional lubricants. Let us prove our case.

R_x FOR YOUR MACHINERY

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No. 130-AA — Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING — This is the LUBRIPLATE Lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.



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NEWARK 3, N. J. TOLEDO 3, OHIO

DEALERS FROM COAST TO COAST
CONSULT YOUR CLASSIFIED TELEPHONE BOOK

FIT THE LUBRICANT TO THE JOB

The operation of all types of machinery is dependent upon lubrication and to assure satisfactory operation, bearings, gears, cams, chains and other moving parts must be lubricated with a lubricant that "fits the job."

Equipment Manufacturers increasingly realized the extreme importance of proper lubrication, so most often included the appropriate lubrication system in their construction design. When no special lubricating devices are incorporated in the machine design, manufacturers will generally specify, with accompanying literature or tags, just how and with what type product the lubrication is to be performed. There remains for the equipment user however, to consider his own individual operating conditions as a basis for selecting the proper type oil or grease that will have all the necessary properties required for assuring satisfactory lubrication.

In choosing an oil, operating Speeds and Temperatures are the most determinant factors. High speeds require light bodied oils; high temperatures require a heavy oil that will retain its film strength and will not be dissipated to a watery consistency in the presence of considerable heat, and shall possess high flash and fire points. Likewise the choice of grease will depend on Operating Speeds, Temperatures, Loads, and the possible presence of water, acid, or dust conditions. High Speeds require a light to fluid grease; high temperatures require a medium to heavy grease. For heavy loads, medium to heavy greases, and preferably enhanced by an extreme pressure additive, are most suitable. However, today's trend is leaning toward multi-purpose lubricants.

LUBRIPLATE lubricants were developed to "fit the job." Whether grease or oil is required there is a LUBRIPLATE product to meet every lubrication demand. LUBRIPLATE arrests progressive wear and protects against rust and corrosion. Because LUBRIPLATE is endowed with special qualities not found in ordinary lubricants, it is well able to meet the modern demands of higher speeds, heavier loads, and extremes of heat and cold, to the utmost satisfaction of its many users.

A copy of "THE LUBRIPLATE SERVICE HANDBOOK" containing valuable information on the subject of lubrication will be furnished without charge by writing Fiske Brothers Refining Company, Newark 5, N. J.

Adv.

and processes that will affect the daily life of a considerable portion of the world. Essentially, it is a continuation of the fundamental studies on nuclear physics that were abandoned by private companies, so that scientists could spend their time, during the war years, on radar, the atom bomb, and other developments.

NEW PRINTING INK RESEARCH INSTITUTE ESTABLISHED

A TEN-POINT research program has been outlined for the National Printing Ink Research Institute being established at Lehigh University. Dr. Albert C. Zettlemoyer, associate professor of chemistry and chemical engineering, has been elected as Lehigh's lecturer for the project. I. M. Bernstein, formerly director of research for H. D. Roosen Co., Brooklyn, N. Y., has been named director of the Printing Ink Institute.

Employing the resources of the University's chemistry laboratories, the Institute will offer to industry and business the following general services: Basic and exploratory research, the training of technical men at the graduate level for employment by

CONVENTION CALENDAR

American Institute of Chemical Engineers, regional meeting, Palace Hotel, San Francisco, Calif., August 25-28.

American Chemical Society, 110th meeting, Chicago, Ill., September 9-13.

Fourth National Chemical Exposition, Coliseum, Chicago, Ill., September 10-14.

Instrument Society of America, first national conference and exhibit, William Penn Hotel, Pittsburgh, Pa., September 16-20.

American Gas Association, annual convention and exhibit, Atlantic City, N. J., October 7-12.

The Electrochemical Society, Inc., fall meeting, Hotel Royal York, Toronto Canada, October 16-19.

Engineering Society of Western Pennsylvania, seventh annual water conference, Hotel William Penn., Pittsburgh, Pa., October 28-30.

Federation of Paint and Varnish Production Clubs, annual convention and paint industries show, Hotel Claridge, Atlantic City, N. J., November 4-6.

National Paint, Varnish & Lacquer Association, annual convention, Atlantic City, N. J., November 6-8.

National Metal Exposition, Municipal Auditorium, Atlantic City, N. J., November 18-22.

Seventeenth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York, N. Y., December 2-7.

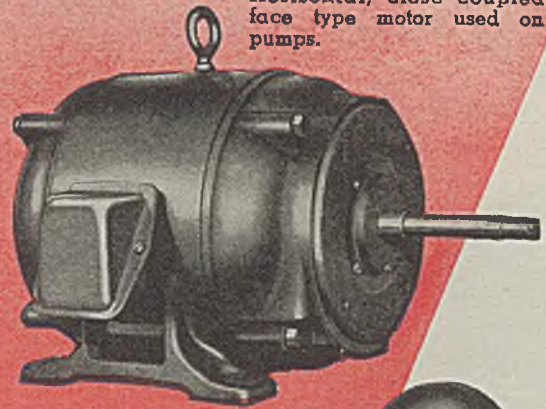
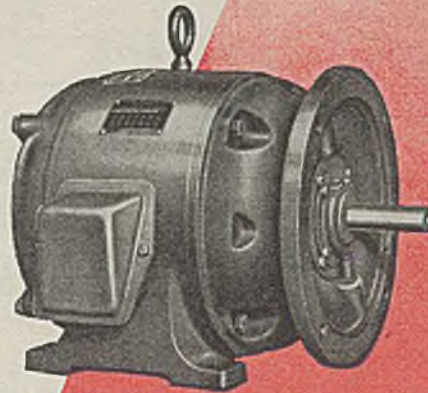
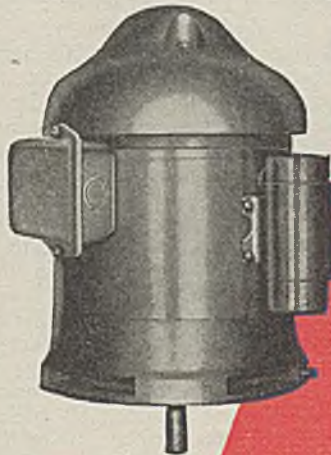
Seventh International Heating and Ventilating Exposition, Lakeside Hall, Cleveland, Ohio, January 27-31, 1947.

Second National Plastics Exposition, Coliseum, Chicago, Ill., May 5-11, 1947.

Horizontal flange mounted motor.

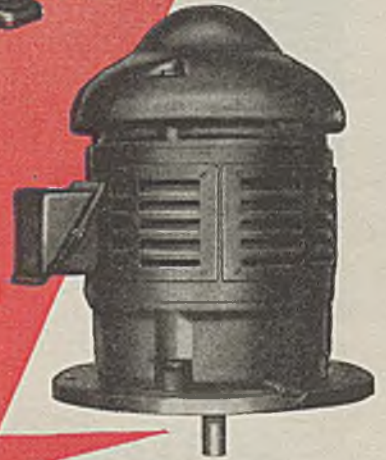
Horizontal, close coupled face type motor used on pumps.

Vertical, face type, motor used on jet pumps.



Century

NEMA Standard Flange and Face Type Motors Provide These Advantages:



Vertical flange mounted motor.

- Interchangeability
- Simplified Service Problems
- Comparatively Better Shipments

Many designers are taking advantage of the benefits of motor standardization, especially motors for flange and face type motor mountings.

Century motors with standard face type brackets are used where the motor is fastened from the driven machine side and the flange type bracket is used where the motor is fastened to the machine from the motor side.

Flange and face type

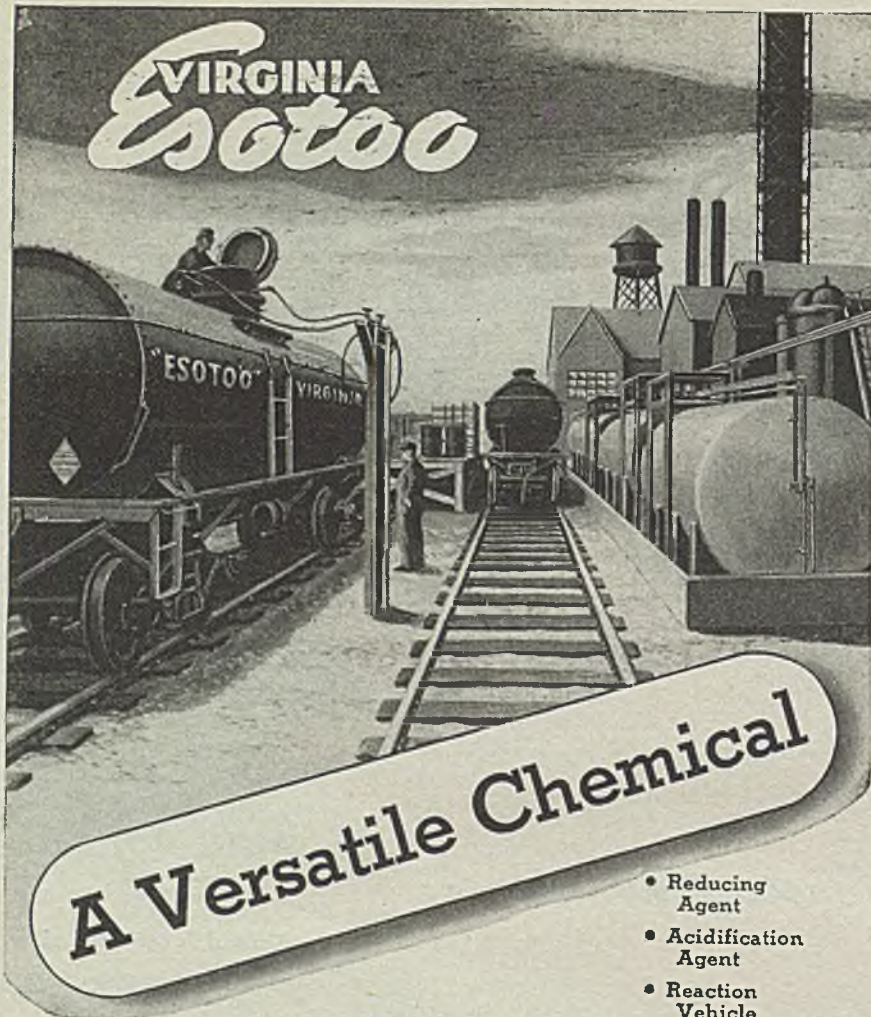
Century motors are supplied in single phase, three phase and direct current types, for vertical or horizontal mounting.

Other Century motors are made in a wide range of types and sizes from 1/20 to 600 horsepower. To assure top performance Century motors are engineered to the functional characteristics of the machines they drive. Select

Century motors for all your electrically powered equipment.



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A Versatile Chemical

"ESOTOO," Virginia's trade name for 99.98+% pure liquid SO₂, has six outstanding advantages as a raw material and as a processor for such important products as sugar, oils, leather and textiles. As a dechlor in water purification, ESOTOO is receiving increased acceptance. Here's why—

- 1— Container sizes to suit any scope of operation.
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Other high purity Virginia Products: Zinc Sulfate
Sodium Hydrosulphite Zinc Hydrosulphite

- Reducing Agent
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VIRGINIA "ESOTOO" is shipped in 150 lb. cylinders, ton drums, single-unit and multi-unit tank cars.



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graphic arts firms, and evaluation of specific problems concerning manufacturing and marketing of new printing ink products and machinery.

SHIPPING CONTAINER GROUP APPOINTS DIRECTOR

SHIPPING CONTAINER INSTITUTE has appointed Theodore J. Gross as managing director. The institute was recently formed by a number of leading fiber box manufacturers to provide a technical information center, and to conduct fundamental research in the field of fiber shipping containers. The program will be carried on by a staff of experts furnished by the industry.

The Institute will coordinate laboratory analyses of the various container materials and designs with field studies of large-scale experimental shipments. The condition of fiber boxes after long rail hauls will be studied to determine causes of damage in transit and the corrective measures necessary to reduce damage to commodities shipped in fiber boxes. At the same time continuous studies will be made in the boxmakers' plants.

The need for a technical center similar to that maintained by other major industries is shown by the increase in production of fabricated boards from 11 billion square feet in 1927 to an estimated 60 billion square feet for 1946. Membership in the Institute is open to all manufacturers of fiber shipping containers.

NEW YORK COMMERCE OFFICE IN NEW QUARTERS

REGIONAL offices in New York of the United States Department of Commerce have been moved from 61 Broadway to the 60th floor in the Empire State Bldg., 350 Fifth Avenue. This change effects the Bureau of Foreign and Domestic Commerce and the Bureau of the Census.

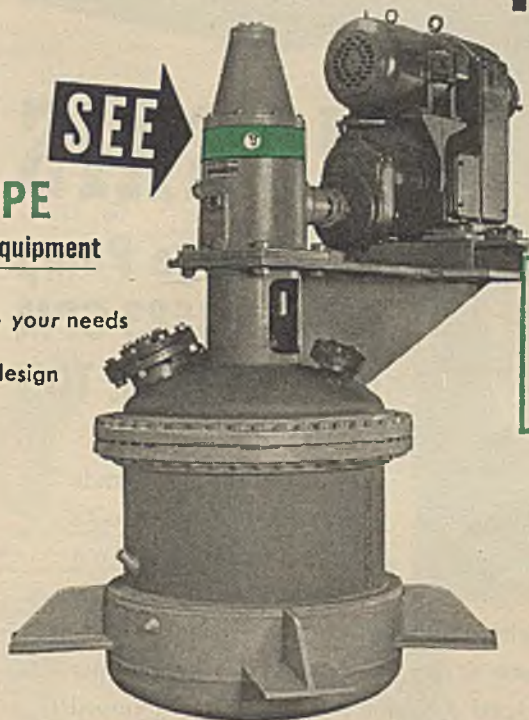
ASTM ANNUAL MEETING HELD IN BUFFALO

INTEREST in the American Society for Testing Materials' expanding work on specifications and tests for materials and methods of evaluating assemblies of these materials in various forms was shown by the fact that the total registration for the annual meeting held in Buffalo throughout the week beginning June 24 was 1,825.

There were eight symposiums with technical papers ranging in number from 4 to 15, covering a wide diversity of fields. The topics covered included: Symposiums on bearings, gas turbine materials, fatigue, spectroscopic light sources, oil procurement practices, testing parts and assemblies, pH measurements, atmospheric weathering of corrosion-resistant steels, and freezing and thawing tests of concrete. In addition to these symposiums there were other sessions devoted to effect of temperature on metals, cement and concrete, plastics, non-ferrous metals, bituminous materials, and others, 25 separate sessions being required to provide adequate time for all the papers and reports.

The new officers for the 1946-47 term are: Arthur W. Carpenter, president; R. L. Templin, vice-president; T. A. Boyd, vice-president. The following men were elected

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- Built**—to last
- Built**—of warranted materials fitted to your needs
- Built**—to precise I*P*E standards
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TO YOUR
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ENGINEERING. I*P*E equipment—both complete plants and individual units—incorporates advanced engineering. Result: equipment created *functionally* to fit your *own* process, simplified plant layout, and in many instances, a better product. This broad engineering experience has resulted in major improvements in standard equipment used by the process industries. I*P*E technological skills can, and do, incorporate both engineering and design improvements, especially where special equipment has been “tailored” to your particular manufacturing process.

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2

DESIGN. Advanced design improvements are an important feature of I*P*E process equipment. I*P*E designers strip equipment down to fundamentals, adding only those design improvements that add greater efficiency. This means lower maintenance cost, less trouble shooting, longer equipment life and less outage!

If Production Is Holding Up Your Orders — Remember I*P*E Delivers Equipment on Time

MANUFACTURERS ARE being flooded with orders in these days of reconversion . . . particularly the chemical process industries. Even if full time production finds you unable to keep up with the avalanche of orders, consider this . . . let I*P*E analyze your production process . . . make suggestions that will help to step up your output through the addition of new process equipment.

MANY NATIONAL MANUFACTURERS have been able to increase production within a short period by calling in I*P*E as *Process Equipment Counsel*. Each I*P*E installation recommended is handled as a specific problem, geared solely to your product, rate of production and physical conditions encountered. The delivery of recommended equipment *will be made on time!* I*P*E has been the first to design certain types of chemical processing equipment that have become the standard for the industry. We have “tackled” and solved engineering problems attempted by few other manufacturers.

I*P*E's **STAFF** is at your disposal without obligation. Why not write, 'phone or wire today?

See I*P*E for

- Agitators
- Agitator Drives
- Autoclaves
- Chemical Process Equipment
- Complete Process Plants
- Condensers
- Conical Dry Blenders
- Continuous Processing Units
- Dewtherm Kettles
- Digesters
- Disolvers
- Electric Kettles
- Extruders
- Gas Absorbers
- Grease Mixers
- Heat Exchangers
- Horizontal Mixers
- Jacketed Processing Units
- Kettles
- Mixers
- Nitrators
- Paint Mixers
- Paste Mixers
- Side Entering Agitators
- Soap Crutchers
- Special Process Machinery
- Special Valves
- Stills
- Sulfonators
- Synthetic Resin Plants
- Turbine Agitated Units
- Vacuum Kettles & Mixing Equipment

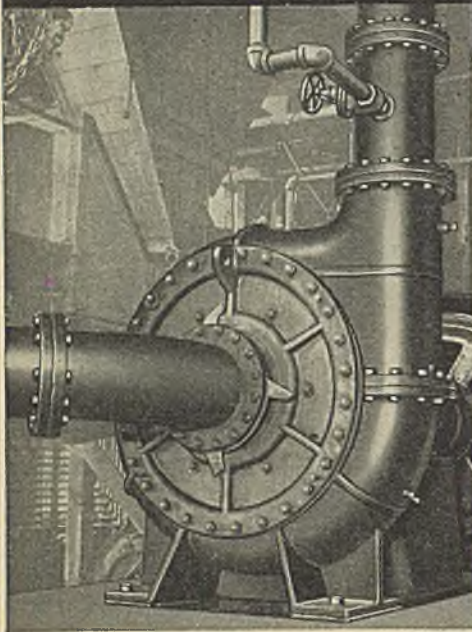


“Special and Standard Process Equipment Engineered to Your Requirements”

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**200 Tons of Tailing Solids
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24 Hours a Day!**



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12" Dredge Pump delivers 4583 GPM against 62 ft. TDH

- Handling low-grade amygdaloid deposits from a storage pool to a regrinding plant, this

Morris 12", Type H dredging pump with a 14" suction and 12" discharge, operates 24 hours a day, pumping 4,583 gallons per minute against a 62-foot total dynamic head. Material pumped includes coarse rubbish along with particles of sizes ranging from 3/8" to flotation slimes. The pump, driven by a 200 HP motor, operates at 360 RPM, and has been in continuous 24-hour service since late in August of 1943.

Engineered for Handling Heavy Materials at High Heads

The Morris Type H, Heavy-Duty, Lined Dredging Pump provides exceptionally high efficiency in handling heavy materials against high heads. Easy entrance curves, a special form of impeller inlet and volute casing, plus pressure-balance of the impeller increase both the hydraulic and mechanical efficiency. All parts subject to wear—the shell liner, impeller, suction throat liner, and suction disc liner—are readily renewable with little labor and without disturbing the adjustment of the pump or its bearings. A suction opening larger than the discharge permits deeper dredging and handling a higher percentage of solids without causing excessive vacuum on the suction. Lubrication and repacking are required only at long intervals.

Write today for complete information on pumps suited to your needs. Every recommendation backed by 82 years of experience, and a wide line of pump types, assuring "engineered to the job" efficiency.

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MORRIS

CENTRIFUGAL PUMPS

to the board of directors: A. G. Ashcroft, A. T. Chameroy, J. H. Foote, and F. E. Richart.

Nineteenth Award of the Charles B. Dudley Medal was made to H. R. Copson, research chemist, International Nickel Co. for his paper on "A Theory of the Mechanism of Rusting of Low Alloys Steels in the Atmosphere."

NEW ELECTROCHEMICAL PLANT BUILDING IN WEST TEXAS

CONSTRUCTION has started on a \$500,000 Frontier Chemical Co. electrochemical manufacturing plant at Denver City. It is scheduled to be completed and in operation October 15.

Products of the plant will be distributed in the oil pools of the Permian basin, for use in drilling for, and producing oil and gas. When the plant is in full production, it will produce 25 tons of concentrated hydrochloric acid and about 10 tons of caustic soda daily.

Officers of the new company are: Robert L. Wood, Robert Chiles, Jr., and Curtis W. Cannon. Cannon will be general manager of the plant. Wood and Chiles are owners of the Western Co., an oil field acidizing concern, with headquarters in Midland, Tex.

CHICAGO CHEMISTS' CLUB ELECTS OFFICERS

AT THE annual business meeting of the Chicago Chemists' Club, the following officers for the year 1946-47 were elected: president, J. K. Stewart; first vice president, L. G. VandeBogart; second vice president, Paul E. Wenaas; treasurer, Earl C. Leamon, and secretary, J. D. Ingle. W. Courtney Wilson, Paul Van Cleef, Lyle O. Hill and Herman Kerst, Jr., were elected trustees.

ASME TO HOLD PETROLEUM INDUSTRY CONFERENCE

THE American Society of Mechanical Engineers has recently revived its interest in the mechanical engineering problems of the petroleum industry. Replacing the former petroleum division of the Society is the petroleum committee of the Process Industries Division which, going ahead actively, has arranged a program of more than 40 technical papers that will be presented at a National Conference on Petroleum Mechanical Engineering. The conference will be held at the Mayo Hotel, Tulsa, Okla., on Oct. 7-9, 1946.

ENGINEERING COURSES GIVEN FOR FOOD PROCESSES

A SERIES of courses which signify the introduction of engineering methods and principles into the food products field will be offered at the Polytechnic Institute of Brooklyn during the coming academic year. Courses in food manufacture and technology, technology of food flavors, colors and synthetic additives and technology of dairy products will be given in succeeding semesters. The courses will be taught by Dr. Morris B. Jacobs, senior chemist of the chemical laboratories of the New York City Department of Health who was appointed adjunct professor of chemistry in January 1946.

Vaportight CONDULETS

for electrical installations that are exposed to **weather, moisture, steam or non-combustible dust**

The illustrations show a representative selection from the hundreds of different Vaportight Condulets that are listed in Crouse-Hinds Condulet Catalog 2500. Many other Condulets can be furnished with gaskets that make them Vaportight and Weatherproof.

CONDULETS are made only by CROUSE-HINDS

No. 10

a series of advertisements which demonstrate that CROUSE-HINDS "complete line" means much more than just a range of sizes—there is a wide variety of highly specialized types in each classification.



Type X Obround Condulet with Vaportight Gasket



Type AHG Vaportight Flexible Fixture Hanger



Type RCD-8 Vaportight Lighting Fixture for wall mounting



Type YSW Vaportight Circuit Breaker Condulet



Type FSC Condulet with Vaportight Gasket



Type FS Vaportight Switch Condulet



Type GSC Condulet with Vaportight Gasket



Type FD Vaportight Switch Condulet



Type GRT Condulet with Vaportight Gasket



Type FD Vaportight Switch Condulet



Type C Obround Condulet with Vaportight Switch



Type FS Two-Gang Vaportight Switch Condulet



Type FS Vaportight Triple Switch Condulet



Type FSC Two-Gang Tandem Condulet with Vaportight Switch and Threaded Cap Plug Receptacle



Type FSC Vaportight Push Button Station Condulet



Type VG Vaportight Lighting Condulet



Type FSC Vaportight Plug Receptacle Condulet



Type FS Vaportight Lighting Condulet



Type GS Vaportight Lighting Fixture for GS Series Condulets



Type VPH Vaportight Indirect Lighting Condulet



Type VDB Vaportight Lighting Condulet 500-Watt



Type VDA Vaportight Lighting Condulet with Dome Reflector



Type VC Vaportight Lighting Condulet



Type V Vaportight Lighting Condulet with Dome Reflector



Type VDA Vaportight Lighting Condulet with Angle Reflector



Type ARB Vaportight Lighting Fixture for GRF Series Condulets



Type V Vaportight Lighting Condulet for mounting on machines



Type VXHA Vaportight Lighting Condulet with flush hubs



Type V Vaportight Heavy Duty Lighting Condulet with Shatterproof glass for use in the food industry



Type VR Vaportight Lighting Condulet for mounting on a hand rail



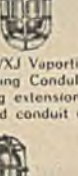
Type VDA Vaportight Tank or Vat Light



Type VXJ Vaportight Lighting Condulet for making extensions from concealed conduit wiring



Type ARC Vaportight Lighting Fixture for Obround Condulets



Type VLG Vaportight Gauge Lighting Condulet Fluorescent



Type VS Vaportight Hand Lamp with Rubber Handle

Type VFC Vaportight Gauge Lighting Condulet



Type WV Vaportight Lighting Condulet with Fresnel Lens



Type DVS Dust-Tight and Vaportight Circuit Breaker Condulet



Type DVS Dust-Tight and Vaportight Circuit Breaker Condulet



Type VJ Vaportight Lighting Condulet



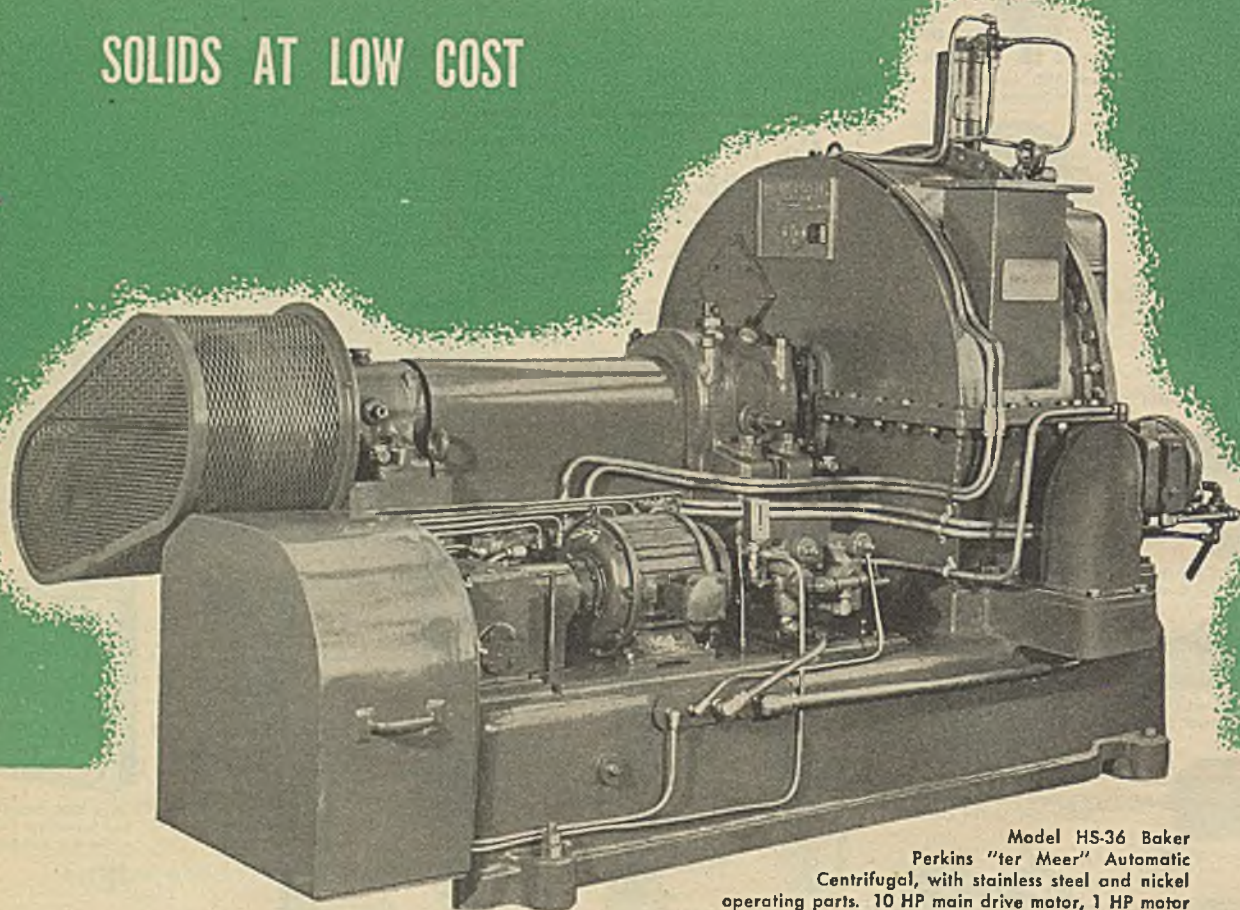
Type DVP Dust-Tight and Vaportight Panelboard

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Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Kansas City — Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — San Francisco — Seattle — St. Louis — Washington. Resident Sales Engineers: Albany — Atlanta — Charlotte — Indianapolis — New Orleans
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BAKER PERKINS "ter MEER" AUTOMATIC CENTRIFUGALS
SPEED SEPARATION OF LIQUIDS AND
SOLIDS AT LOW COST



Model HS-36 Baker Perkins "ter Meer" Automatic Centrifugal, with stainless steel and nickel operating parts. 10 HP main drive motor, 1 HP motor driven pump.

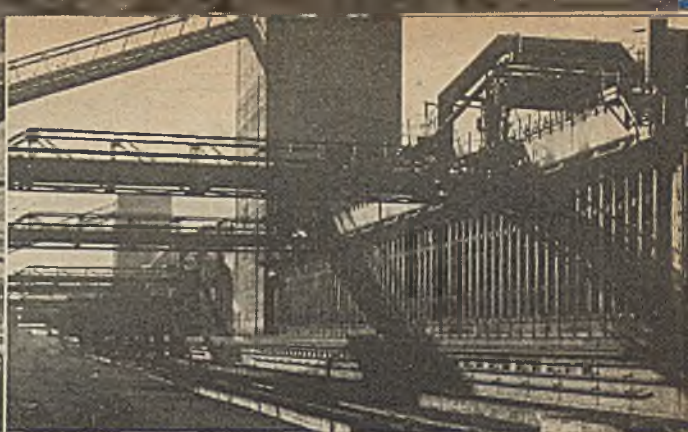
If your manufacturing calls for separation of liquids and solids, and you are interested in performing this operation automatically with maximum production at low cost, it will pay you to investigate Baker Perkins "ter Meer" Automatic Centrifugals. Available with drums from 24" to 96" diameter, they are built to easily withstand sustained heavy-duty production. Horizontal shafts in massive bearings are mounted on husky one-piece pedestals which form part of the heavy machine base. Controls which automatically time every step in the operating cycle can be easily

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BAKER PERKINS EQUIPMENT GIVES MORE YEARS OF EFFICIENT SERVICE



Mead aluminum reduction plant of the Permanente Metals Corp. at Spokane, Wash., where the first Kaiser aluminum was produced last month. Annual capacity is 216 million pounds of aluminum ingot

These 252 byproduct coke ovens of Columbia Steel Co. at Geneva, Utah, will become the West's largest producer of benzol and other coke-oven chemicals

PACIFIC PROCESS INDUSTRIES

TRENDS • EVENTS • DEVELOPMENTS

JOHN R. CALLAHAM, Pacific Coast Editor, San Francisco, Calif.

KAISER ALUMINUM PRODUCTION GETS UNDER WAY

PRODUCTION of aluminum got under way during July at the two Spokane, Wash., plants of Permanente Metals Corp., according to a recent announcement of the Kaiser organization. The Mead alumina reduction unit (see accompanying photograph) was ready for production by mid-July, approximately two weeks after the remelt furnaces and hot rolling facilities of the Trentwood mills got under way. Aluminum pig from Metal Reserve Corp. and scrap will be used to operate Trentwood until Mead's production is sufficient to supply the demands of the rolling mills. Permanente's alumina facilities at Baton Rouge, La., which will supply alumina to the Mead plant, will be in operation later this year.

The Mead reduction plant has an annual capacity of 216 million pounds of aluminum ingot, while Baton Rouge can produce one billion pounds of alumina yearly. Trentwood, first of the three plants to start operations, has a capacity of 288 million pounds of finished aluminum plate, sheet and strip products a year. Built during the war, it is one of the largest and most modern rolling mills in the country. Spokane has now become the second largest aluminum center of the world, according to Norman L. Krey, works manager at the Mead plant.

Kaiser's two Spokane plants will make available some 80 million pounds of aluminum by the end of this year, stated the report. The schedule calls for 4 million pounds for July, 8 million in August, 12 million in September, 16 million in October and 20 millions each for November and December.

GAS AND PETROLEUM USES INCREASE IN CALIFORNIA

DURING 1945 there were over 538,273,900 M cu.ft. of natural gas, worth over \$35,362,300, produced and utilized (sold or used) in California, according to the California Division of Mines, San Francisco,

compared with 467,743,200 M cu.ft. valued at \$31,797,400 in 1944. The 1945 output of utilized natural gas is the largest annual yield on record for this state.

Crude petroleum produced in California during 1945 amounted to 328,262,400 bbl. valued at \$342,756,700 at the well. This is the largest annual yield of crude oil ever reported in the state. The 1944 output was 311,717,800 bbl. The accompanying table shows California production of natural gas and crude petroleum since 1939.

California Production of Natural Gas and Crude Petroleum*

Year	Natural Gas, M. Cu. Ft.	Crude Petroleum, Bbl.
1939.....	340,754,804	224,253,110
1940.....	352,871,945	223,294,805
1941.....	378,173,737	229,684,784
1942.....	413,180,942	247,491,289
1943.....	443,219,847	284,145,702
1944.....	467,743,258	311,717,804
1945.....	538,273,934	328,262,400

* California Division of Mines, San Francisco.

TURLOCK CWS PLANT BOUGHT BY CHEMURGIC CORP

SALE of the chemical warfare plant in Turlock, Calif., to the Chemurgic Corp. of Richmond, Calif., for \$162,500 was announced during June by the War Assets Corp. During the war, the Turlock plant was leased and operated by the Day & Night Flare Corp. for the assembly and loading of incendiary ammunition. The Turlock plant is situated on 154 acres of land and has 88,900 sq.ft. of combined building areas. The Chemurgic Corp., with a plant at Richmond, expects to produce plastic specialty products, railroad fuses and torpedoes, and scientific pyrotechnics on the property. E. B. Luther is president of Chemurgic Corp. which, in addition to the above line of products, makes rodenticides and other specialty products.

UTAH'S GENEVA IMPORTANT TO CHEMICAL INDUSTRIES

WITH the approval of the Justice Dept. in June, the ultra-modern \$202,000,000 government-financed steel plant in Provo, Utah, has been sold to Columbia Steel Co., subsidiary of U. S. Steel Corp., which operated the plant under a government contract during the war. The Columbia bid involved: (1) Outright purchase of the plant for \$40,000,000 with \$5,000,000 payable immediately and the balance within 18-24 mo. when the remodeling of the plant is expected to be completed; (2) obligation to spend \$18,600,000 for additional facilities at Geneva to produce some 386,000 tons yearly of hot-rolled coils; (3) proposal to construct at Pittsburg, Calif., a cold reduction mill at an estimated cost of \$25,000,000 for converting the above coils into sheet and tinsplate; (4) payment of approximately \$7,500,000 for the inventories at Geneva. Working capital has been estimated to be at least \$9,000,000, making a total estimated investment by U. S. Steel of \$100,000,000.

Columbia Steel Co. now operates mills in Torrance and Pittsburg, Calif., and at Ironton, Utah. The acquisition of Geneva gives this firm approximately 40 percent of the steel producing capacity of the West, which has increased from some 2,000,000 to about 4,600,000 ingot tons since 1938. The present output is produced in 57 open-hearth furnaces and 5 electric furnaces.

Significance of Geneva's operations to the chemical and process equipment industries is widespread: (1) The 252 Koppers-Becker byproduct coke ovens (see accompanying table and illustration) will make Geneva the West's largest producer of benzol, ammonium sulphate and other vital chemicals derived from coking operations; (2) Geneva will stimulate consumption of pickling acid and the large number of other chemicals used in steel producing and finishing operations; (3) the proposal by U. S. Steel to use

Coke Ovens Located in the West and Their Capacities¹

	Byproduct Ovens Number	Capacity, Tons	Pig Iron, Net Tons
Colorado Fuel & Iron Corp.	192	675,000	750,000
Columbia Steel Co. ²	56	209,500	300,000
Columbia Steel Co. ²	252	1,094,000	1,150,000
Kaiser Steel Co., Inc.....	90	340,000	400,000

¹ From "Western Steel Industry," J. R. Mahoney, Bur. of Econ. & Business Research, University of Utah, Salt Lake City, 1944. ² Also has 500 beehive ovens at Columbia, Utah. ³ Ovens of the Koppers-Becker underjet type.

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Proposed developments at California Research Corp., Richmond, now getting under way. Drawing shows additions to the present laboratory and office buildings (left) and the new process laboratory and pilot plant building (right)

Geneva as a basing point for shipment of steel products and the greater availability of such products should stimulate the growth and independence of western steel-consuming equipment manufacturers; (4) the accelerated industrialization of Utah and the intermountain area will hasten greater exploitation of the area's basic heavy chemical raw materials, especially phosphates, salines and sulphur-bearing materials. A number of such moves are reported already to be planned or under way.

FERROSILICON MAGNESIUM PLANT OFFERED FOR SALE

THE FERROSILICON magnesium plant at Manteca, Calif., operated during the war by Permanente Metals Corp., has been declared surplus and is now offered for sale or lease, according to War Assets Administration, San Francisco. The plant, designed to produce 10,800 tons of magnesium metal annually, was built at a cost to the government of \$6,230,000. It is in a fenced-in area of about 26 acres, which is part of a tract of 138 acres. Machinery and equipment include all items necessary for reducing pellets of magnesium crystals and casting and molding ingots. The two furnace buildings, containing 64 gas-fired furnaces having a total of 1,024 special steel retorts 9½ in. diameter by 10 ft. long, have a floor area of 258,832 sq. ft. Both low- and high-vacuum pumps are included in the equipment. The ingot foundry, containing nine gas-fired melting furnaces, has 9,954 sq. ft. Raw material processing equipment includes facilities for handling, storage, mixing and briquetting calcined dolomite and ferrosilicon and for removal and collecting of dust from the rotary briquetting presses.

The Manteca plant, one of the two ferrosilicon magnesium units built in the West during the war, is not to be confused with

the Permanente, Calif., carbothermic magnesium plant operated by Permanente Metals Corp. This latter unit, using a modified carbothermic reduction process, is scheduled to resume commercial operations within a few months.

CALIFORNIA RESEARCH EXPANDS FACILITIES AT RICHMOND

ALREADY expanded to many times its original size, the California Research Corp. is still growing and placing greater emphasis on petroleum research activities. As the research subsidiary of Standard Oil Co. of California, Cal Research is taking steps to enlarge its petroleum and petrochemical research facilities both at Richmond and at El Segundo, Calif. The expansion program has already begun at Richmond, the cost of which is reported to approach \$2,000,000.

The Richmond projects include a new wing which will double the office and laboratory space of the present administration building. A new process laboratory and pilot plant building to cost more than \$1,000,000 is in the design stage. This structure will centralize research facilities now housed in a number of smaller buildings. It is especially planned for the erection of non-permanent pilot plants and heavy equipment. New laboratories and office space will probably be built at El Segundo at a later date. H. G. Vesper is president of California Research Corp., while A. L. Lyman is director of the Richmond laboratories.

WESTERN FERTILIZER USAGE CONTINUES TO INCREASE

CONSUMPTION of all commercial-grade fertilizers in the 11 western states has increased from the 1935-1939 average of 274,000 short tons to 678,000 tons during 1945, according to data released by the National

Fertilizer Consumption in the Western States, Short Tons *

	Average 1935-1939	1940	1941	1942	1943	1944	1945
Montana	4,154	4,500	4,500	4,500	5,000	7,300	8,000
Idaho	5,186	7,000	7,000	9,600	11,000	20,000	30,000
Wyoming	1,522	2,100	1,700	2,000	2,000	2,500	3,000
Colorado	2,894	5,557	6,256	8,264	8,500	10,000	15,379
New Mexico	2,112	2,406	3,876	4,000	4,107	7,002	8,000
Arizona	6,279	6,902	9,787	10,000	15,126	21,600	29,453
Utah	1,990	3,050	2,800	2,000	3,500	7,000	6,026
Nevada	500	500	500	600	200	400	750
Washington	24,630	30,000	35,000	44,999	45,000	50,000	56,504
Oregon	16,260	19,500	20,000	21,895	27,000	36,000	37,434
California	209,123	216,990	285,043	301,145	300,268	418,308	483,591
Total	274,450	298,505	356,482	400,003	421,801	580,108	678,137†

* Based on tax tag sales, records of government officials or estimates as sold by commercial producers; does not include government direct distribution. National Fertilizer Association. † Government direct distribution for 1945 amounted to 28,945 tons, bringing the total consumption for the year to 707,082 tons.

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- There's Sodium Methylate, used in the preparation of sulfa drugs, barbiturates, vitamins, and organic intermediates . . .
- And there's Dry Ice, the modern low-temperature refrigerant . . .
- There's HTH, a high-test calcium hypochlorite widely used for laundry bleaching and water treatment . . .
- Lo-Bax and HTH-15, chlorine sanitizing agents for dairy and poultry use . . .
- Super-Mafos briquet cleanser for dishwashing . . .
- Super-Nufos briquet cleanser for dairy can washing . . .
- Purite for refining and desulphurizing iron . . .
- PH-Plus for alkalinity control in water treatment . . .
- Chromotex for plant cleaning of rugs and carpets . . .
- Neutrotone for "location" cleaning of carpeting.

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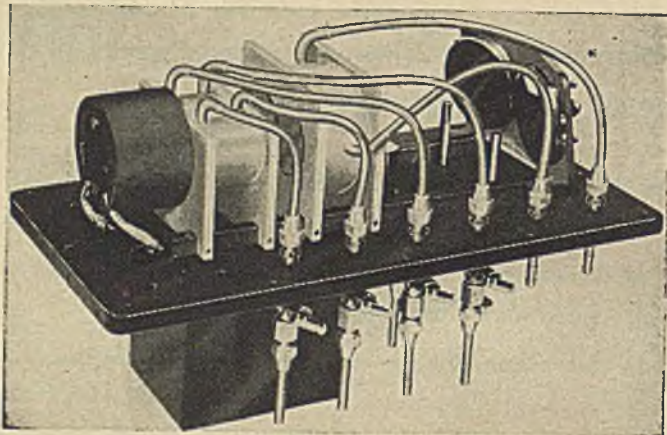


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- Construction suited to industrial installation requirements.

The complete equipment comprises the Analyzer, an amplifier, a recorder, and a set of cables and connectors. Because the uses of this equipment are so varied—for detection, measurement, and control—an outline of performance requirements should be furnished with your request for further information; ask for Bulletin 468.

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Fertilizer Association. This is a tonnage increase of 147.1 percent and compares with the national increase of 69.2 percent. During the same periods of comparison, the West increased its percentage of total national consumption of commercially-produced fertilizers from 3.8 to 5.5 percent. The accompanying table shows the growth of fertilizer consumption in the West by states.

POTASH CONSUMPTION RISES IN WEST

CONSUMPTION of agricultural potash in the western states has increased from 8,800 short tons K_2O during 1940 to about 15,600 tons for the fiscal year 1944-45, according to a study on consumption and future requirements of potash in American agriculture made by J. W. Turrentine of the American Potash Institute. Table I shows figures for the individual western states over a period of years. Major production of potash in this country is by five plants, three of which are located in New Mexico with one in each of the states of California and Utah.

Although comparatively little is known on consumption of chemical potash salts, the same study states that some 5,400 short tons (K_2O basis) of such salts of American origin were delivered in the West during the fiscal year 1944-45. California received 4,110 tons of 60 percent muriate and 42 tons of sulphate, while Nevada and Oregon received 785 and 560 tons, respectively, of 60 percent muriate.

Table I—Consumption of Agricultural Potash in Western States¹

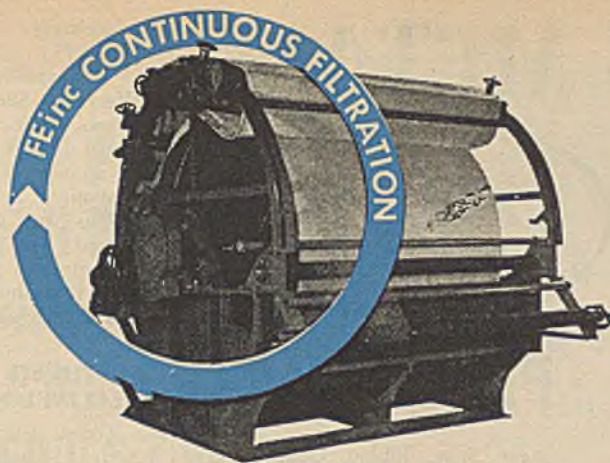
	1935-39 Average	1940	1941	1942	1943	1944	1945 ²
Ariz.	33	39	38	50	92	472	...
Calif.	6,034	5,852	7,342	8,914	10,806	9,778	11,345 ³
Colo.	54	201	141	195	145	60	232
Idaho	81	8	15	148	264	180	212
Mont.	42	45	45	5	11	3	24
N. M.	7	5	20	4	23	22	2
Nev.	9	10	10	6	1	6	...
Ore.	895	1,231	1,240	1,241	1,374	1,080	1,072
Utah	13	15	14	10	26	2	70
Wash.	1,444	1,445	1,540	3,158	2,326	1,750	2,674
Wyo.	10	0	0	0	6	2	...
Total	8,822	8,851	10,405	13,729	15,074	13,355	15,631

¹ In short tons K_2O . From study by J. W. Turrentine, American Potash Institute, Washington, D. C. ² As deliveries of agricultural potash salts of American origin for the period June-May, 1944-45. The total consists of 9,160 tons of 60 percent muriate, 50 tons of 50 percent muriate and 6,422 tons of sulphates. ³ Consisting of 5,166 tons of 60 percent muriate and 6,179 tons of sulphates.

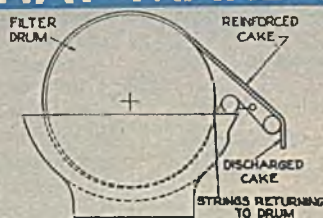
CARBON BLACK PLANT SOLD BY WAC

SALE of the partially completed carbon black plant at Eunice, N. M., to Chas. E. Johnson & Co. and Columbian Carbon Co. for \$750,000 has been announced by War Assets Corp. The unit, about 60 percent completed, cost the government about \$1,400,000 and was scheduled to be operated by Chas. E. Johnson & Co. to produce carbon black by the channel process for the tire industry. Included in the property are 638 acres of land and 240 burner buildings.

Two other channel type carbon black plants are located in New Mexico at Eunice and at Monument. Each has an annual capacity of approximately 15,000,000 lb. from 168 and 144 burner houses



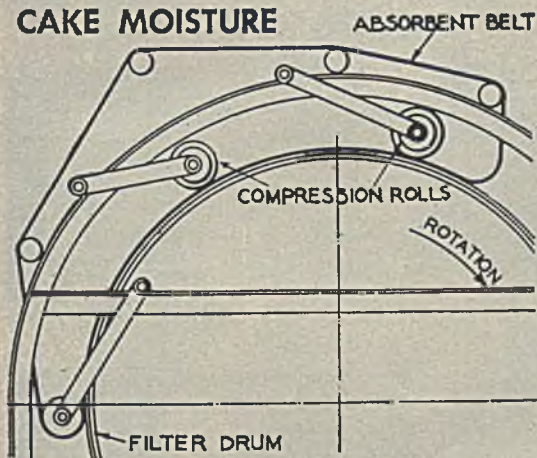
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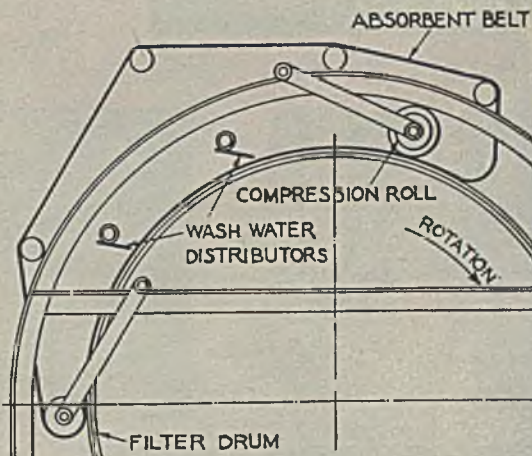
LOWER CAKE MOISTURE



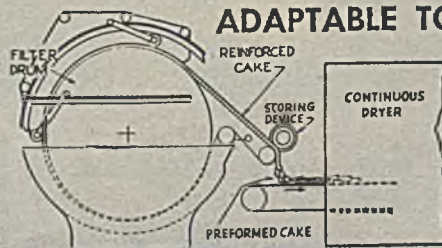
FE Compression Mechanism squeezes 2 to 6% more moisture out of the filter cake. It also reduces vacuum power requirements by closing up cracks that may occur in the cake. As shown above, it consists of segmented compression rolls that ride on a cotton duck compression belt on the exposed portion of the revolving filter drum.

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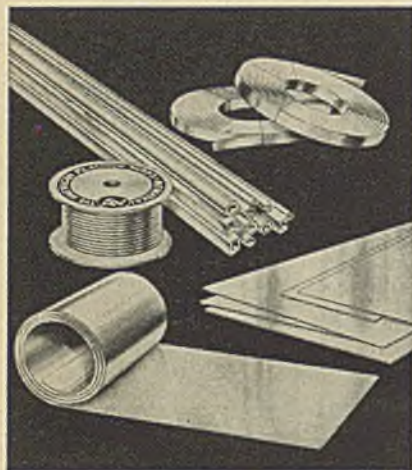
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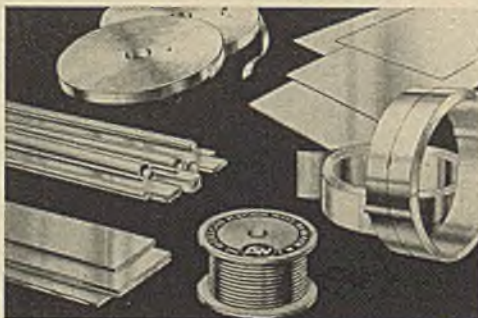
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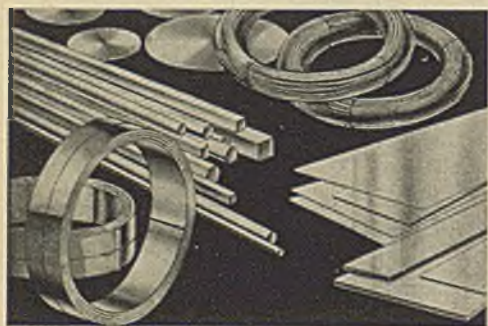


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respectively. Both began operations during 1945.

Other producers of carbon black in the West are Shell Chemical Corp. at Shell Point, Calif., and Great Lakes Carbon Corp. in Los Angeles. With the doubling of ammonia production facilities recently announced by Shell, this firm's output of carbon black should be correspondingly increased. The Shell plant produces hydrogen for ammonia synthesis, with carbon black as a byproduct, by the Pyzel process of thermal decomposition of natural gas.

SULPHURIC ACID OUTPUT DECLINED SLIGHTLY

TOTAL new production of sulphuric acid in the 11 western states declined from 718,000 tons (basis 100 percent H_2SO_4) for 1944 to 690,000 tons for 1945, according to recent data from the Bureau of the Census. These figures include data for government-owned plants which are operated by private interests and which served industrial uses; they do not include the output of plants owned by the government and operated in conjunction with ordnance works and arsenals. The western output was by 16 commercial plants, of which 14 use the contact process and two the chamber method (for a list of these producers, their processes and plant locations, see *Chem. & Met.*, Sept. 1945, p. 166).

Western Production of Sulphuric Acid*

	1939	1944	1945
New Production.....	376,423	718,120	690,446
Percentage of national production.....	7.8	8.4	8.0
Consumed in producing plants.....	36,611	94,583	58,320†
Number of producing plants.....		16	16

* As short tons of 100 percent H_2SO_4 . Does not include output from government-owned plants operated in conjunction with ordnance works and arsenals. From Bureau of the Census. † For January through September only.

METER ASSOCIATION ELECTS NEW OFFICERS

AT ITS annual meeting in June, the Southern California Meter Association, Los Angeles, elected Lee Cheever of Southern Counties Gas Co. as president to succeed C. L. Hutchings of Tidewater Associated Oil Co. Also elected was C. G. Cortelyou of General Petroleum Corp. as vice president, G. H. Forster, Jr., of The Texas Co. as secretary-treasurer and F. E. McAllister of Southern California Gas Co. as auditor.

The Association, consisting of persons in southern California concerned with the economical installation, servicing and calibration of fluid meters, instruments and controllers, has now grown to a membership of 329. Total new members accepted during the past fiscal year was 79.

DDT TO BE PRODUCED IN NORTHWEST

FIRST plant for the commercial production of DDT west of the Rockies will be built at Portland, Ore., by Pennsylvania Salt Mfg. Co. of Washington, according to a recent announcement. The unit will be installed in conjunction with the new \$1,000,000 caustic soda and chlorine plant now under construction on the Willamette River in Portland, where the firm is also

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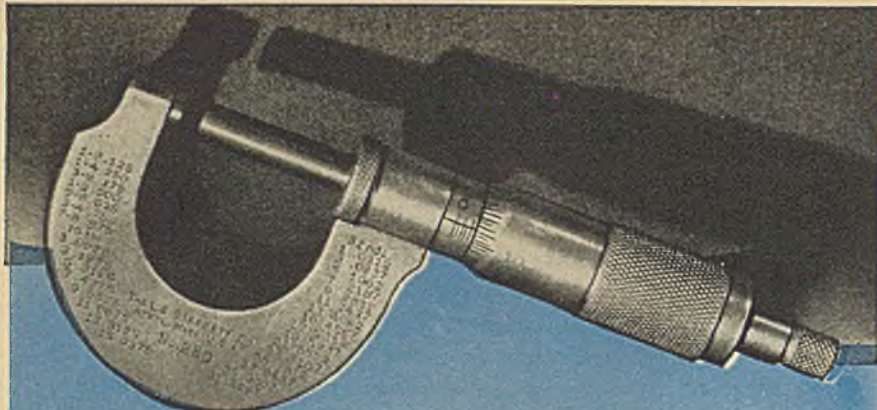
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expanding present facilities for producing sodium chlorate (*Chem. & Met.*, July, 1946, p. 196). The company has also operated for many years a caustic soda and chlorine plant in Tacoma, Wash. The Portland DDT unit is expected to be in production within 12 months, according to the announcement. The company's other two technical DDT plants are located at Natrona, Pa., and Pittstown, N. J.

CRUDE DISTILLATION UNIT FOR EL SEGUNDO REFINERY

PLANS for construction of a \$2,250,000 crude distillation unit at its El Segundo, Calif., refinery were announced during July by Standard Oil Co. of California, San Francisco. The project has received approval of CPA. The unit will have a capacity of approximately 30,000 bbl. daily, according to the release, and will handle the first step in distillation. With such modern processes, utilization of crude oil is being increased. Construction on the project is scheduled to begin in September, with completion set for early next year.

SYNTHETIC ZEOLITE PRODUCER OPERATES IN ARIZONA

A SYNTHETIC zeolite known as Aridzone is now being produced by Arizona Minerals Corp., Yuma, Ariz., according to a recent report. Raw materials used in the plant include quartz mined on the company's property at Guila, 13 mi. east of Yuma, bauxite, caustic soda and soda ash. These are reacted, dissolved, mixed and concentrated by solar evaporation, then milled, washed and bagged for use in water purification. The plant employs approximately 15 men, and the firm has a branch office in Los Angeles. L. A. Piatt is general manager at Yuma.

CERAMICS FIRM BEGINS HUGE EXPANSION

Now getting under way is the \$1,000,000 expansion program of Gladding, McBean & Co. to enlarge production facilities for fine china, earthenware, floor and wall tile, and pipe products at its Glendale, Calif., plant. According to F. B. Ortman, president, work is already under way on all the planned improvements in the program except the new and modern china unit, estimated to cost \$300,000, for which a building permit must first be obtained. The program now in progress includes modernization and expansion of the firm's earthenware and wall tile factory and the building of an additional kiln for the manufacture of pipe products. Orders for machinery and equipment have been placed, and the company expects the new facilities to be in operation before the end of the year.

Earthenware produced by Gladding, McBean & Co. has a body composition of "Malinite" in which a high proportion of talc instead of clay is used. Usually regarded as an outstanding technical achievement in the pottery industry, Malinite was developed by the firm's chemical researchers several years ago. A suitable, low-fire amorphous flux binds the particles of talc into a strong mass highly resistant to thermal shock; clay is used only to make the body plastic and workable. In addition to increased brilliance

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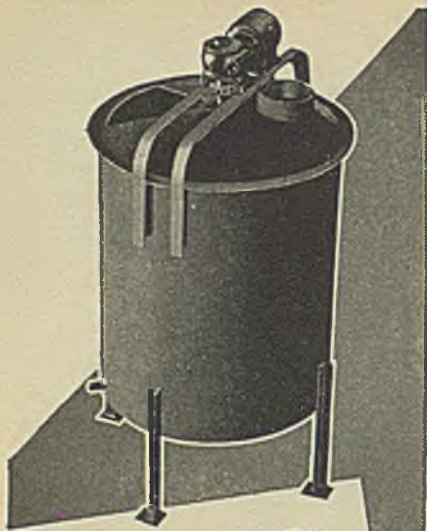
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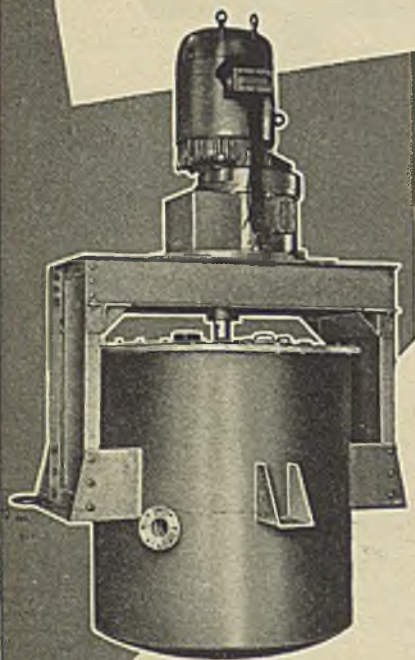
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of colored glazes, the talc body provides extraordinary resistance to glaze crazing.

In addition to its large Glendale plant, Gladding, McBean & Co. operates 11 other plants in the West. Three of these are located in southern California, three in the San Francisco Bay region, four in the Pacific Northwest, and one in Utah. The latter plant is government owned.

MANY NEW CHEMICAL PLANTS NOW UNDER WAY

IN RECENT months, a number of new western chemical and chemical process plants have been announced, contracted for, or begun construction which have not been given news space in these columns. Some of the more important of these developments are mentioned in the following paragraphs.

Acetic Acid—A new unit to produce acetic acid, now ready to begin operations, has been built and will be operated by a subsidiary of Stuart Oxygen Co., San Francisco. The new plant, located in Portland, will synthesize from acetylene.

Petroleum Waxes—The new \$7,000,000 Triton lubricating oil plant recently announced by Union Oil Co. of California to be erected at the firm's refinery in Wilmington will substantially increase western production of petroleum-derived paraffin waxes. The firm now has a similar plant at Oleum, Calif.

Cement—Portland Cement Co., Portland, has obtained CPA approval to invest \$290,000 in construction of new buildings to expand cement output at Oswego. An additional \$580,000 will be spent on new equipment. Production will be raised to 3,000 bbl. daily.

Alcohol—According to one report, an industrial alcohol plant will be erected at Yakima or Ellensburg, Wash., by Robert Maloy of Mount Vernon. The plant, it was reported, would handle 100 tons daily of low-grade potatoes and would start operations at an early date.

Paint Products—Pacific Paint & Varnish Co., Berkeley, Calif., has let the contract for a \$120,000 paint resin and varnish plant in Berkeley.

Soda Ash—A major development to exploit the extensive trona deposits near Green River, Wyo., as a source of soda ash and possibly other chemicals has been begun by Westvaco Chlorine Products Corp. at a cost estimated at approximately \$2,500,000. Sinking of a 1,500-ft. shaft has started. The trona deposits are on land leased from Union Pacific Railroad Co.

Potato Sirup—A new sirup plant, to use cull wheat or potatoes, is being established at Klamath Falls, Ore., according to H. P. Carstensen, master of the Washington State Grange. The entire sirup output is reported already contracted for to be used in manufacture of wines. This is the fifth Grange-sponsored chemurgic plant using cull wheat or potatoes in the states of Washington and Oregon.

Ammonium Sulphate—Pacific Northwest agriculture will soon be able to receive, according to reports, agriculture-grade ammonium sulphate from a new plant at Eugene, Ore. Both acid and ammonia will be shipped to the plant.

Gypsum Products—U. S. Gypsum Co., Los Angeles, has announced plans for a \$2,-

500,000 gypsum products plant at Plaster City, Calif. The firm's plant at Midland, Calif., which can convert 800 tons of gypsum daily into wallboard, is reported to be the largest of its kind in this country.

Research Laboratory—Contract has been awarded by American Potash & Chemical Corp. for construction of a research and chemical engineering laboratory at its Trona works. Specifications call for an expenditure of \$245,000.

Manganese Sulphate—Commercial production of manganese sulphate and other manganese chemicals is scheduled to begin in the immediate future by a firm located in southern California. This is believed to be the only commercial producer of these chemicals in the West.

Paint Products—E. I. du Pont de Nemours & Co., South San Francisco, has awarded contract for a \$40,000 factory addition as the first step in a larger program to more than double the capacity of this paint, lacquer and protective coatings plant.

Pumps—Peerless Pump Div. of Food Machinery Corp. plans to expand manufacturing space of its Los Angeles plant by about 23,000 sq.ft. This division also has a producing factory at Fresno.

Aromatic Chemicals—Felton Chemical Co., Los Angeles, has moved its factory location and obtained 12,000 sq.ft. of floor space in a new building for expanded production of essential and perfume oils, food flavorings and colorings, and aromatic chemicals.

Sheet Steel—The Scidellhuber Iron & Bronze Works of Seattle plans immediate construction of a steel rolling mill in Seattle at an investment of \$3,500,000 according to one report. Such a development would make steel more readily available for Northwest fabricators of equipment for the expanding process industries.

Roofing Materials—The Pioneer Div. of Flintkote Co. has announced plans for construction of a \$500,000 roof products manufacturing plant in Portland, Ore.

Chlorine—It has now been made known that the previously announced Portland expansion of Pennsylvania Salt Mfg. Co. of Washington (*Chem. & Met.* July, p. 196) will be for production of chlorine and caustic soda and for expanded output of sodium and potassium chlorates. The firm has also announced that DDT will be manufactured in Portland.

Sheet Steel—Columbia Steel Co. has awarded contract for a \$6,000,000 expansion of facilities at its Pittsburg, Calif., mill. Included will be facilities for producing cold reduction sheet and tin plate.

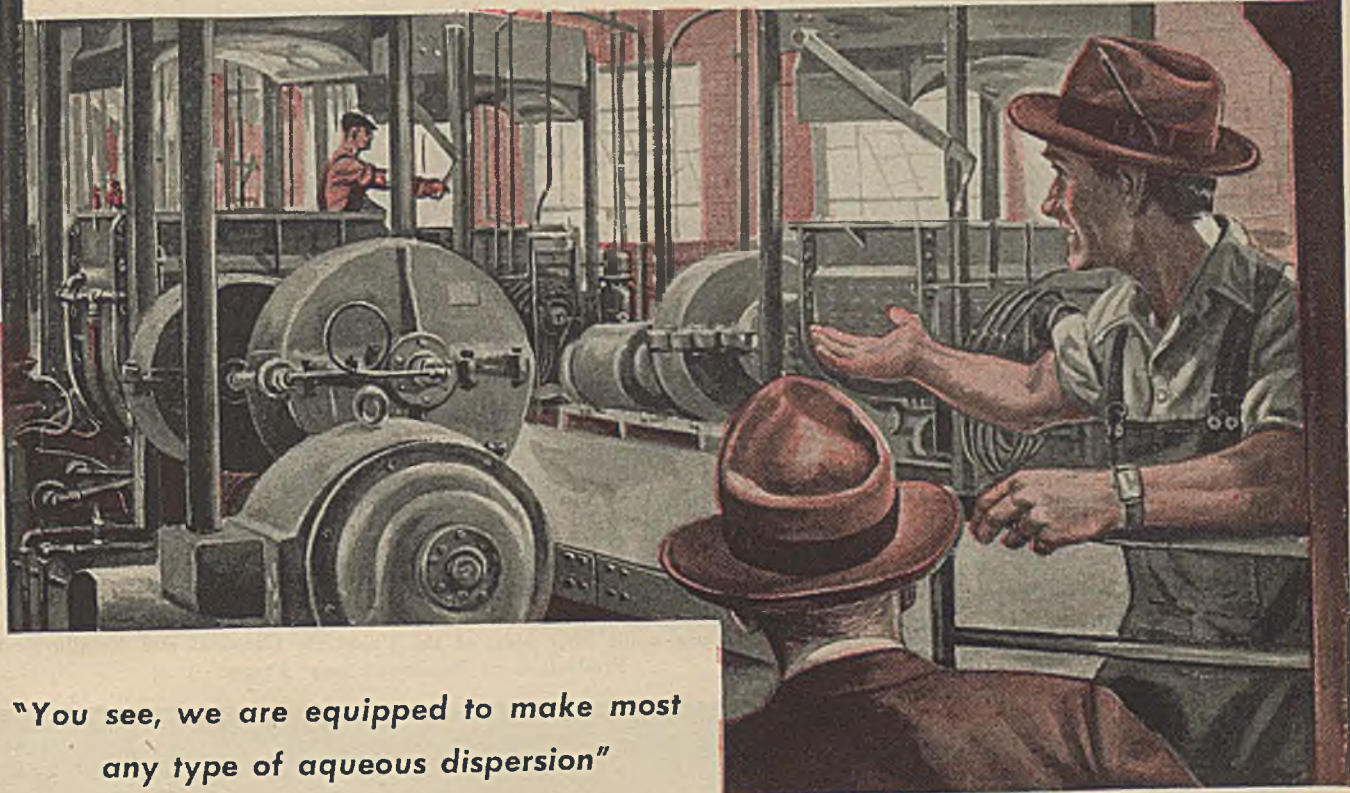
Bitumens—A pilot plant is now being operated by Utah Chemical & Oil Co. at Vernal, Utah, to produce 50 bbl. daily of oil from bituminous sands of the region. The firm, according to reports, intends to remove resins from these low-sulphur hydrocarbons by selective solvents and then to process them further into several products.

Mercaptans—The mercaptan extraction and purification unit of Union Oil Co. of California at its Wilmington, Calif., refinery is now in commercial operations. Chief product is methyl mercaptan.

Polybutene—Facilities for production of polybutenes for Oronite Chemical Co. at the Richmond, Calif., refinery of Standard Oil Co. of California have recently been substantially increased.

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NEWS FROM ABROAD

ENGLAND WILL INCREASE PURCHASES OF CHEMICAL EQUIPMENT AS RESULT OF UNITED STATES LOAN

Special Correspondence

EMPLOYMENT in the British chemical industry continues to rise, according to the latest Ministry of Labor statistics. More women who entered industrial work during the war are returning to their domestic duties, but the engagement of male workers more than offsets this drain on the labor force. Compared with prewar days, the chemical trades now have 40 percent more workers on their pay-rolls. No other industry can boast of such a progress rate, and there is no doubt that when the new plants now under construction or design enter the productive stage the chemical industry, which now employs close on 175,000 workers, will be even more important in the country's economic system.

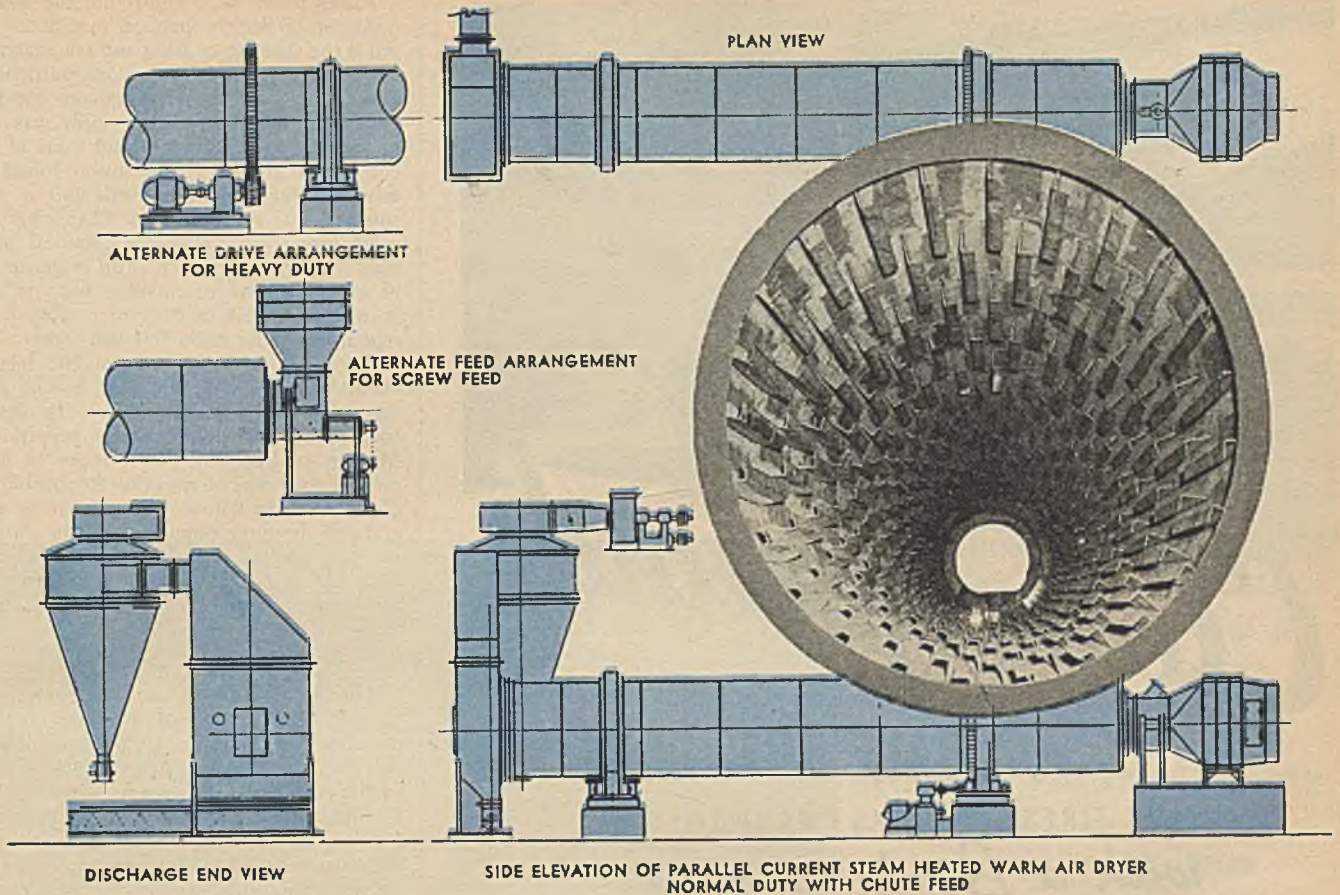
Big gains over prewar figures also characterize the export trade of the chemical industry. In June most manufacturers suffered a slight decline of shipments owing to V-Day and Whitsun holidays, but July seems to have brought a recovery. In future it is expected that price advances will speed up the value expansion of chemical exports. In the home market, however, price increases are still effected only after careful consideration.

When new fertilizer prices were announced by the Board of Trade, the rise in superphosphates was countered by slight cuts elsewhere. In general the price trend is distinctly upward, but as long as control is maintained over key products alterations are comparatively rare and normally the outcome of special circumstances.

There are of course factors which affect the prices of all chemicals, if in varying degree, such as the rise of the cost of coal fuel and rail transport. Enforced employment of men in the place of women and higher salaries for specialists and skilled men resulting from the shortage of key personnel also tend to raise the cost of all chemical processes. But these are partially offset by economies through full-capacity work and lower sales promotion expenditure. The market therefore only gradually reflects the rising tendency of basic cost elements. There is no authoritative index of British chemical prices which could be compared with quotations in the world market, but it seems that at the present stage British chemicals consumers are faring much better than their colleagues abroad.

Part of the new staple fiber plant of the Union for Chemical and Metallurgical Production in Neratovice near Prague





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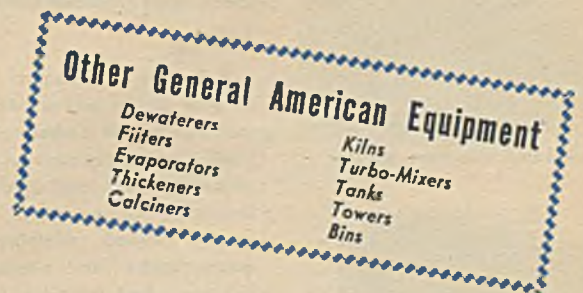
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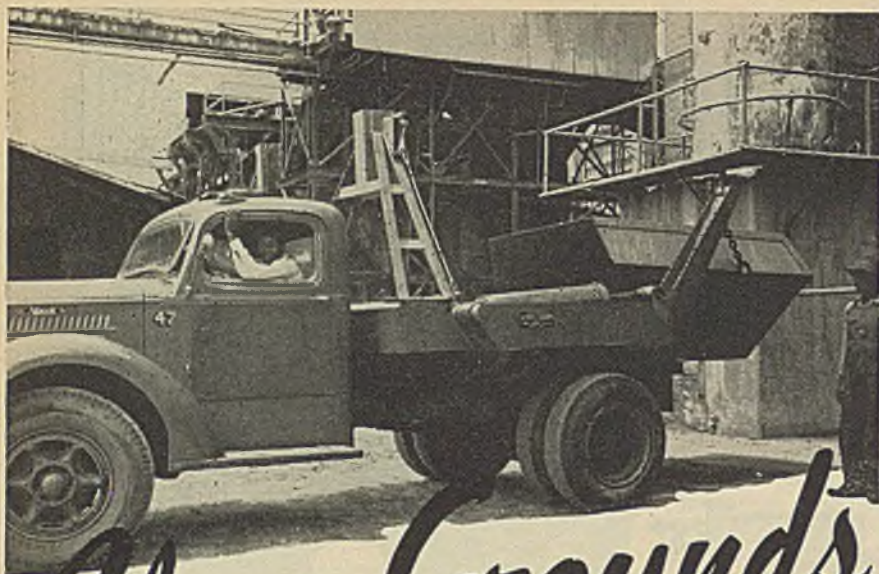
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Rising prices are certainly not the biggest headache of British chemical manufacturers, nor is the shortage of labor and raw materials for processing the most serious bottleneck. Danger point no. 1 is and remains the fuel position. The immediate supply has improved during the summer, but some of the coal which in the colder season found its way into the domestic hearth and is now shipped to manufacturers clamoring for more fuel is unsuitable for chemical processes. Moreover, there is little evidence yet of any marked improvement in outputs, and it is feared that next winter will see a repetition of the strain felt last winter.

As in prewar days some of the biggest chemical works in Britain were leading consumers of otherwise unmarketable grades of coal and derivatives in surplus supply, the Ministry of Fuel and Power seems to have given a good deal of attention to possibilities of reducing the consumption of coal in general and the more popular grades in particular in chemical factories. Chemical processes are also studied with a view to the replacement of coal by fuel oil and oil residues and by electricity.

CHEMICALS FROM OIL

The trend away from high-grade coal towards substitute fuels is likely to encourage the supporters of an expansion of the British oil refining industry as the difficulties of disposing of refinery residues in the local market were one of the main arguments put forward in defence of continuing refining operations near the centers of oil production. Such an important oil producer and refiner of international format as the Shell combine still wishes to restrict oil refining in Britain mainly to high-grade products. The company is now moving towards the manufacture of high-grade chemical products in extensions of its big plants in the British Isles. In addition to the three big Shell refineries on the Thames, on the Manchester Ship Canal, and on the Clyde, there is a large manufacturing plant at Barton, near Manchester, which is devoted entirely to the manufacture of a comprehensive range of petroleum greases.

While these Shell plants cover about 70 percent of the lubricating oil production and bitumen requirements of the country, they have replaced most of the high-grade lubricants for which Germany used to have a near-monopoly in European production before the war. As other oil refiners are certainly no less active in the field of selective refining, it is hoped that this comparatively young industry, based as it is on a large and growing home market, will in future be the leading one in Europe, surpassing in importance even those in continental countries where the bulk of the motor spirit for local needs is refined on the spot.

The development of the high-grade lubricant industry owes much of course to the war which brought home to authorities and consumers the country's dependence on imports. The same stimulus was responsible for the work on indigenous sources of carbon black undertaken by the Department of Scientific and Industrial Research during the war. Tar products and petroleum residues available in England were tested, and it is claimed that many improvements were discovered. Important consuming interests have insistently demanded a British carbon black production, but the Inter-Departmental Com-

Now Becomes



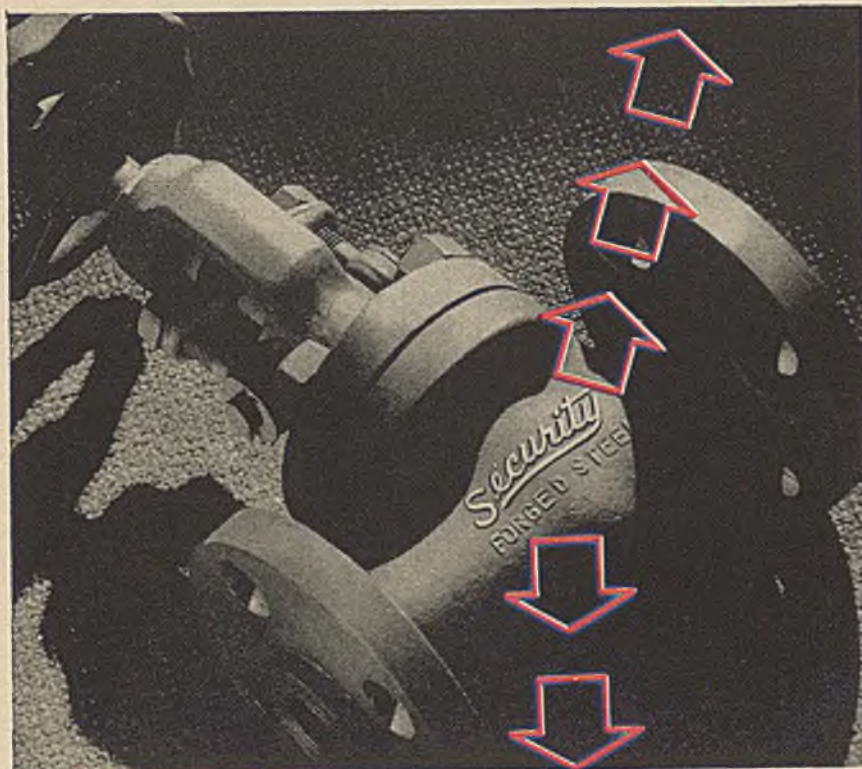
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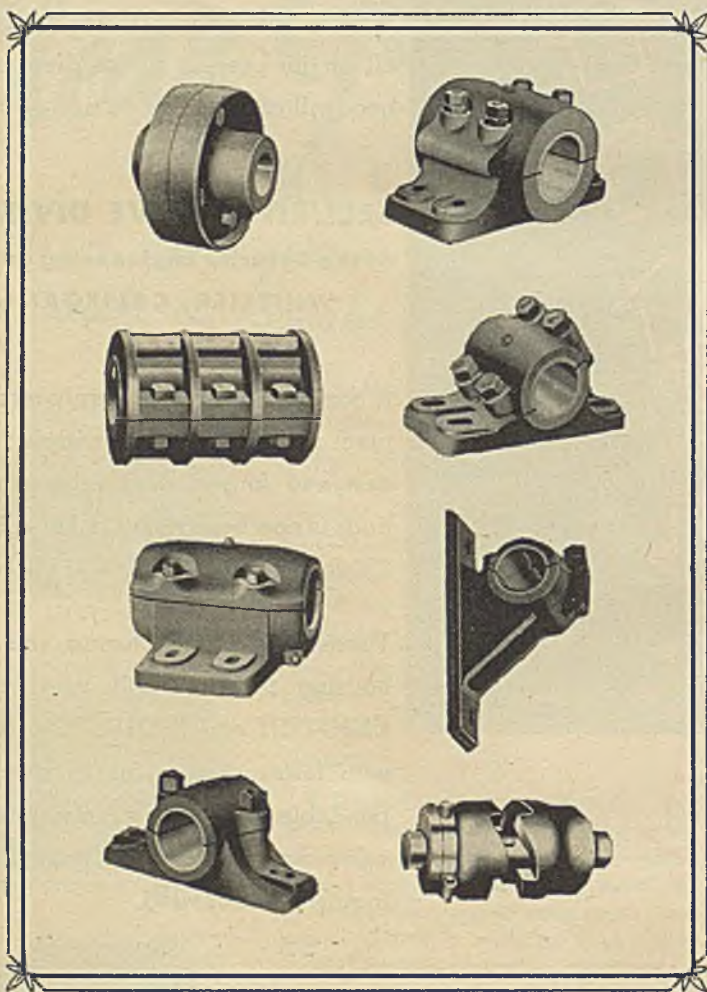
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mittee set up by the government to study the question is now considering the possibility of developing the production of carbon black, especially of the channel and furnace types, from natural gas in the sterling area, from which fact it may be concluded that economical production possibilities are not believed to exist in the British Isles.

If it thus seems that currency considerations are still very important, there is, on the other hand, evidence that this factor does not override all other arguments. The "token imports" of U. S. and Canadian goods permitted by the Board of Trade include paints and varnishes, toilet preparations, and carbon electrodes. This concession soon will be followed by others, but the would-be exporter to the British market in North America should not forget that the opportunities opened by the loan to Britain are strictly limited. Under one quarter of the total sum is to be spent in the first year, and the bulk of this will be earmarked for food and engineering products needed for industrial re-equipment.

CHEMICAL IMPORTS

Moreover, the opportunities for dealings in chemical manufactures between highly industrialized countries like U. S. A. and Great Britain are chiefly limited to products for which one country either enjoys a substantial advantage in producing costs or depends on exports for the disposal of surplus byproducts. U. S. petroleum derivatives belong to the former and British coal-tar derivatives to the latter category. As far as the normal range of industrial chemicals is concerned, British manufacturers feel themselves well able to meet all reasonable demands from the home market.

As regards chemical products for which the British production is not sufficiently large to cover all domestic needs and at the same time to meet the foreign orders reaching them, the generally accepted view now seems to be that it is better to permit limited imports to satisfy part of the domestic demand than to concentrate the activities of British manufacturers entirely on the home market to the exclusion of all export opportunities. It is argued that complete neglect of the foreign business would make it impossible for British makers to re-enter foreign markets when they have again a surplus at their disposal, while supplementation of British production for the home market by importation will in any case be necessary if the urgent demands for the housing drive, in particular, are to be met.

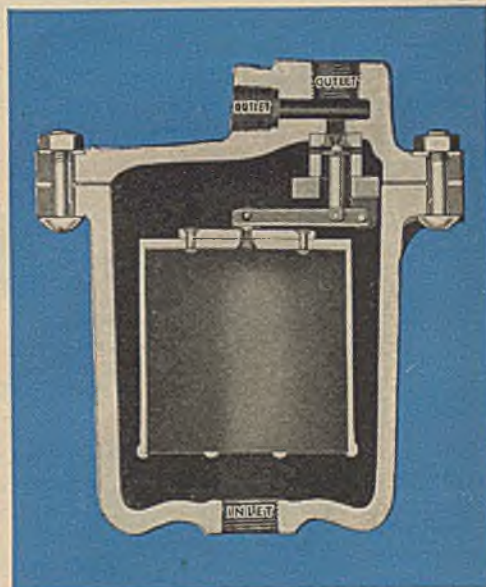
While it thus seems that the passage of the U. S. loan for Britain through Congress will not result in an immediate expansion of the trade in ordinary chemicals, paint materials and other products in short supply will now be admitted more easily into Britain. Above all, chemical engineering products for equipment of new factories and extension and modernization of existing plants probably will soon be ordered in substantial amounts from U. S. firms, for British chemical plant manufacturers are unable to deal with all the large orders to be placed in the near future for early delivery. Not only is there a shortage of chemical plant producing capacity in England, but the supply of chemical engineers from the universities is also insufficient, so much so that the shortage of skilled plant designers threatens to develop into a serious bottleneck.

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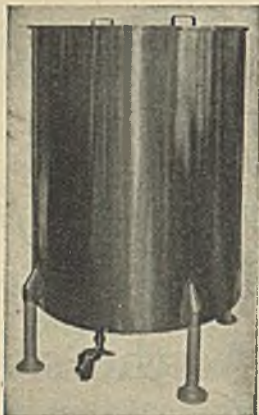
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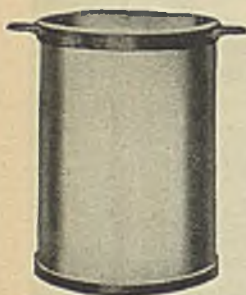
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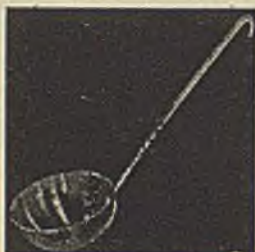


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Special Correspondence

THE South African Tung Oil Growers' Association estimates there are about 150,000 tung trees in the Union. The first seed arrived in 1923, and soon after trial plantings were made in the eastern Transvaal, in Swaziland and in Natal. The initial work proved difficult, for the number of trees increased slowly. The high prices quoted for the oil attracted the South African farmer, and in recent years the annual yield for the Union has been between 250 and 280 tons of oil. During the war demand was so keen that all the oil South Africa could produce had a ready market overseas, and since the war demand has remained good. The Union Government has a horticultural station at Nelspruit in the northern Transvaal, where tung oil research is carried out.

It is likely that in the near future this oil will be used in South Africa for making quick-drying paints, varnishes and enamel, waterproofing materials, linoleums, insulating compounds, quick-drying printers' ink, brake-lining, airplane covering and similar products. A tree in South Africa several years old has on occasion yielded up to 45 lb. of hulled seed, but this cannot be regarded as average.

The sprayings of DDT from aircraft in the Mkuzi game reserve in Zululand to eradicate tsetse fly has given promising results and experiments will be continued. After the third spraying copious rains

created conditions unsuitable for the use of DDT, which is most effective when the grass is not long and there is not much foliage. The Department of Agriculture thus decided to postpone the fourth spraying until winter.

It was proposed in the South African Parliament that the government undertake the provision of oil from coal. Parliament has already vested the ownership of oil found in South Africa in the State, and it is now maintained that it should not matter whether the oil is in liquid form or impregnated in the molecules of coal—the State should get it out.

Tests for natural oil have so far proved disappointing and the possibility that gusher oil may be found, while it should not be wholly excluded, can only be regarded as remote. The South African Torbanite Co., usually known as SATMAR, is now producing 6,000,000 gal. of petrol annually and hopes to increase production to 12,000,000 gal. by the end of 1946, but the torbanite deposits are insufficient to render the Union self-supporting. According to figures given in the House of Assembly, a plant capable of producing 70,000,000 gal. of gasoline a year would cost £8,000,000. This quantity would be less than half the country's present imports, but would be a substantial contribution and would provide employment for about 1,000 Europeans and 6,000 non-Europeans. About 12,

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diameter, deeper stuffing box, conservative rating...and final testing to meet your operating conditions...will keep you sold on this Taber "general-use" Pump.

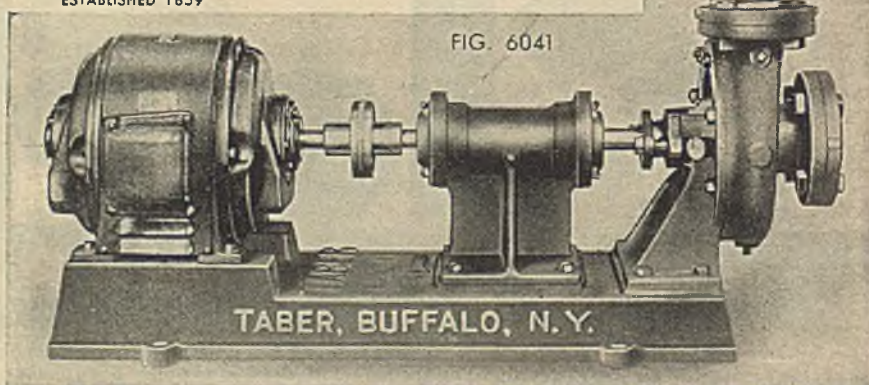
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PLEASE WRITE, ON YOUR
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BULLETIN CL-339

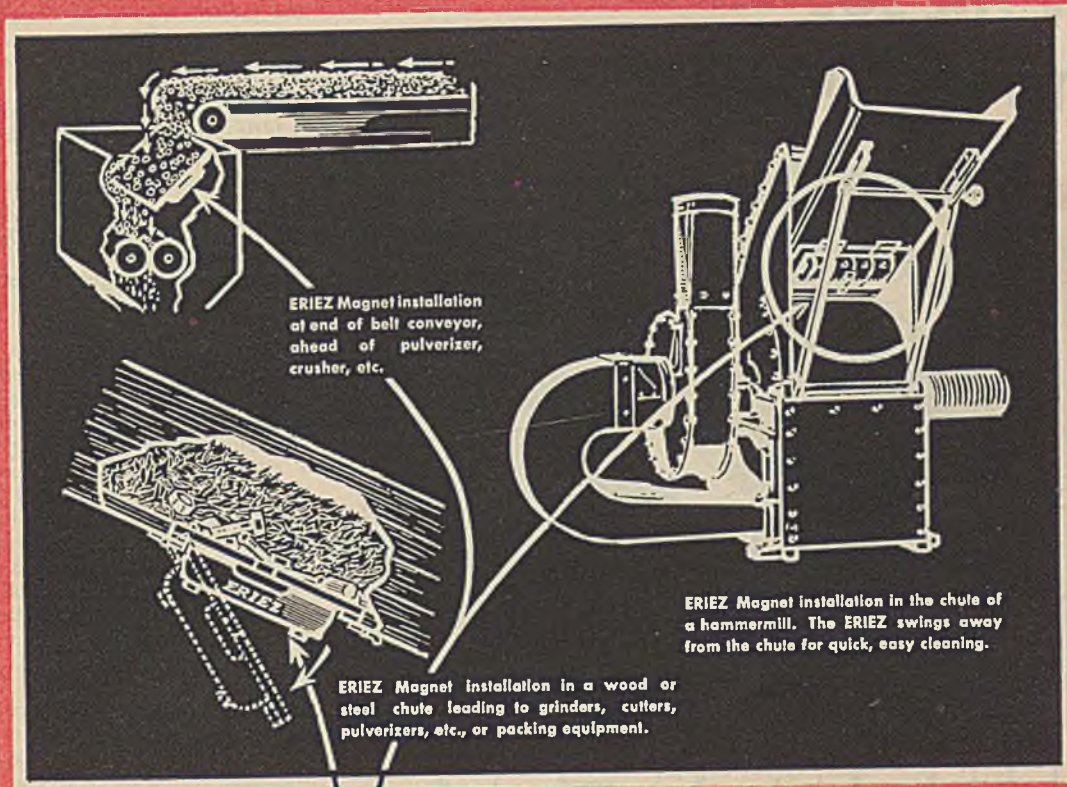
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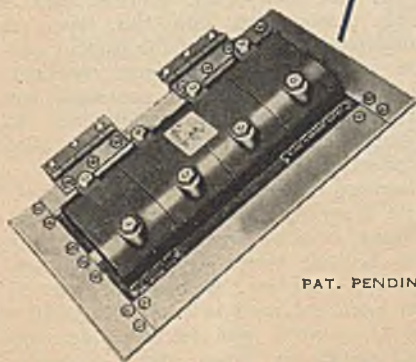
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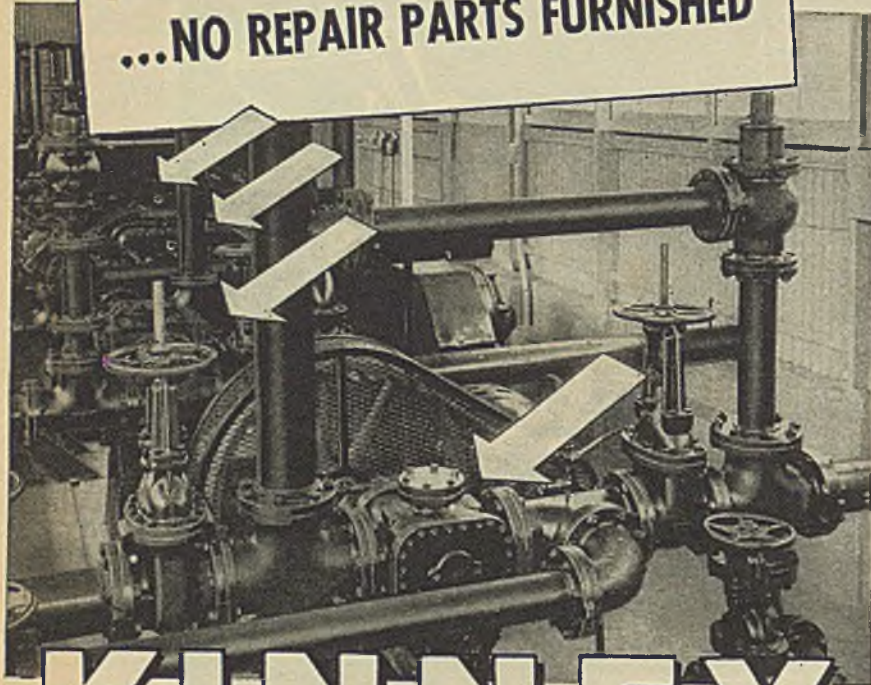
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 FIG. 4 STAINLESS
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Write for Bulletin 18A.

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000,000 tons of coal annually would be required to meet South Africa's needs.

It is being urged that the shore whaling stations in South Africa, closed many years ago, should be re-opened, but against the present high price of whale oil it is pointed out that not only would the maintenance and labor costs of such factories be too high, but the cost of the plant would be prohibitive. In any case there is little likelihood that the plant would be obtainable for a long time. There could be no question of establishing shore stations this year. Durban is able to operate a shore station economically mainly because its coal supplies are at the back door, whales can be caught almost the whole year round and the catchers are based next to the big repair shops.

It is possible that a £50,000 factory will be opened in Durban to manufacture hydrolyzed protein on a large scale. Experiments by the chief tuberculosis officer in the Union have shown that the protein is excellent for treating tuberculosis and similar wasting diseases. It is regarded as marking a big advance in nutritional research. The Industrial Development Corp. is likely to assist with capital for the factory, but it will leave actual production to private enterprise. The plant would be large enough to supply all needs of the Union and also to export. It is said that a site has been selected for the new factory. So far such products have been obtained from the pilot plant opened in Durban some months ago, and then the substance proved of great value in treating tuberculosis.

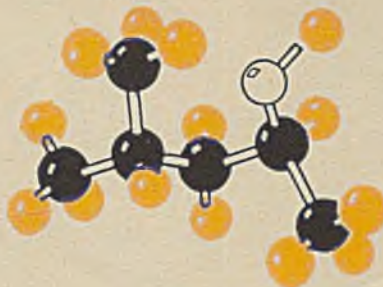
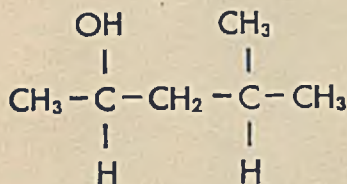
DDT PRODUCTION

Supplies of DDT have become available in South Africa from the government factory at Klipfontein, North Rand, Transvaal. The recently erected plant has been producing continuously for several months, but government requirements for priority uses absorbed most of the output. Now a sufficient stock has been built up to ensure a regular supply of some compounds though it is expected demand will exceed supply for some months. At first three DDT insecticides were released for general use. These were a paraffin spraying solution, talc dusting powder and an emulsifiable liquid. Farmers have received priority in the supply of the emulsifiable liquid. The bulk of the available stock is being compounded into this type. A considerable proportion of the paraffin solution is being filled into large containers for farmers in dairies and cow-sheds and for large food-handling organizations. In addition, small containers are being filled for sale to the public.

Seaweed is becoming a commercial proposition along the Cape west coast. Agar-agar is being extracted by a Cape Town firm from half-tide seaweed gathered at Langebaan and elsewhere. Last year a Transvaal firm interested itself in a plan to build a sort of seaweed farm in which agar-agar weed could be grown under controlled conditions at Hout Bay. Now the Cape Divisional Council has been approached for a concession for cutting, harvesting and cultivating seaweed at various localities. The idea is to use the seaweed for making plastics, mostly for medical implements.

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For more detailed information on the application, properties, and specifications, write for Technical Bulletin #SC: 46-1

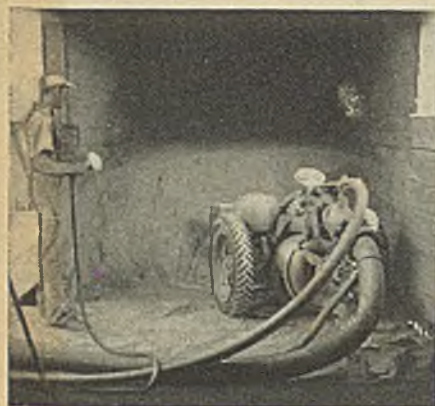
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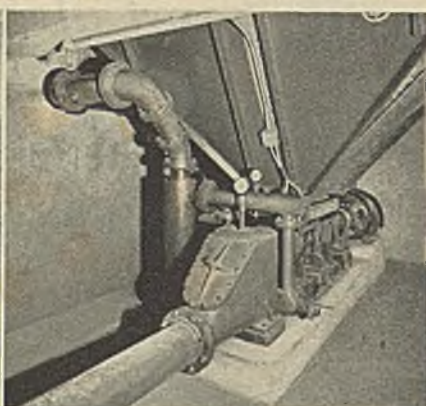
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There are two practical ways to handle dry pulverized materials . . .



Fuller-Kinyon Remote-Control Unloader unloading material from box car



Fuller-Kinyon Stationary Pump installed in pit underneath tracks unloading material from hopper-bottom car

and both are Fuller-Kinyon

The old saying, "There are no two ways about it," doesn't hold good when applied to the unloading and conveying of bulk, dry pulverized materials. Because, there are two practical ways to do the job, and they're both Fuller-Kinyon. Both systems are efficient and economical of operation, do a quick, clean job of unloading and conveying from box and hopper-bottom cars, ships and barges.

Fuller-Kinyon Remote-Control Unloader—for unloading from box cars, ships and barges. Now used by many ready-mix concrete and asphalt plants, and contractors on highways and dam construction. Any ordinary laborer can operate this equipment with the greatest of ease. Built in different types and sizes for various capacities.

Fuller-Kinyon Stationary Pump—for unloading from hopper-bottom cars. The pump is installed in a pit underneath the tracks. Connection between car and pump is quickly and easily made without dust or loss of material. Built for various capacities, from a few tons to 300 tons per hour. Used extensively in the chemical-process industries for unloading, conveying to storage and from storage to process in the plant.

Write for literature illustrating and describing Fuller-Kinyon Systems, both stationary and Remote-Control Unloader.

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P-81

the United States reported that he had arranged for large shipments of South African graphite on a regular basis. He said American users were impressed by the quality of South African graphite. At present his company is exporting to Australia, the Argentine, Egypt, Palestine and Turkey. The company planned to expand in the near future, erecting a new factory at Krugersdorp.

An increasing number of American chemical and allied firms have appointed South African representatives and an increasing number of new American chemical lines are offered on the local market. At the same time there is strong demand for many of the older staple types of chemical.

Paints and varnishes are to be manufactured in South Africa by African Chemical & Explosives Industries, an associated company of Imperial Chemical Industries. It is also stated that the South African firm will undertake the manufacture of cyanide, leather cloth and a number of chemicals so as to develop local secondary industries.

NEW MATCH PLANT

Plant for the recently-established Capital Match Corp., is expected to reach South Africa before the end of the year, and production should begin within three months after it arrives, said the chairman at statutory meeting of the company. He said that the initial output would represent about 12 percent of the matches consumed in South Africa, a quality match equal to the best being aimed at. It was intended to obtain supplies from South African cardboard factories and to use locally-made paper and so far as possible chemicals made in the Union. Requests from other African territories indicated that there would be no difficulty in disposing of the company's products outside the borders of South Africa, if they felt it desirable to enter the export market.

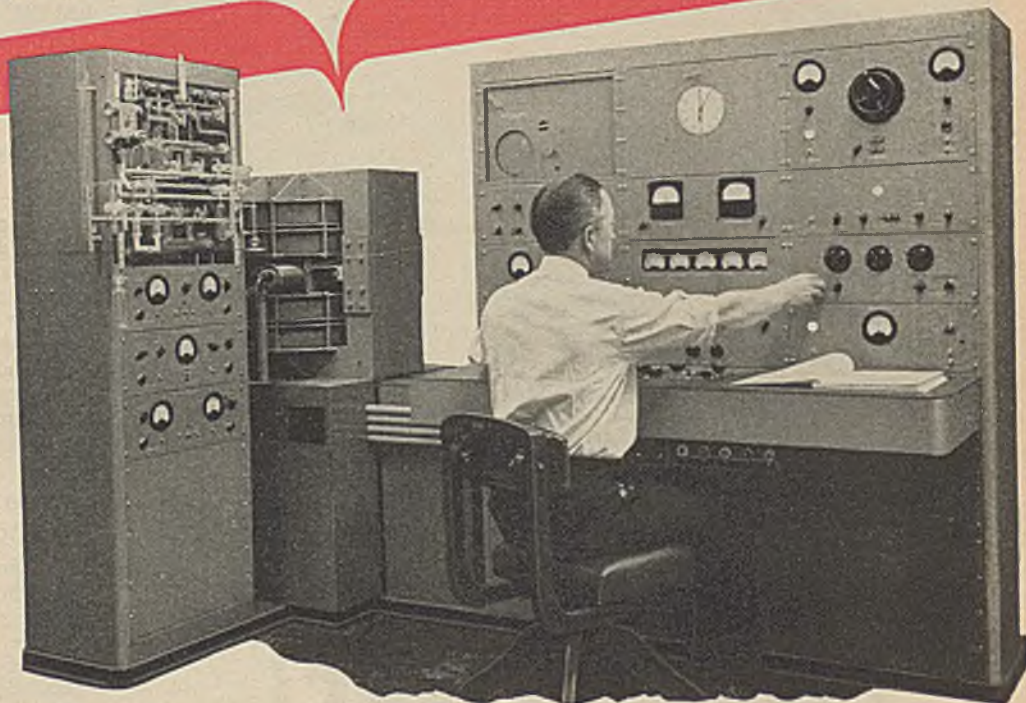
Recent improvements in production methods have enabled local producers of oxygen and acetylene to reduce the prices of dissolved acetylene. Since 1927 the industry has reduced the standard price of dissolved acetylene by nearly 35 percent, and that of oxygen by about 60 percent.

Although not yet working to full capacity, the new timber impregnation plant at Cape Town already is treating up to 4,000 cu. ft. of timber a day. The plant had been installed in agreement with Hickson's Timber Impregnation Co., which operated a similar plant in Johannesburg, and whose parent company in Britain manufactured Wolman Salts—a preservative discovered by a German scientist. Wolman Tanalith, the particular brand of the salts used against beetle attack, has undergone service tests in many parts of the world, and proved effective. The Minister of Posts and Telegraphs said that the government's new timber impregnation plant at Bellville, Cape, would soon be in operation.

CONDITIONS FAVORABLE FOR QUININE SUPPLIES

REPORTS to the Department of Commerce say that production of quinine in the Netherlands Indies was increased by 16 percent during the Japanese occupation. Output in 1944 was 747 tons compared with

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650 tons in 1940. Area planted to cinchona trees declined from 36,062 acres in 1942 to 34,095 acres in 1945. In almost all cases, upkeep and maintenance of facilities was adequate. The Japanese started to build two plants for treatment of the bark and while they were not completed, they may be of considerable use when production on a large scale is resumed.

**PAPER MAKERS CHEMICALS
 NEEDED IN NETHERLANDS**

PAPER manufacturers in the Netherlands are suffering because of a shortage in many types of chemicals. The Department of Commerce reports that stocks received from Germany during the occupation are nearing depletion and Germany has nothing further to offer. Salt cake used in making sulphate paper is in very short supply and sizing materials are badly needed. Some chlorine has been imported from Switzerland but supplies are inadequate. Dyes and pigments are being received from Switzerland and additional imports are expected from Czechoslovakia. A heavy demand exists for rosin from the United States as European sources are restricted.

**PALESTINE ENLARGES OUTPUT
 OF PLASTICS PRODUCTS**

PALESTINE has given considerable attention to the expansion of its plastics industry which now includes nine plants manufacturing household articles, parts for telephone and electrical appliances, containers for cosmetics and pharmaceuticals, rims for sun glasses, fountain-pen parts, buttons, and musical instruments. Total annual production has a value of £100,000. Delays in the arrival of imported molding powders have been a serious obstacle to regular production. One factory evolved a molding powder from calcium cyanamide filled with sawdust or with dried, powdered orange peel.

**LARGE SURPLUS STOCKS OF
 TUNG OIL POSSIBLE**

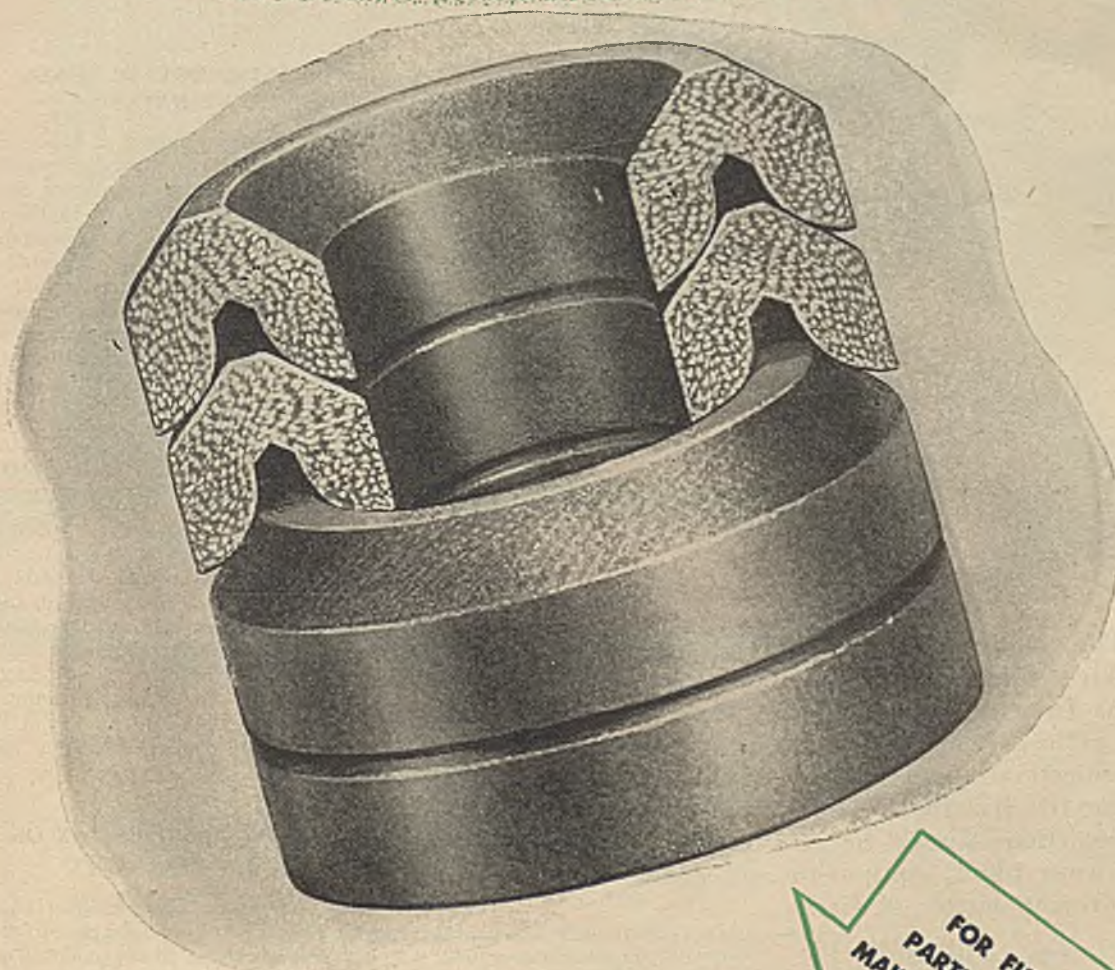
TUNG oil, one of China's main exportable products, can be made available in Shanghai in large quantities for shipment abroad, according to an official of the China Vegetable Oil Co., which produced tung oil in factories at various parts of the country. It is estimated that an average of 2,000 tons of tung oil beyond the amount set aside for domestic consumption can be produced every month by the organization at one refinery at Wanhshien in Szechwan.

**CHILE WILL PRODUCE WHALE
 OIL FOR EXPORT TRADE**

WITH the acquisition of new catchers, Chile's only whaling company is expected to produce a substantial surplus of whale oil for export in 1947. The Santiago Press reports that plans are under discussion for enlarging the scope of whaling operations. During 1945, 447 whales were caught with an oil yield of 3,456 metric tons as compared with 360 whales and 2,343 metric tons of oil in 1944. In January-March, 1946, 149 whales were caught. The entire

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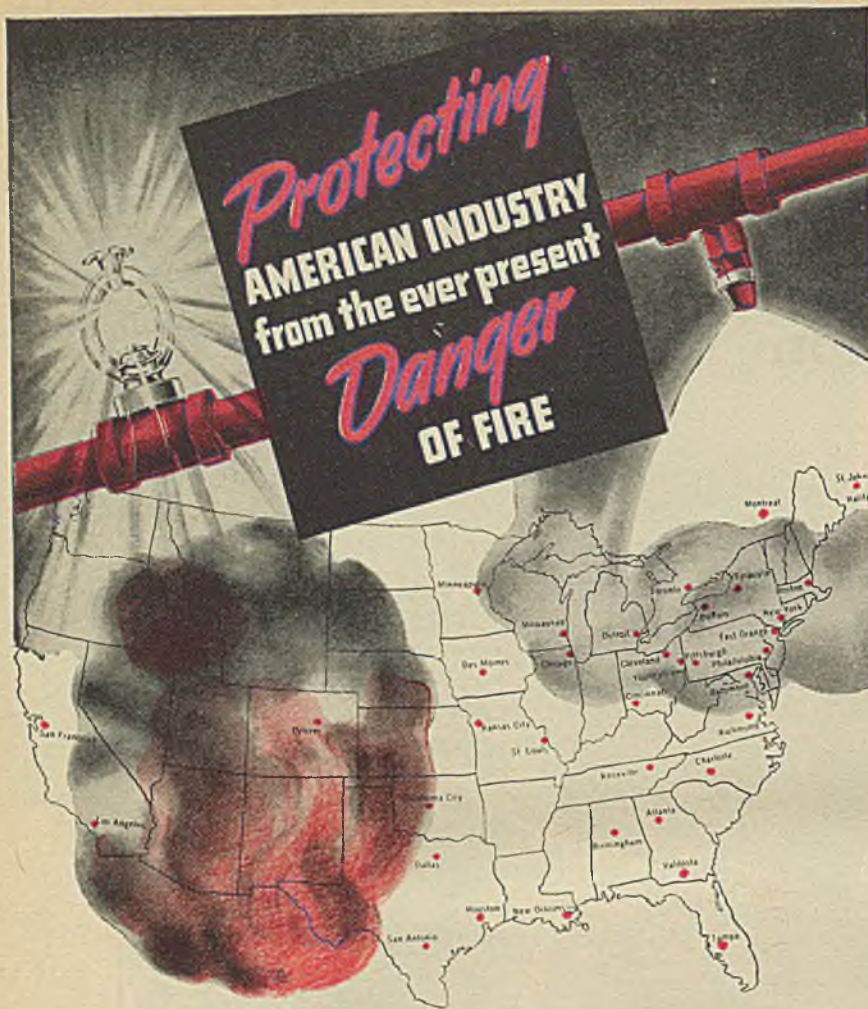
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whale oil production in 1945 and in the first quarter of this year was used at home, chiefly in the manufacture of soap.

FRENCH PAPER PRODUCTION SHOWS MARKED INCREASE

PAPER production in France had reached 50 percent of the 1936-39 average by May of this year. During March, output of paper and paperboard rose about 25 percent above the February totals. Newsprint production was up 55 percent in March and woodpulp output advance 25 percent to a total of 19,307 metric tons. Imports of paper and paperboard were lower.

SPANISH POTASH MINES SPEED UP RATES

MINING of potash in Spain is on the upward trend with average monthly production in the early months of this year at a rate of from 12,000 to 14,000 metric tons of K_2O content. A considerable part of production is being exported to Great Britain under a contract calling for 60,000 tons of 60 percent grade in 1946. Spanish production of superphosphate and ammonium sulphate in the first quarter of this year was about the same as in the comparable period of last year.

FINLAND PLANS EXPANSION OF RAYON MANUFACTURE

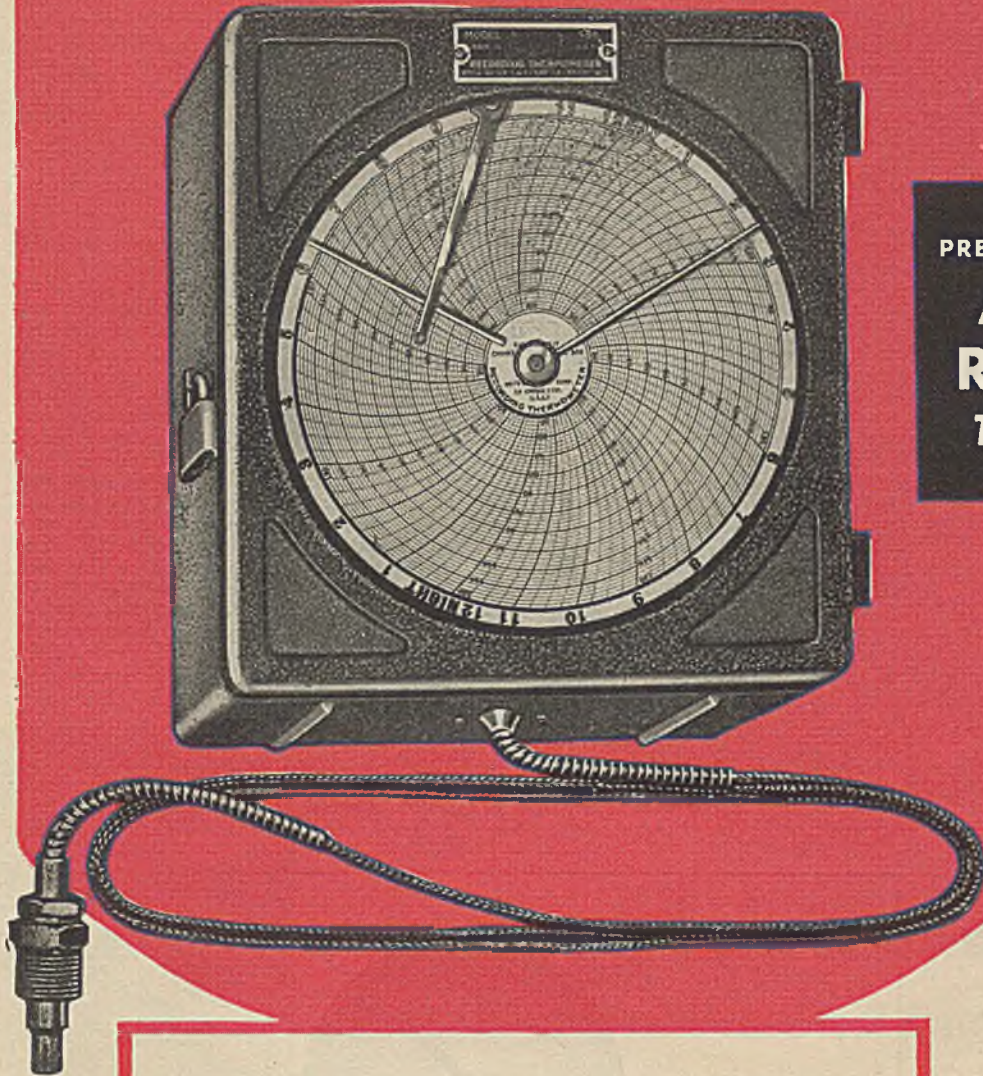
ACCORDING to press advices, Finland is planning to expand its facilities for the production of rayon yarn. Favorable decision is said to have been reached for the establishment of a new plant near the Gamla Karleby and if machinery, labor and building materials are available, it is expected that the plant will be able to get into production some time in 1947. At present Finland has one rayon plant in operation near Valkeakoski.

MEXICO IMPOSES TAX ON ALL SALES OF SALT

A RECENT law enacted in Mexico establishes a first-hand sales tax of 0.04 Mexican peso per kg. on all salt produced or imported into Mexico. Importers will not be permitted to withdraw their merchandise from Customs until they have paid the tax. The law will become effective after the organization of a National Society of Salt Producers to include at least 80 percent of Mexican producers. Members of the society will receive a subsidy of 0.02 peso per kg. on their salt production. Nonmembers and importers will not be eligible for the subsidy.

SURINAM EXPORTED LESS BAUXITE LAST YEAR

SHIPMENTS of bauxite from the three mines operated in Surinam during 1945 amounted to 673,185 long tons which was an increase of 155,478 tons over 1944 but was much less than the totals for 1941, 1942, and 1943 which were 1,093,764, 1,227,512, and 1,662,766 long tons respectively. Included in the 1945 total were 16,521 tons of chemical-grade ore.



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The Hi-Lift is water lubricated—no oil is used underground. The only moving parts are rotor and shaft. Can be installed in wells as small as 4" in diameter. The Peerless Hi-Lift is the ideal source for pumping clean water in a wide variety of municipal, industrial and commercial applications. Request Literature.

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Advances in Acetylene Chemistry—This report is a translation of a captured German report, giving an address by the director of the I. G. Farben plant at Ludwigshafen on the occasion of the first meeting of the Technical Society in Harnack House, Berlin, July 1940. The author discusses new techniques in the handling of acetylene to prepare vinyl compounds. The vinyl reaction with few exceptions is applicable to all organic compounds with hydroxyl groups. In effect acetylene can be used to convert most organic substances into polymerizable compounds. A substance like vinyl methyl ether can be broken down into acetaldehyde and methanol, which should be a useful way of preparing acetaldehyde without using mercury. The vinyl process is important in Germany because there is no lack of acetylene in Germany. Vinyl polymers have already found many uses in Germany. (Reppe, PB 13366; July 1945; 30 p.; M. 50¢; P. \$2.)

The Paint, Varnish and Lacquer Industry of Germany—German paints, varnishes and lacquers, before 1938, were similar to American products. After this date important changes developed, primarily as the result of shortages of oils, natural resins and certain pigments. Ade-

quate substitutes were found in most instances through the research and development of I. G. Farben and other firms, and through the use of domestic or "ersatz" materials. Emphasis in this report is placed on information which might be novel to American industry and which might lead to improved and less expensive protective and decorative organic coatings. The report covers the following topics: Organization and operation of the industry; raw materials; water paints and emulsion type coatings; nitrocellulose lacquers; synthetic coatings; air-dry urea and phenolic coatings; coatings for light metals and aircraft; marine paints; chemical resistant coatings; synthetic resins; lead cyanamide; and coating systems for selected items such as cans, fuel tanks and cables. Appendixes include a list of targets visited, a list of the leading wartime German manufacturers, and sources of information. There is also a drawing of a two-roll mill. (H. O. Farr, Jr., PB 15158; 1945; 66 p.; M. \$1; P. \$5.)

I. G. Farbenindustrie A. G., Auschwitz, Upper Silesia—This report on the Auschwitz project on the Vistula River, which project was never completed, contains valuable information on the projected operations by the farsighted I. G. man-



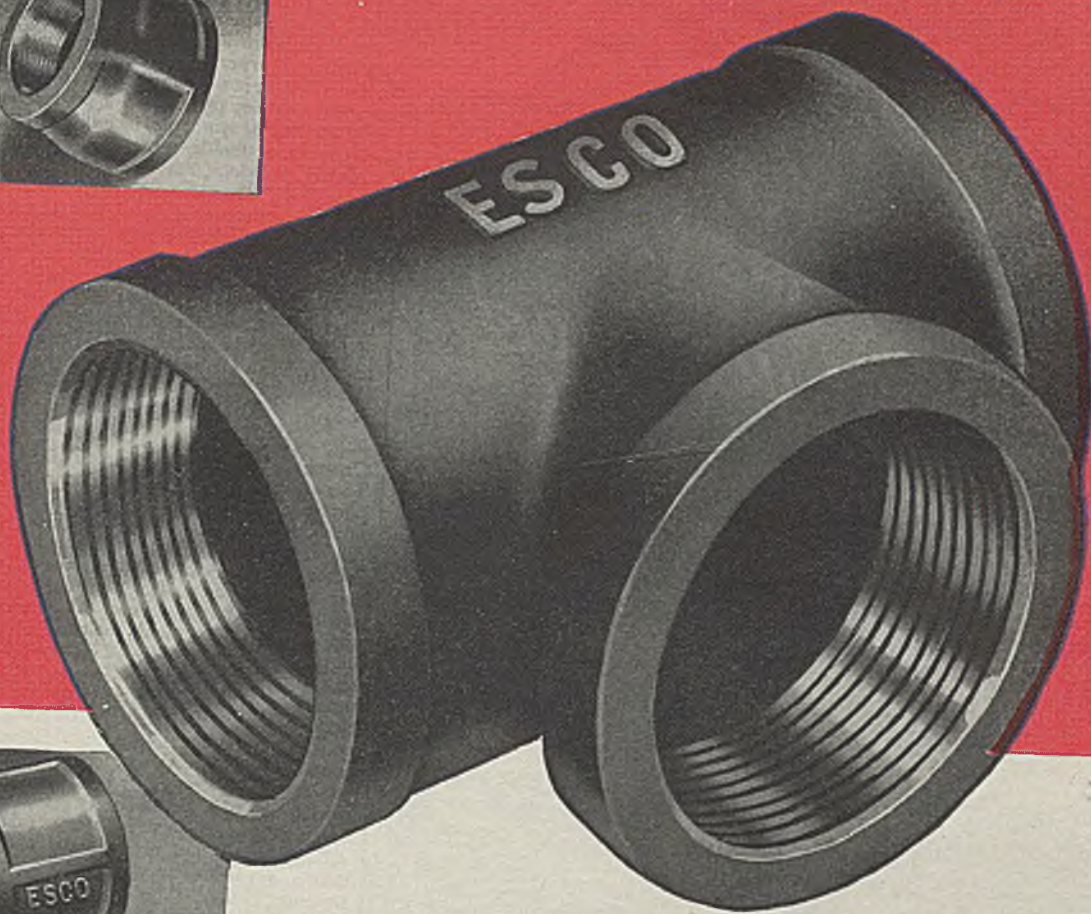
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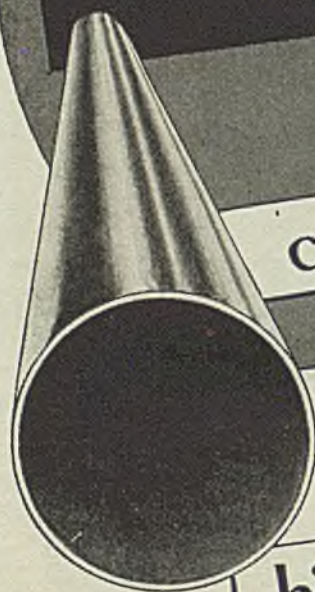
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Organization of Polymerization Information—This report is a composite of four different reports on visits made by American investigators under the sponsorship of the Rubber Subcommittee of Technical Industrial Intelligence Committee to the leading synthetic rubber plants in Germany: Schkopau, Leverkusen, Ludwigshafen, and Huls. It gives a summary of German research and development, and polymerization techniques. As early as 1926-1927 a great deal of research had been done in Germany of the polymerization of butadiene and isoprene in which the hydrocarbon was either mass polymerized or polymerized in latex emulsion. However, the efforts to duplicate the structure of natural rubber were unsuccessful. A turning point was reached when it was realized that it was not so important to synthesize natural rubber as to obtain cheaply and economically chemical substances which, while unlike natural rubber in structure, would show similar or even better qualities than others more closely related chemically to the natural product. On this basis German research and production developed in general on lines similar to those in the United States and finally resulted in the mass production of a great number of more-or-less rubber-like elastomers meeting different specifications as to tensile strength, heat and oil resistance, etc. The report gives a historical background on the development of elastomer chemistry in Germany and then describes the techniques of the different synthetic rubber plants visited. It enumerates all substances which have been investigated or actually used in elastomer production such as the dienes, vinyl compounds, modifiers, and antioxidants. It finally contains a flow-sheet of polymerization. (R. F. Dunbrook and P. S. Greer, PB 13342; 1945; 58 p.; M. \$1; P. \$4.)

The Status of Synthetic Rubber Research and Polymer Evaluation—The report covers a survey of recent research studies in synthetic rubber in Germany and reflects the opinions of German scientists looking toward improvement of synthetic rubbers. This material is the result of interviews with representatives of the I. G. Farbenindustrie at Ludwigshafen, Huls and Leverkusen, and of the Continental Gummi Werke at Hannover. The most promising research leads that were discovered are the buna 4 development and Ludwigshafen and the Redax system of polymerization developed at Leverkusen. Exhibits appended to report include: (1.) The titration of the internal and terminal double bonds in polymers of butadiene and its homologues with perbenzoic acid. (I. G. Farben, Ludwigshafen. Translation). (2.) Definition of the K-value. (3.) The heat sensitization of bunalax with legvin M-50. (I. G. Farben, Leverkusen). (4.) Preparation of buna solutions for viscosity measurements. (Translation). (5.) Leverkusen comparison of GR-S vs. German buna. (6.) Concerning fractionation of buna so-

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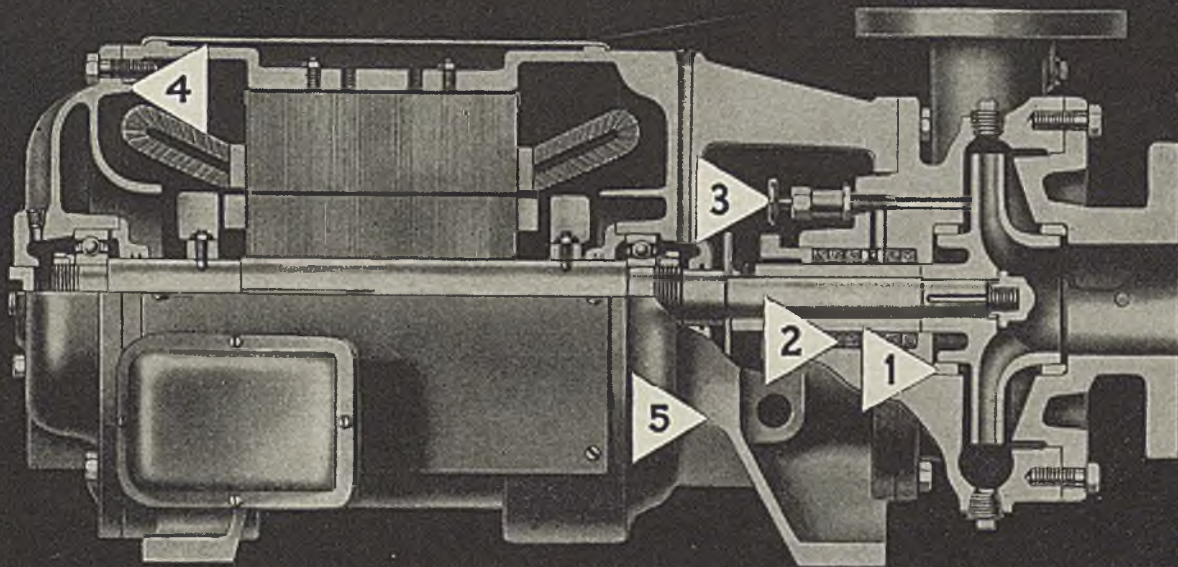
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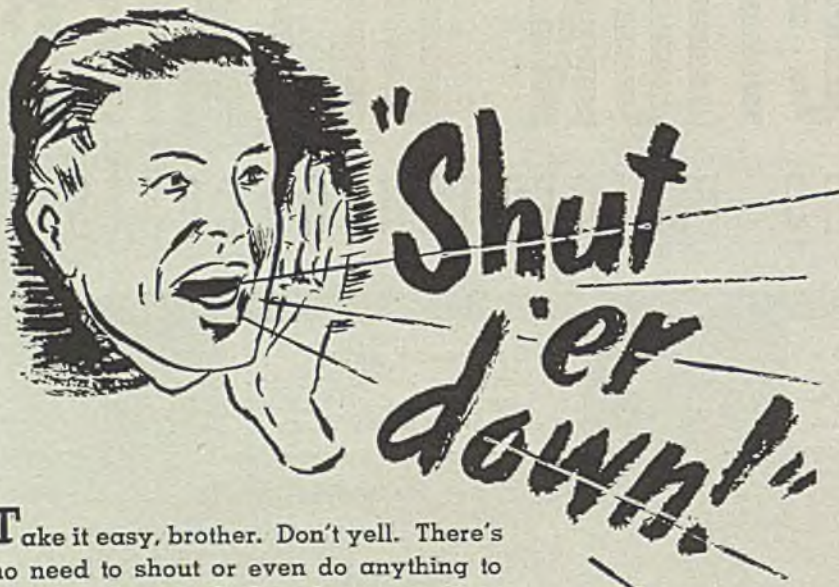
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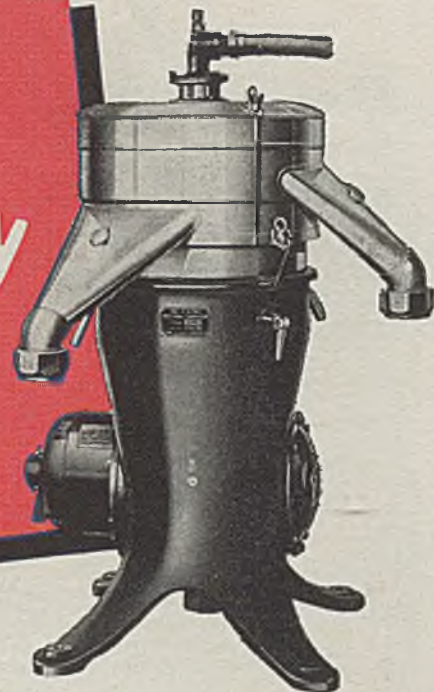
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lutions. (Translation). There is also a brief note by J. N. Street on experience with German built synthetic tires. (C. S. Marvel, PB 11193; 1945; 47 p.; M. 50¢; P. \$4.)

The Saccharification of Wood by the Bergius Process at Suddentschen Holzversucherung Werke A. G., Regensburg—Most of the wood received at this plant for saccharification by the Bergius process is in the form of small logs, about 6 ft. in length, and 6 to 8 in. in diameter. The wood is reduced to small chips in a crushing plant, and conveyed by cyclone to a revolving drum dryer, heated by waste flue gases. Wood chips with 5 percent moisture are fed into 4 batteries of acid diffusers. Each battery consists of the seven diffusers used in the complete operation of extracting the wood carbohydrates. The diffuser is a steel cylinder lined with bitumen, upon which has been superimposed two layers of acid-resisting tiles. The first diffuser is filled with a 28 to 30 percent concentration of cold hydrochloric acid. The extract is passed through the remaining six diffusers in series, and at the same time the acid concentration of 55 percent in the seventh diffuser. The extract from the seventh diffuser is returned to the first, and passed through the others in series. When it finally collects again in the seventh diffuser it is drawn off. The complete diffusion process takes 55 hr. The extract now contains 28 percent dissolved carbohydrate. Part is returned to circulation and part is conveyed to vacuum stills from which HCl in 40 percent concentration is recovered at about 40 deg. C. At 60 percent solution of carbohydrates containing about 3 percent of HCl remains in the still. This solution is diluted with water to a carbohydrate concentration of 20 percent and the sugars are inverted at 130 deg. C. Thereafter the system is neutralized with calcium hydroxide or ammonia and diluted to a sugar concentration (i.e., total reducing substances) of 3 percent. The yield of sugars by this process was stated to be 60 percent of the dry weight of the original wood. Manufacturing processes for producing yeast, yeast extract and yeast spice are described. The albumin containing preparations are made by extracting the cellulose from the wood with muriatic acid. The muriatic acid is then removed from the wood sugar solution in a vacuum damping plant, and afterwards the product is neutralized and cleaned by active cold. The sugar in this cleaned wood sugar solution consists of about 70 percent dextrose, the remaining 30 percent consisting of xylose, arbinose, mannose and galactose. This sugar solution serves as the main food for the breeding of yeast, although the following food salts are also added: Diammonium-phosphate, ammoniac, potassium chloride, magnesium sulphate. Utilization of the ligneous residue (lignin) left in the diffusers is discussed. It can be made into lignin briquettes or used as a manure and soil improvement remedy, or in the manufacturing of medicinal coal. (W. G. Campbell and H. J. Bunker, PB 18897; Aug. 1945; 11 p.; M. 50¢; P. \$1.)

The Synthesis of Fluorine-Mica of the Phlogopite Group; Crystallochemical and Microscopic Investigations of Synthetic Phlogopites; and Regular Intergrowth of Synthetic Phlogopite With Hydrus Mica—This is a series of three reports on synthetic mica research by Dr. W. Eitel and co-workers of the Kaiser Wilhelm Institute for Silicate Research at Berlin-Dahlem and Ostheim Rhoen, Germany. A process for the production of synthetic mica on a laboratory scale was developed. In PB 20530 practical details involved in the synthesis are set forth. Potash-magnesia mica and barium mica were made in small crucibles. To produce well oriented crystals, particular importance was placed on well regulated temperatures, gradient in a vertical direction during the first of the cooling period and a magnetic field surrounding the crucible in a horizontal direction. In PB 20531, the basic crystallographic theories are discussed with complete descrip-

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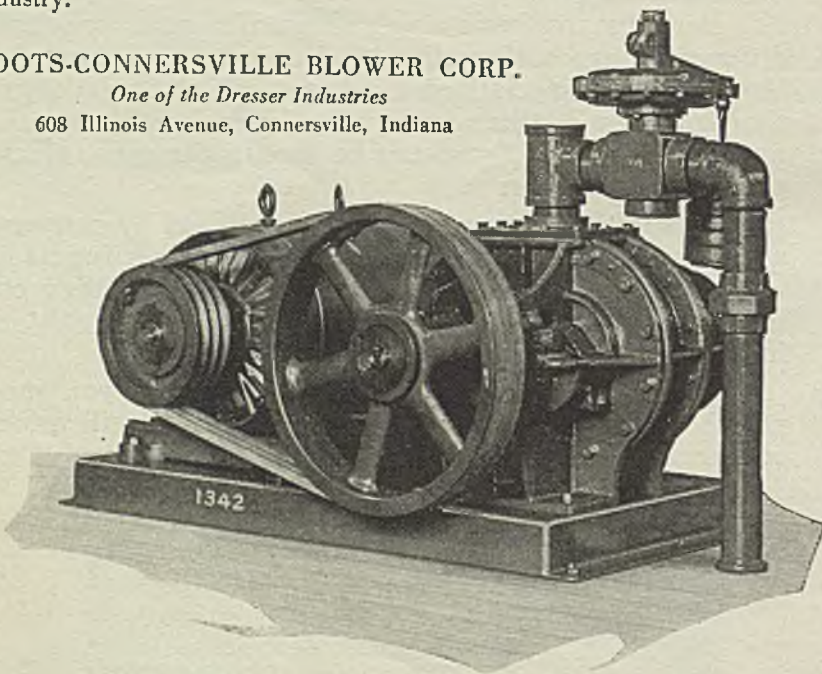
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tions of the results of various melts in the phlogopite series. PB 20532 gives the results of crystallographic studies of synthetic phlogopite and rules governing intergrowth of phlogopite and humite crystals are derived. Included are tables, diagrams and explanatory photo-micrographs. (W. Eitel, PB 20530; Mar. 1946; 41 p.—PB 20531; Mar. 1946; 32 p.—PB 20532; Mar. 1946; 34 p.—M. 50¢; P. \$3 each.)

Process for Manufacture of Hydrogen Peroxide—

This is a microfilm of documents, graphs, drawings and correspondence in the development and amelioration of hydrogen peroxide, diesel oil and other fuels. All were considered by the Germans as very secret. Among the papers dealing with hydrogen peroxide is the official paper granting a patent in 1941. However, there is also included the material leading to the patent development of the process beginning in 1935 and extending beyond the patent date of 1941 to 1944. Although the patent is granted to I. G. at Frankfort, most work appears to have been done on hydrogen peroxide at Ludwigshafen under the direction of a Dr. Pfeiderer. The Renal distillation process is emphasized. The main body of the microfilm consists of reports of development of substitute fuels and the increasing of efficiency of established fuels. The Germans tested the combustibility of various fuels with which they mixed tetranitromethane in varying proportions. Directions and recommendations for transport and storage and properties of fuels were carried out and are reported. The work carried out by I. G. in their various fuels research investigations interested the Army, Navy and Air Forces and correspondence between I. G. and these army branches is also part of the film. There is also included a bibliography used by the investigators on certain phases of the research. (I. G. Farbenindustrie AKT.—GES., PB 16409; 1944; 264 p.; M. \$3.; enlargement print \$18.)

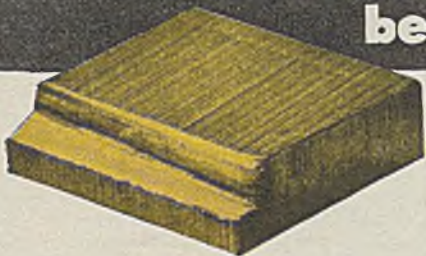
The Light Metals Industry in Germany—This guide prepared by the Foreign Economic Administration covers this subject under the following headings: I. Introduction; II. Development of the German aluminum industry; III. German penetration of the European aluminum industry; IV. Development of the German magnesium industry; V. Light metals alloy manufacture and fabrication; VI. Wartime controls over the German metal industry; VII. Organization of the German light metals industries; VIII. International organization of the light metals industries; IX. Recommendations. Appendix A, technology of manufacture and uses of the light metals; appendix B, electric energy sources of the German light metals industry; appendix C, light alloy manufacturers and fabricators; appendix D, leaders in the German light metals industry; appendix E, organization of the international aluminum cartel. Tables of statistics and a map showing location of German controlled aluminum, alumina and magnesium plants are included. (U. S. War Department; PB 16948; May 1945; 138 p.; M. \$1.50; P. \$10.)

Possible Production of Protein Yeast From Wood Sugar in the U. S. Occupied Area in Austria as Proposed by Dr. Bergius and Also Other Possibilities—This report is concerned with various possible methods of producing protein yeast from wood sugar in the United States occupied area in Austria. American authorities had decided not to approve or sponsor such a plan but since it was realized that there was a possibility that the Austrian government might consider supporting some such plan it was decided to submit the material which was available on the subject. Three proposals are submitted with this report. The first proposal, made by Dr. Friedrich Bergius, proposed the use of the sulphite pulp and zellwolle factory, Lenzing, to produce wood sugar from sulphite pulp by means of the Bergius concentrated hydrochloric acid process and to convert this sugar into protein yeast. It also proposed to produce from the waste pulping liquors of the sulphite pulp mill, a product

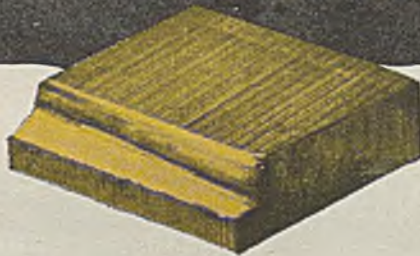
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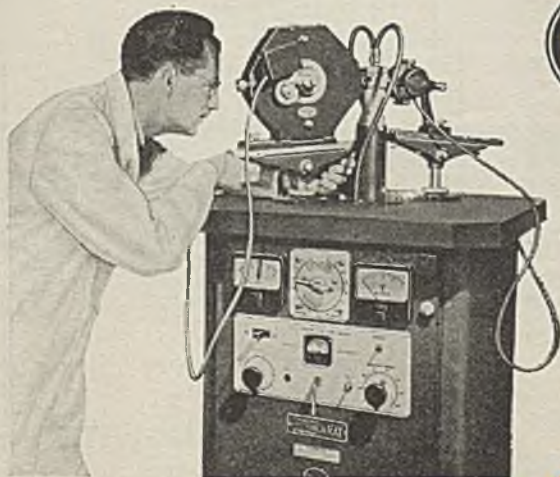


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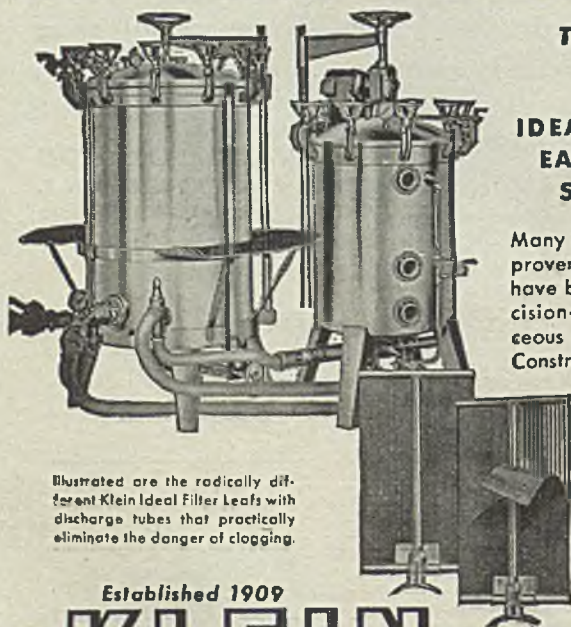
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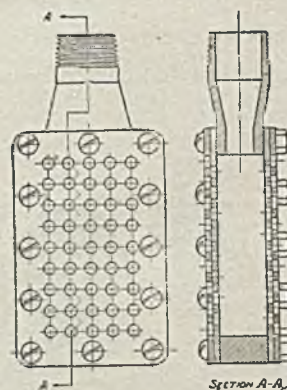
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known as Biosyl-protein. The second enclosure to this report, dated Aug. 7, 1945, describes the facilities available for micelle production. The third report is concerned with yeast-making from whey by the Waldhof method. Advantages and disadvantages of each proposal are discussed. (Carlile P. Winslow, PB 10874; Oct. 25, 1945; 18 p.; M. 50c; P. \$2.)

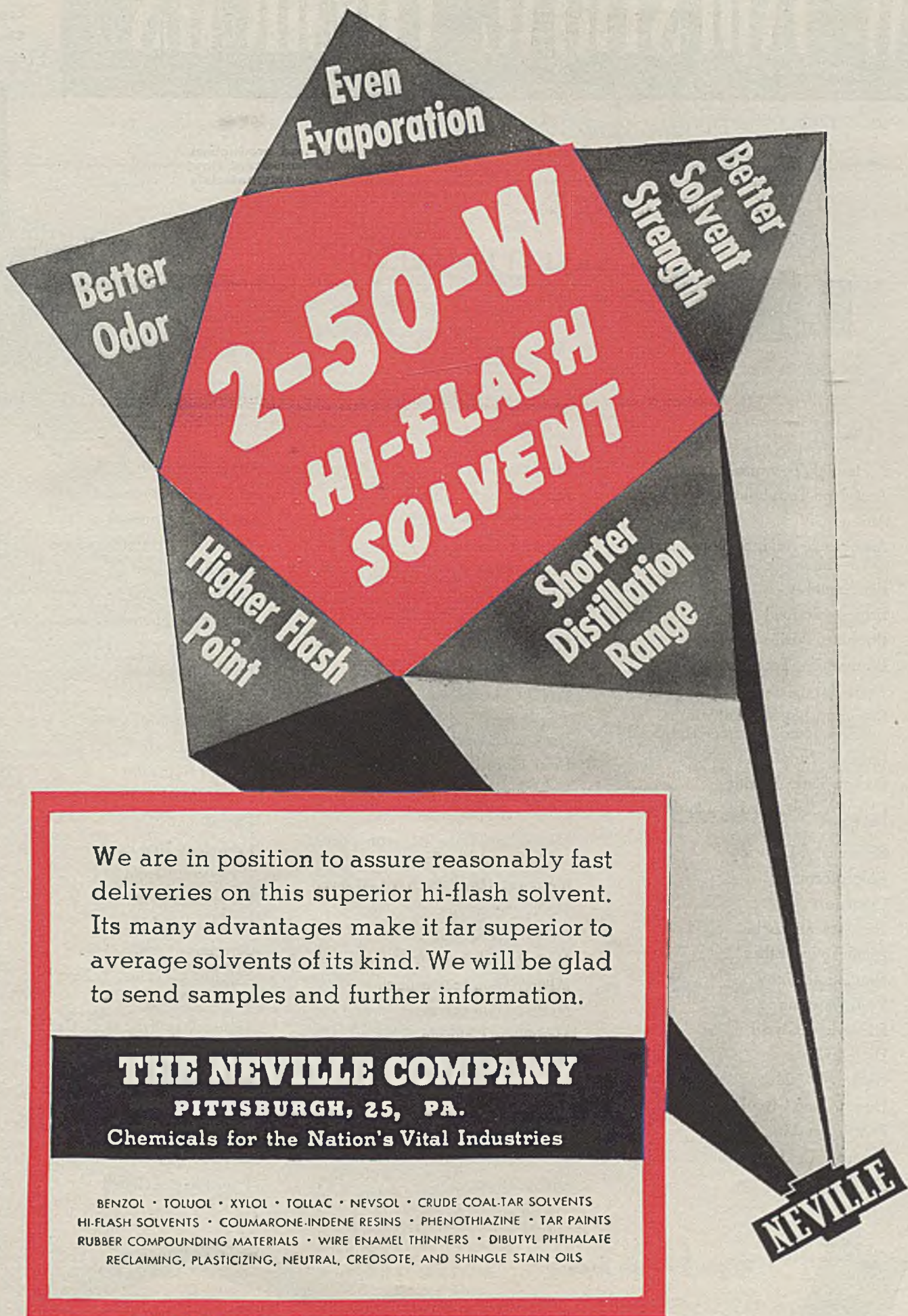
Production of Phosphate Fertilizer by Sintering of Phosphate Rock With Sodium Sulphate and Lignite—Production trials in a pilot-plant at the works of the Lurgi Gesellschaft, Frankfurt a. Main, and agricultural trials of the subject fertilizer (known as "Lubeck" phosphate) had been made and were favorable, with one exception. The process had not been developed on a commercial scale, and the firm had not decided before the war whether to pursue it or not. The basis of the process is to burn a mixture of phosphate rock, sodium sulphate and brown coal in a reducing atmosphere. The nature of the reactions is not clear but the sulphate is reduced to sulphide sulphur, and this is apparently combined in a calcium sodium phosphate with partial replacement of oxygen by sulphur in the phosphorus pentoxide. The formula tentatively suggested is $\text{CaO} \cdot \text{Na}_2\text{O} \cdot \text{P}_2\text{O}_5 \cdot \text{S}_2$, though the possibility that the sulphur may occur in the manner of apatite is not excluded. Tests indicated that neither calcium nor sodium sulphide were present in the product and that if sulphide sulphur was removed from the product by treatment with dilute sulphuric acid the solubility of the phosphorus acid in ammonium citrate was much reduced. A report, No. 1597, Nov. 19, 1936, of the Technisches Sekretariat of the Metallgesellschaft, gives details of the experimental work carried out in the laboratory and in small experimental kilns. Extracts from this report on the decomposition of phosphate with sodium carbonate and carbon are presented in the appendix. (J. R. Haes and F. M. Lea, PB 18915; Aug. 1945; 13 p.; M. 50c; P. \$1.)

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Paradibrombenzene
Paraphenylphenol
Para Tertiary Butyl Phenol
Perchlorethylene
Phenol
Phenol Sulfonic Acid
Phenyl Acetate
Phenyl Hydrazine
Phenyl Methyl Pyrazolone
Phthalimide
Propylene Dichloride
Propylene Glycol
Propylene Oxide
Sodium Sulphide
Styrene
Sulphur Chloride, Yellow
Sulphur Monochloride
Tetrachlorethane, Ind. Grade
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Phosphoric Acid vs. Materials of Chemical Plant Construction—Part II

This is Part II of a symposium designed to outline the usefulness of various representative materials in phosphoric acid service.

The symposium will be concluded next month.

RUBBER LINING

O. S. TRUE

U. S. Rubber Co.
New York, N. Y.

RUBBER linings have been extensively used in the manufacture, storage, and distribution of phosphoric acid.

Insofar as storage and distribution is concerned, the principal problem has been the prevention of product discoloration. Many rubber compounds impart a considerable degree of color to phosphoric acid solutions, but it has been found that relatively pure gum stocks prepared with especial control of antioxidants impart little color and result in an entirely satisfactory lining material. Soft rubber stocks as described above are entirely suitable for handling acid up to 85 percent concentration and at temperatures up to 150 deg. F.

For process work in connection with preparation of phosphoric acid, higher temperatures are encountered, and where slight obvious discoloration is not objectionable, semi-hard rubber stocks can be used which permit somewhat higher temperatures, with 180 deg. F. felt to be the safe maximum.

For process work involving extreme high temperatures, it is possible to protect the rubber lining with an inner lining of acid-proof brick. In such cases the operating temperature and the temperature gradient through the brick should be controlled so as to limit the maximum temperature at the face of the rubber to approximately 180 deg. F. There are numerous successful installations employing this type of construction.

With regard to the synthetics—GR-S (buna-S), GR-M (neoprene), GR-A (buna-N, perbunan), and GR-I (butyl)—these materials have not been extensively used commercially for handling phosphoric acid. GR-S is unsuitable for this service due to the presence of antioxidant used in the preparation of the raw material, which results in excessive discoloration. GR-M compounds have been prepared which compare very favorably with natural rubber insofar as discoloration of product is concerned, and tests indicate that linings of this material should be entirely satisfactory. The GR-M linings carry a preferential price which has

tended to limit the use of this material. GR-I compounds have been prepared which are non-discoloring and which give satisfactory test results. Restricted availability of this material has precluded its commercial use. Preliminary tests with GR-A indicate that satisfactory linings of this material can be developed.

By far the majority of experimental and commercial work in connection with phosphoric acid has been done with natural rubber. Natural rubber linings have proven entirely satisfactory for the service requirements within the limits specified above, and based upon reasonable availability will probably continue to be the standard material used for this service.

Tests also indicate that GR-M and GR-I compounds are suitable for the service requirements. These tests to date have been confined to determination of degree of discoloration of product, although it is probable that the materials will be satisfactory for the concentration and temperature limits defined above.

TANTALUM

FREDERICK L. HUNTER

Fansteel Metallurgical Corp.
North Chicago, Ill.

TANTALUM is inert to pure phosphoric acid in any concentration at temperatures up to 175 deg. C. However, it is not resistant to the contamination which commonly occurs in phosphoric acid, namely, fluorides.

Where the fluorine concentration is below 10 ppm., tantalum can be used safely and profitably for heat transfer surfaces in phosphoric acid. Where fluorine concentration is greater, rapid embrittlement will take place, followed by pitting in two or three months, the rate of embrittlement and pitting being proportional to the fluorine concentration. An appreciable concentration of sulphur trioxide in phosphoric acid is also damaging to tantalum.

Where these contaminants are not present, aeration, concentration or the presence of other impurities such as arsenic have no effect on tantalum.

Tantalum bayonet heaters have been used successfully for heating phosphoric acid of low fluorine content in the processing of the

acid to eliminate impurities. Overall coefficients for heating phosphoric acid with steam range between 600 and 1,000 Btu/sq.ft./deg. F/hr., depending upon the temperature and concentration of the acid.

Tantalum heaters are particularly appropriate for the production of food grade acid, not only because tantalum is insoluble in phosphoric acid, but because any particles of tantalum which might get into the acid accidentally would have no detrimental effect in the human body.

STAINLESS STEEL

H. C. ESGAR

Carnegie-Illinois Steel Corp.
Pittsburgh, Pa.

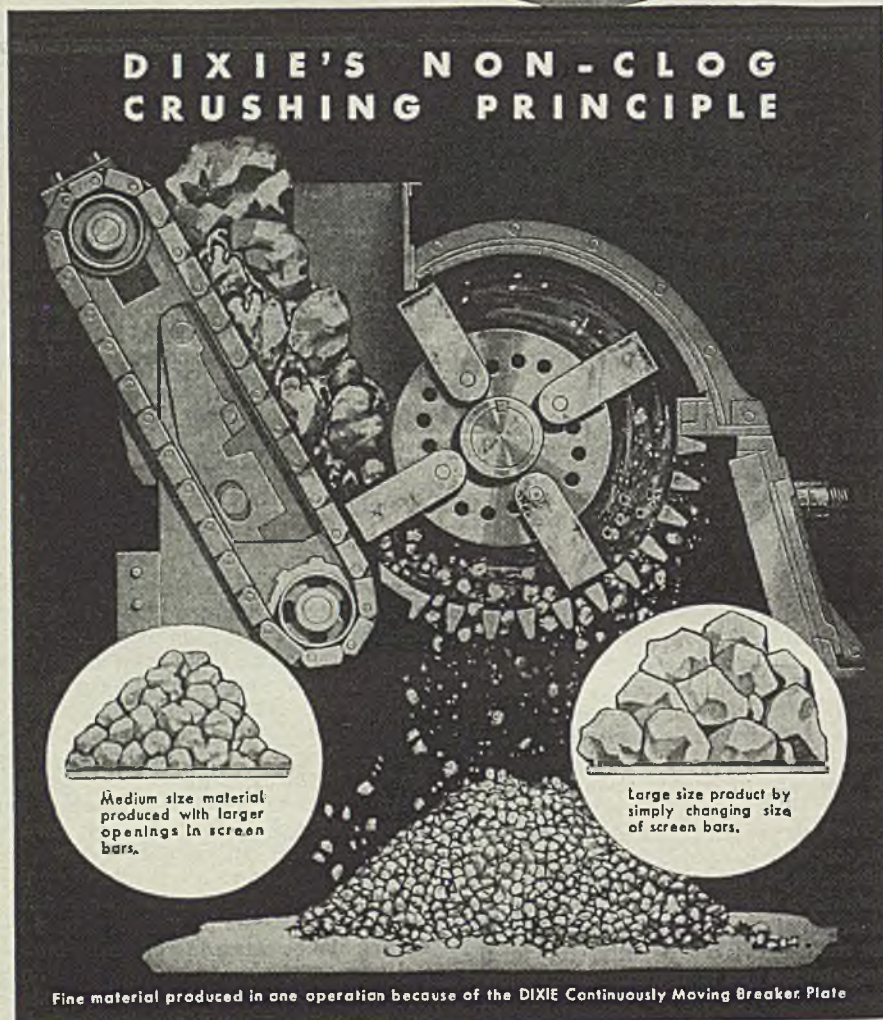
PHOSPHORIC ACID is classed as a borderline material with regard to its effect upon stainless steel. That is, in many cases stainless steel can be used with entire satisfaction, but in others serious corrosion difficulties are encountered. The corrosion resistance of stainless steel is believed to be due to the presence of a very thin, continuous, transparent film of oxide which forms naturally when the clean metal is exposed to the atmosphere and which, because of its continuity, prevents further attack on the metal underneath. Any reducing reagent, unless inhibited, will attack this film, while oxidizing agents will cause its renewal should the existing film be abraded or otherwise broken.

Under properly controlled conditions, however, most phosphoric acid products can be handled safely in stainless steel. Difficulties increase, of course, as the concentration increases. Temperature also aggravates the problem, particularly when the material is agitated. Ordinarily, stainless steel should be used only when temperatures do not exceed 200 deg. F.

The fluorides normally present in the phosphate rock which is burned to produce the raw phosphate used in the industry represent a major source of trouble in connection with stainless steel. These fluorides must, therefore, be either fully neutralized or eliminated from the phosphoric acid before it can be processed successfully in stainless steel equipment. This precaution applies to all phases of phosphoric acid manufacture or use, whether it be in baking powder or in fertilizer. Another precaution which must be observed in phosphoric acid manufacture is that filtering agents such as charcoal or diatomaceous earth be confined to the filtering process and equipment. Experience shows that if even minute particles of such filtering agents pass the filter system they will tend to settle out on the sides or bottoms of subsequent equipment and through an apparently catalytic action on the oxide film cause corrosion underneath.

This action, as well as other corrosive at-

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tack, may be minimized by maintaining stainless steel surfaces in a scrupulously clean condition. A polish of at least No. 4 Finish facilitates cleaning operations. The degree of polish apparently plays an important part in maintaining a more uniform and contiguous oxide film on stainless steel and experience shows that such a surface is most resistant to corrosive attack by phosphoric acid and its products:

Type 316 stainless steel (16-18 percent Cr, 10-14 Ni, 1.75-2 Mo, and not more than 0.10 percent carbon) has been found to be most resistant to corrosive attack by phosphoric acid and has been used successfully for storing and manufacturing the C.P. product as well as certain non-C.P. grades in which the fluorine content has been controlled. Type 304 stainless (carbon held to 0.08 percent max., with 18-20 Cr, 8-10 Ni) has been found satisfactory, when polished, for storing 85 percent cold phosphoric acid or for handling concentrations up to 5 percent in various phases of the manufacturing processes. There are occasionally uses where the 321 or 347 stabilized grades may be applied. The ordinary Type 302 should not be used in any phosphoric application. In any application, moreover, the engineering, as well as the chemical and metallurgical aspects of the installation should be checked before using stainless steel.

Good engineering design is essential to the successful use of stainless steel in the phosphoric acid industry. Flanged and dished heads are always to be preferred over flat plate heads which involve corner or fillet welds. Where rectangular units are necessary, it is preferable to bend the plates so as to bring the welds out away from the corners so that they may be dressed and polished to best advantage.

Fusion arc welding, normally with reversed polarity, under carefully controlled conditions to avoid porosity and inclusion of slag or oxide particles has been found acceptable for fabricating stainless steel units of various types for use with phosphoric acid. Coated electrodes of a composition such as to deposit weld metal equivalent to the stainless steel being fabricated should always be used. All welding flux must be carefully removed between successive beads and after the final bead has been deposited and the weld should be dressed flush and polished to agree with the original finish on any stainless steel surfaces subject to corrosive attack. Whenever possible, the finished article should be annealed before using.

In the grinding and polishing operations, good quality iron-free abrasives must be used in the several grades necessary to bring the weld area to the same degree of finish as possessed by the original sheet, and the whole unit passivated before being placed in service. The usual procedure for passivation is to immerse the unit in a 10-20 percent by volume solution of commercial nitric acid (sp.gr. 1.42) for 15-20 min., the solution being maintained at 130-140 deg. F. This is followed by thorough rinsing in clean hot water. If the size, shape, or location of the unit prevents immersion, the same result can be obtained by swabbing the surface with the hot acid solution and rinsing.

Summary—Stainless steel, preferably Type 316, has been used successfully in practically all stages of the manufacture and processing of phosphoric acid and its products after the rock has been burned. Typical applications

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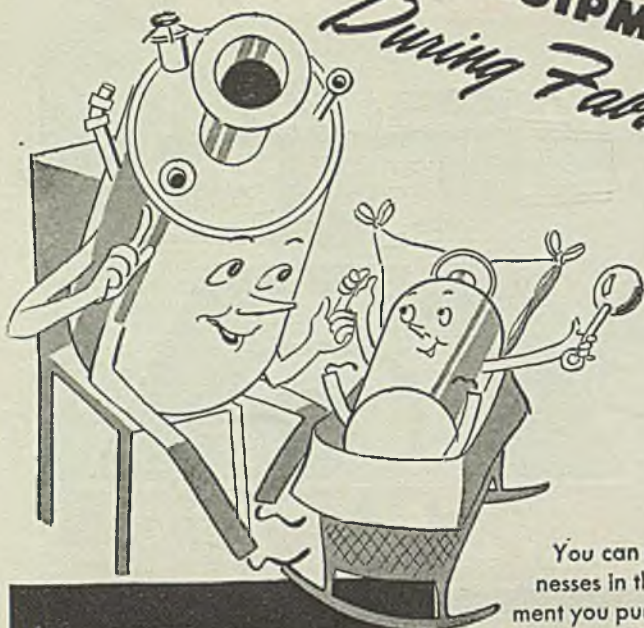
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During Fabrication

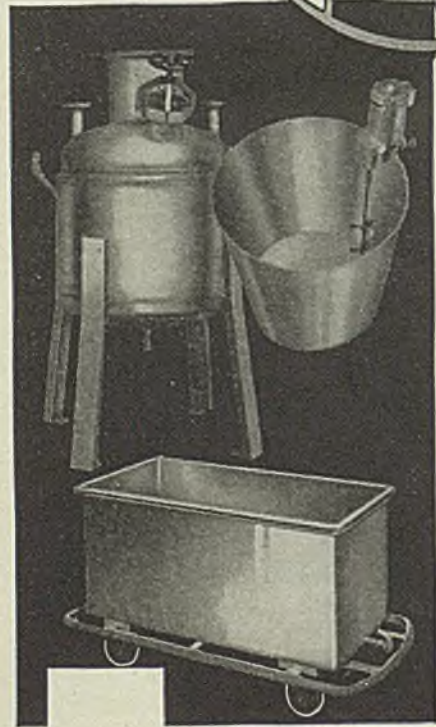


You can avoid hidden weaknesses in the processing equipment you purchase by selecting a fabricator with specialized experience in working with this alloy. Stainless steel is a tricky metal to work. When you bend it, form it, weld it, your fabricator must use shop procedures that safeguard the original properties of the metal. And he must have the plant machinery, engineering skill, and trained manpower to carry out these protective procedures.

As custom builders of processing equipment working exclusively with stainless steel alloy—we offer this specialization to our customers. It assures you processing equipment with no hidden weaknesses—equipment that lasts longer, works more efficiently for your application. Consult with us.

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include collectors of various types, purification, filtration and concentration units, and storage units of varying shapes and sizes. This material has also been used successfully for some piping installations with flanged joints or approved sanitary fittings having ground joints, such as are customarily used in the food industries, many of which utilize phosphoric acid or its products in some phase.

It is impossible to make blanket recommendations as to specific applications of stainless steel in the phosphoric acid industry other than to say that Types 316 and 304 have proved most useful. Ordinarily it is advisable to conduct individual tests and to seek competent technical advice before starting fabrication. Because of varying techniques and problems of manufacture, conditions will vary from plant to plant. As a result, what may seem to be apparently comparable units or applications may actually be exposed to radically different conditions.

VINYL PLASTICS, PAINT*

D. F. SIDDALL

U. S. Stoneware Co.
Akron, Ohio

ONE OF THE virtues of modified vinyl resins is their resistance to phosphoric acid in both dilute and concentrated solutions. Immersion tests have indicated that the percent gain in weight in 7 days immersion, in 50 percent phosphoric acid at room temperature is 0.05 to 0.08, whereas at elevated temperatures (140 deg. F.) under the same conditions, the percent gain in weight is 0.12 to 0.18. The above mentioned figures hold true for practically all concentrations of phosphoric acid from dilute to sirupy concentrations. Not only will vinyl-base resins resist phosphoric acid, but it provides an impermeable barrier to phosphoric acid, allowing none of it to be transmitted through the material and thus preventing any contamination or corrosion of the protected equipment. For protection of equipment involving processing or use of phosphoric acid, vinyls may be used either in the form of a $\frac{3}{8}$ in. sheet lining material bonded to the metal surface, or as a liquid to be applied in the same manner as paint. It is recommended that vinyl paint be used primarily for exterior protection of tanks and structural steel, with the heavier lining material being used for tank interiors.

Conditions of Operation—In recommending the vinyls for phosphoric acid, the only limiting condition is one of temperature. While the maximum temperature recommended for linings is 175 deg. F., this temperature limit, in the case of linings, can be extended as much as 50 deg. F. by oversheathing with a single or double course of acid brick. The oversheathing provides a temperature gradient between the solution temperature and the lining temperature. Temperatures above 250 deg. F. will cause the lining to soften and will hasten chemical reaction.

In solutions of phosphoric acid involving the development of byproducts, or in solu-

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S. BLICKMAN, INC.
Guards Alloys in Fabrication

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* Dr. Siddall's discussion is based on the performance of his company's product, Tygon. Because of variations in compounding methods, the products of the several manufacturers producing vinyl-base materials will show variation in their resistance to phosphoric acid. Therefore, the properties outlined here should be construed as applying strictly to Tygon but only approximately to other vinyls.—Ed.

Hy-lo Crimp



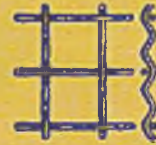
Flat Top Crimp



Double Crimp



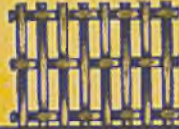
Intermediate Crimp



"Roe-ton" Mesh



"Roe-ton" Mesh



Dutch Weave
Filter Cloth



"Jersey" Stranded
Filter Cloth

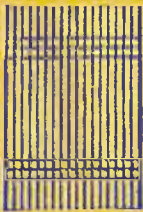


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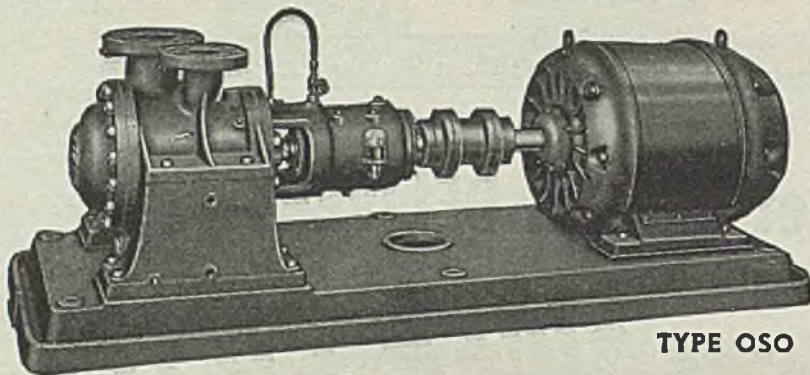
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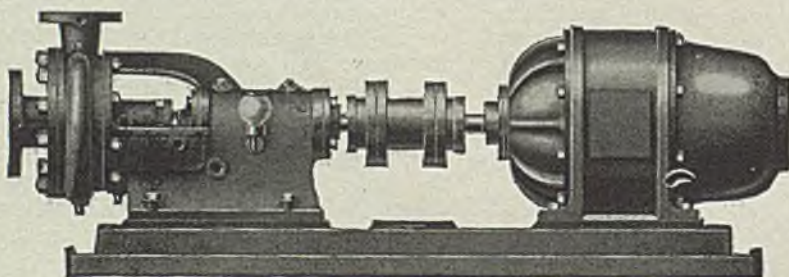
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tions where phosphoric is but a part of the solution, tests should be made to determine the affect of the byproducts as they may adversely affect the ability of the lining to resist the acid.

Aeration in the solution does not influence the ability of vinyl linings to resist the acid, inasmuch as oxidation has no affect on the lining either below or above solution level.

Installation—Sheet lining material may be applied in the field or at the factory, depending on the size of the equipment and the type of installation. Welded steel construction with ground welds is preferable. In the application of linings all seams are "heat-sealed" forming a continuous one-piece lining.

Paint is applied in the conventional manner by spray gun or brush to metal, wood or concrete surfaces. The conventional rules of surface preparation should be followed. Usually an application of primer and two or three finish coats of paint are sufficient, although additional finish coats may be used where corrosive conditions are severe.

Uses in Phosphoric Acid—In the heavy chemical industry, the vinyls may be used wherever phosphoric acid in any concentration is processed. They have a definite application in the manufacture of phosphoric acid by either the Dorr strong acid process, the electric furnace process, or the blast process. Equipment suitable for protection with vinyl linings include spray tanks, purification and slurry tanks, wash tanks, filters, storage tanks, mixers and absorption towers. Wherever elevated temperatures are encountered, brick sheathings should always be considered as a margin of safety.

In the metal finishing industry, wherever phosphoric acid is used in cleaners or in metal preparation, the equipment may be completely protected by the use of vinyl linings.

In organic synthesis and processes involving organic chemicals and phosphoric acid, caution must be exercised in the use of vinyl linings, due to the byproducts formed which may exert a solvating effect on the lining. Solvents such as ketones, esters, chlorinated hydrocarbons and aromatic hydrocarbons tend to swell or dissolve vinyl linings. Processes involving phosphoric acid and alcohols, ethers and aliphatic hydrocarbons may be handled safely. The above information applies equally to the salts of phosphoric acid in any concentration, again the services being subject to the maximum temperature limitation.

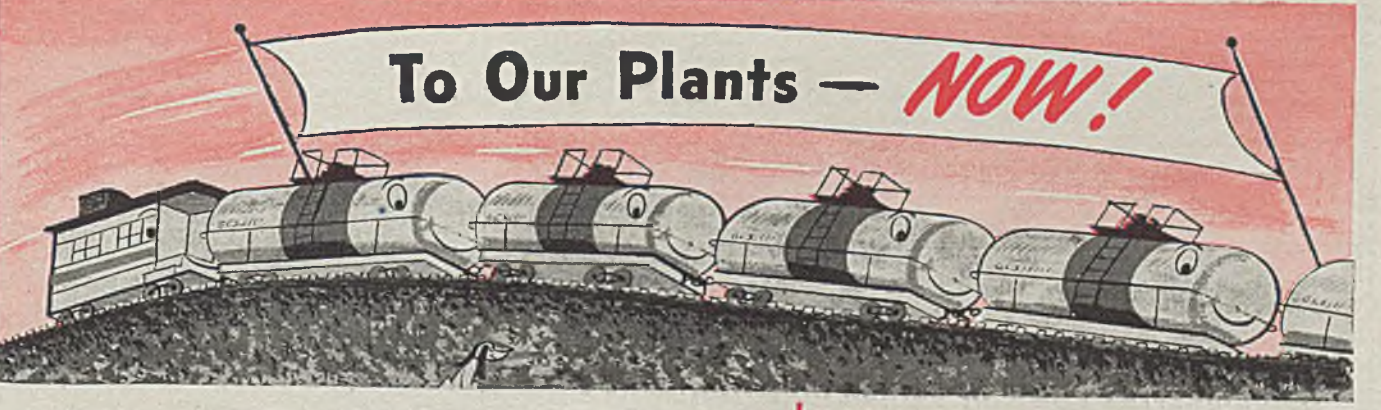
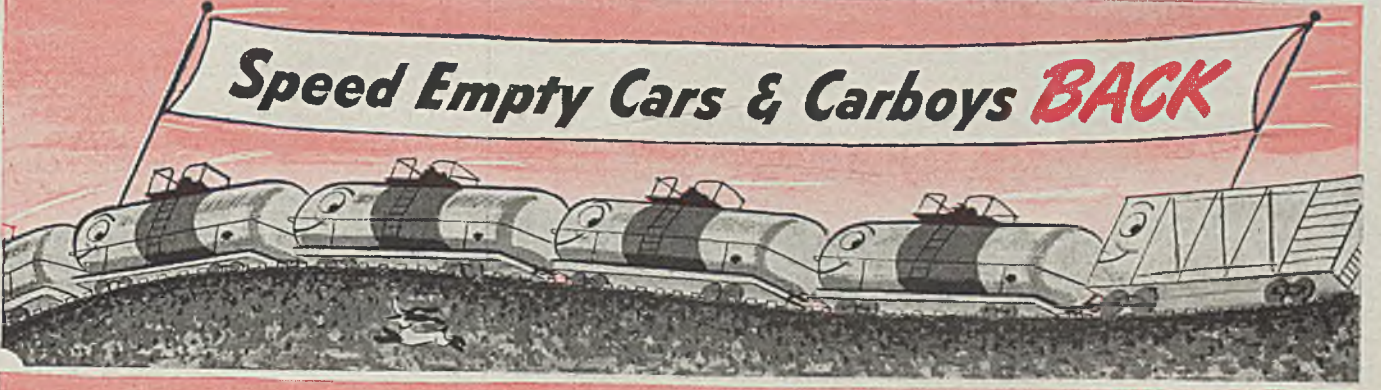
In some cases, vinyl-base paint may be used to protect equipment from phosphoric acid, wherever temperatures are not encountered. It is not recommended that paints be used to build up a lining on the interior of a processing tank wherever agitation or temperature is encountered. In dilute acid and normal temperatures, a built-up coating of six to eight coats will serve for mixing, storage or shipping. The paint may be applied to new porous wood tanks, or to properly constructed concrete storage tanks.

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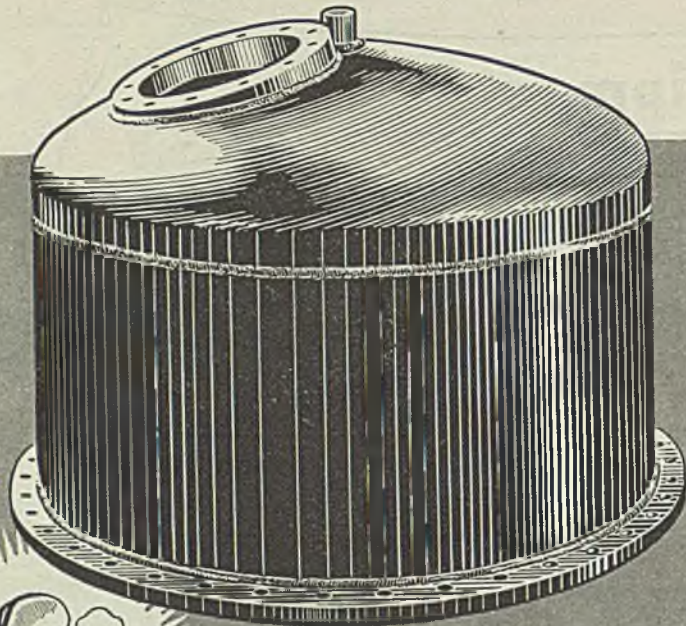
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acts to some extent with phosphoric acid. This reaction is negligible at ambient temperatures and therefore, chemical stoneware equipment is suitable for use with phosphoric acid under these conditions. In fact, it may be stated that under ordinary industrial conditions the action of phosphoric acid on silica is not sufficiently great to render its use inadmissible due to the fact that reaction occurs at temperatures greater than those at which chemical stoneware is commonly used.

Experience has shown that temperatures greater than 80 deg. C. should not be exceeded, although a search of the literature indicates that severe deterioration does not occur under 150 deg. C. If the temperature limitation is adhered to, any concentration may be used.

The use of chemical stoneware in the manufacture of phosphoric acid is limited, although at least one case is known where a bell-and-spigot tower 40-in. in dia. has been used for this purpose. Generally speaking, it is only in the handling operations such as pumping, storage, and mixing that chemical stoneware is used. Typical equipment for this purpose are chemical stoneware pumps, cylindrical vessels, rectangular tanks, and both conical flange and bell-and-spigot piping.

The use of chemical stoneware with phosphoric acid may be summed up by stating that temperatures over 80 deg. C. should not be exceeded, that any concentration may be handled at these temperatures, and that its main use is for handling equipment such as pumps and vessels.

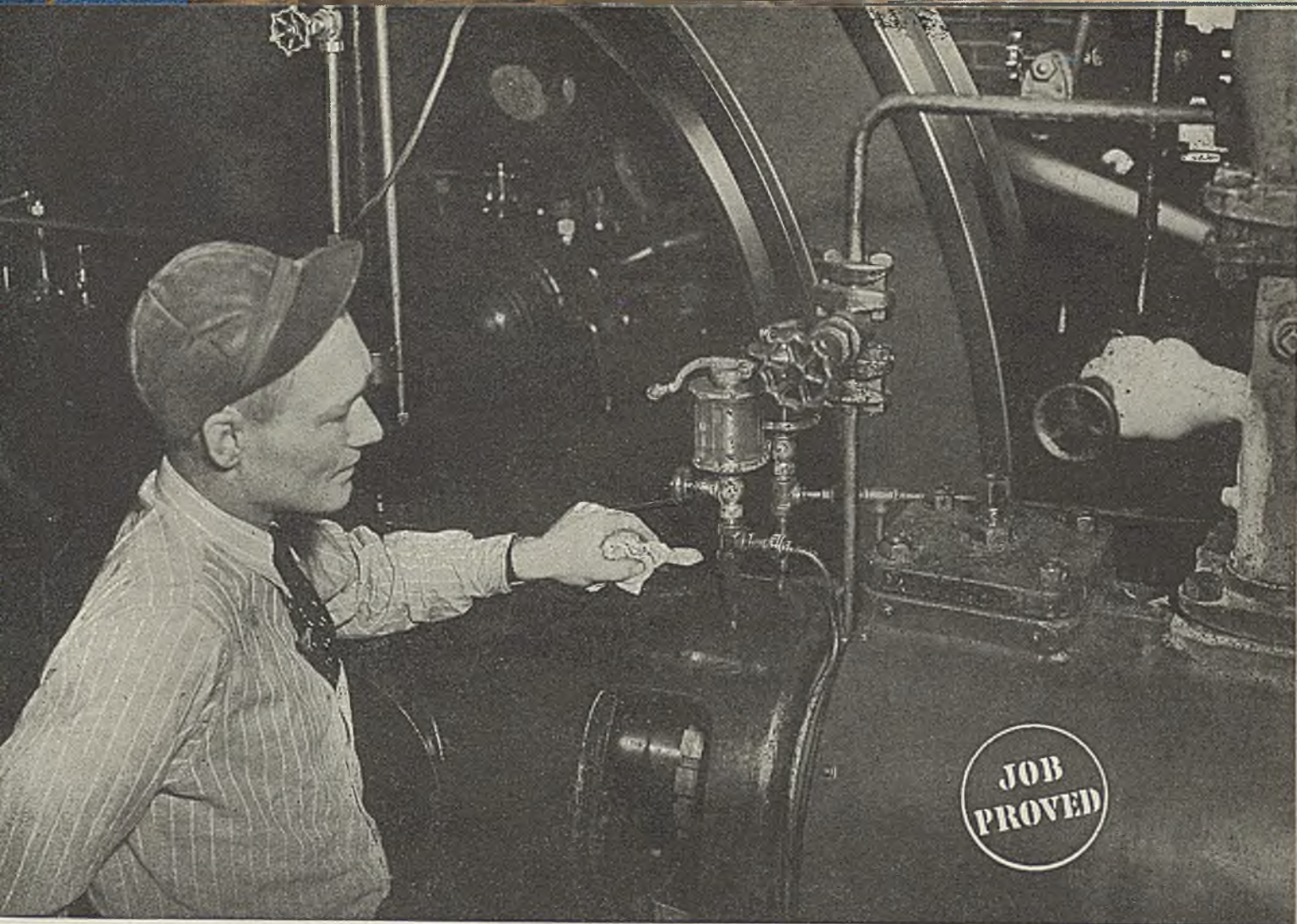
COPPER, COPPER-ALLOYS

C. L. BULOW
Bridgeport Brass Co.
Bridgeport, Conn.

COPPER and copper-base alloys are successfully used in the form of heat exchanger tubing, piping, fittings, etc., although the corrosion rates are comparatively high. From the standpoint of construction, many of these copper alloys can be welded using welding rod of the same composition which gives a weld having approximately the same corrosion resistance as the adjacent material.

Since all of the corrosion accelerating factors discussed may vary from one plant to another, it is advisable to conduct preliminary service or field tests under actual operating conditions before using large quantities of copper alloys. In this way, consideration can then be given to the possible effect of all these corrosion accelerating factors. Selection of the most suitable material for use in a chemical industry is dependent upon several factors, such as (1) the availability of the materials in the proper form, (2) life expectancy, and (3) cost. Since some of the copper-base alloys discussed here are not available in all the forms needed in a chemical plant, the availability of any promising alloy in the desired form and size should be checked before it is given serious consideration.

Effect of Alloy Composition—Some of the available data on the corrosion resistance of copper and a number of copper alloys will be found in accompanying tables. For ease of comparison, the data have been broken down into five groups covering the most common copper-base alloy systems, namely:



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Manufacturer of All Kinds of Wire Cloth Since 1869

482 TERRACE

BUFFALO 2, N. Y.

Rates of Corrosion of Copper in Pure Phosphoric Acid

Acid Conc. %	Temp., Deg. C	Corrosion Rate, Mills Per Yr.	Degree of Aeration ²	Type of Test ³	Reference
6.5	20	22	Q	L	(6)
6.5	20	148	Q	L	(6)
8.4	20	310	W	L	(7)
10	65	1	S	F	(2)
10	65	5	S	F	(2)
10	80	79	S	L	(4)
25	80	86	Q	L	(4)
25	95	17	Q	L	(4)
25	95	338	Ar	L	(4)
42	95	355	Ar	L	(5)
42 ¹	20	16	Q	L	(3)
42 ¹	20	48	Q	L	(3)
60	80	35	Q	L	(4)
76	20	8	S	F	(3)
76	60	10	S	F	(2)
78	85	10	S	F	(2)
85	20	1	S	L	(1)
85	95	6	S	L	(1)
85	95	5	S	L	(4)
90	85	5	S	F	(2)
90	85	25	S	F	(2)
Dil. ⁴	80	726	S	L	(4)
Conc. ⁵	50	338	S	L	(4)
Gas ⁶	95	100	G	F	(2)
Gas ⁶	95	25 ^N	G	F	(2)
Gas ⁷	95	50	G	F	(2)
Gas ⁷	95	50 ^N	G	F	(2)

¹Impure acid obtained by bleaching superphosphate; contained some free iron.
²Aeration: Ar = Agitated constantly, Ar = Aerated, G = Gaseous atmosphere, Q = Quiet immersion, Qp = Quiet immersion in electrostatic precipitator, Qs = Quiet immersion in overflow from settling tank (reducing conditions), S = Submerged, W = Water line attack.
³Test: L = Laboratory, F = Field.
⁴Dilute impure acid.
⁵Concentrated impure acid.
⁶Gases: principally O₂ and N₂ containing a small amount of phosphoric acid and traces of fluorine compounds.
⁷Gases, principally O₂, CO₂, and N₂ containing a small amount of phosphoric acid and traces of fluorine compounds.
⁸Phosphorized copper.

Copper, copper zinc alloys, copper-tin alloys, copper-nickel alloys, copper-aluminum, copper-aluminum-silicon, and copper-silicon alloys.

Examination of the laboratory, field and service data indicates that copper and copper-base alloys, on the whole, should give satisfactory service in handling pure phosphoric acid solutions in various concentrations.

Effect of Temperature—In the range from room temperature up to 100 deg. C. the corrosion rate of copper base alloys is comparatively small. However, the corrosion rate at 100 deg. C. is about five times that which takes place at room temperature.

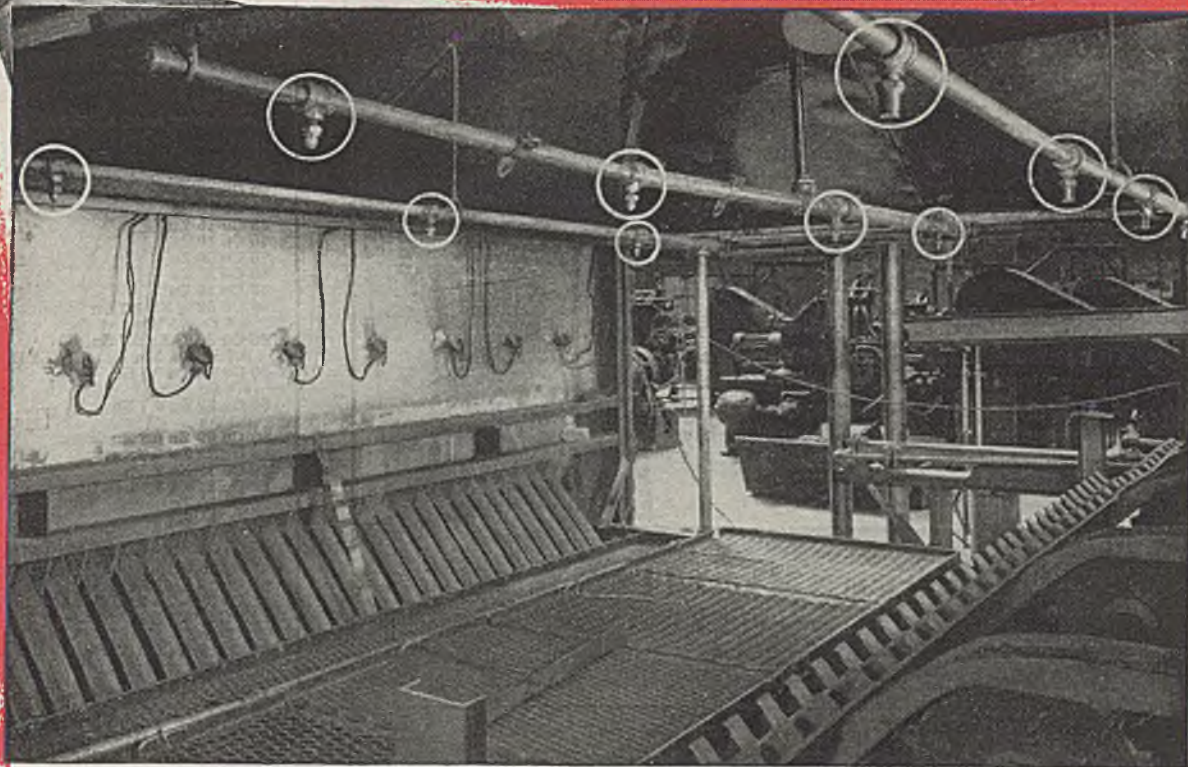
Effect of Aeration—Aeration of phosphoric acid increases the rate of corrosion for copper and its alloys from 10-100 fold depending upon the degree of aeration. Since only a limited amount of aeration exists under usual service conditions, it appears that most of the copper base alloys should be satisfactory for piping and heat exchangers.

The data presented in connection with water line corrosion indicates that consideration must be given to this type of corrosion where tubes or pipes are partially immersed in phosphoric acid solutions. Consideration must also be given to the possible increase in corrosion at the water line in partially filled shells of heat exchangers and in tanks.

Effect of Velocity—No definite information is apparently yet available on the effect of velocity on the rate of corrosion of copper alloys in phosphoric acid solutions. Lacking definite information, it would be well to consider the possible corrosion accelerating effect of impinging or moving streams of phosphoric acid against or on metal surfaces

Engineered Protection

AGAINST FIRE IN QUENCH TANKS



Here's a Grinnell fire protection system for every industrial fire hazard — including protection for storage tanks of highly flammable liquids and extinguishment of oil fires.

Such a constant hazard are open tanks of quenching oils for tempering hot metal parts. Grinnell matches this threat of flash fires with a Mulsifyre or Protectospray installation — instantly ready to drive droplets of water in heavy or light spray at the correct velocity onto the oil surface to form a fire extinguishing emulsion.

Grinnell engineering determines the exact types of spray heads to deliver an effective volume of correctly sized droplets at the necessary velocity to meet the individual conditions.

An experienced engineer from a nearby Grinnell office will gladly help you in working out complete fire protection for any hazard. Grinnell Company, Inc. Executive Offices, Providence 1, Rhode Island. Branch Offices in Principal Cities.

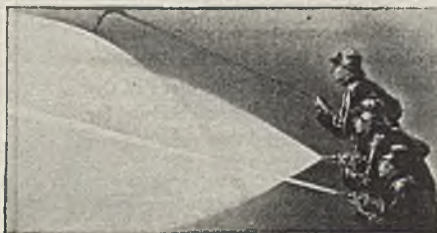
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FLAMEBUSTER — For Manual Fire-Fighting. Low velocity spray for stubborn fires in light, flammable liquids; high velocity spray for fires in heavier oils; solid stream for mopping up.



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The unit was designed by Amersil's Engineering Department. All silica ware used was manufactured in Amersil's own American plant to specifications necessary to produce the required quality and quantity of throughput. Necessary auxiliary equipment to complete the unit, so as to assure the results guaranteed by Amersil, were selected and purchased by our Engineering Service Department.

This integrated design and manufacturing service is available to chemical and metallurgical plants whose processes involve extreme temperatures and highly corrosive operating conditions.

60 TON PLANT
2½ TONS OF 22°B'e ACID AN HOUR ON A 24 HOUR BASIS

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The Indians knew it, the Spaniards knew it, the French knew it, and those of English descent of the Southeastern regions have known for 150 years the superior qualities of Tidewater Red Cypress and its resistance to decay. Along the Atlantic Coastal Plain where lie buried cypress trees that grew over 100,000 years ago in the Pleistocene

Age, many of which have since been dug up, give mute evidence of the lasting qualities of cypress never equalled for its decay resistance. In more recent years industry has also learned that it ticks the difficulties of odor, taste and acid. Tidewater Red Cypress has ALL the qualities you demand for many specific industrial demands.



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and take precautionary steps. These steps would consist of: (1) inserting sleeves at the inlets of tubes in heat exchangers, (2) using heavier elbows and heavier sec-

Rates of Corrosion of Copper-Zinc and Modified Copper-Zinc Alloys in Pure Phosphoric Acid

Alloy Composition ¹	Corrosion Rate, Mills Per Yr.	Degree of Aeration ²	Reference
Laboratory tests, 6.5% acid at room temp.:			
100 Cu	22	Q	(6)
100 Cu	148	W	(6)
90 Cu 10 Zn	22	Q	(6)
90 Cu 10 Zn	162	W	(6)
85 Cu 15 Zn	229	Q	(6)
85 Cu 15 Zn	172 ³	W	(6)
70 Cu 30 Zn	35	Q	(6)
70 Cu 30 Zn	260	W	(6)
65 Cu 35 Zn	41 ⁴	Q	(6)
65 Cu 35 Zn	325 ⁴	W	(6)
60 Cu 38½ Zn 0.7 Sn			
0.7 Fe .05 Mn	19	Q	(6)
60 Cu 38½ Zn 0.7 Sn			
0.7 Fe .05 Mn	123	W	(6)
60 Cu 39 Zn 0.7 Sn			
0.1 As	14	Q	(6)
60 Cu 39 Zn 0.7 Sn			
0.1 As	72	W	(6)
60 Cu 39 Zn 0.7 Sn			
0.1 As	20	Q	(6)
60 Cu 39 Zn 0.7 Sn			
0.1 As	148	W	(6)
60 Cu 37 Zn 3 Pb			
0.1 As	21	Q	(6)
60 Cu 37 Zn 3 Pb			
0.1 As	94	W	(6)
60 Cu 40 Zn			
0.1 As	59	Q	(6)
60 Cu 40 Zn			
0.1 As	180	W	(6)
Field tests, 10% acid at 65 deg. C.:			
85 Cu 15 Zn	5 ⁹	Qs	(2)
70 Cu 29 Zn 1 Sn	5	Qs	(2)
66 Cu 33.5 Zn 0.5 Pb	5 ⁹	Qs	(2)
60.1 Cu 39.1 Zn			
0.7 Sn	1	Qs	(2)
63 Cu 27 Zn 6 Al 3 Fe			
1 Mn	5	Qs	(2)
Laboratory tests, 25% acid at 95 deg. C.:			
87.5 Cu 10.5 Zn	23	Ar	(5)
68 Cu 23 Zn 3 Mn 2 Fe	29	Ar	(5)
66 Cu 32.5 Zn	28 ⁹	Ar	(5)
60 Cu 39 Zn 1 Sn	70	Ar	(5)
Field tests, 78% acid at 60 deg. C.:			
85 Cu 15 Zn	10 ⁹	Q	(2)
70 Cu 29 Zn 1 Sn	10	Q	(2)
66 Cu 33.5 Zn 0.5 Pb	10 ⁹	Q	(2)
60.1 Cu 39.1 Zn 0.7 Sn	25	Q	(2)
63 Cu 27 Zn 6 Al			
3 Fe 1 Mn	25	Q	(2)
Field tests, 78% acid at 85 deg. C.:			
85 Cu 15 Zn	10 ⁹	Qp	(2)
70 Cu 29 Zn 1 Sn	10	Qp	(2)
66 Cu 33.5 Zn 0.5 Pb	10 ⁹	Qp	(2)
60.1 Cu 39.1 Zn 0.7 Sn	50	Qp	(2)
59 Cu 39 Zn 1.2 Fe			
0.7 Sn .05 Mn	5	Qp	(2)
63 Cu 27 Zn 6 Al			
3 Fe 1 Mn	50	Qp	(2)
Field tests, 90% acid at 85 deg. C.:			
85 Cu 15 Zn	10 ⁹	Qp	(2)
70 Cu 29 Zn 1 Sn	10	Qp	(2)
66 Cu 33.5 Zn 0.5 Pb	10 ⁹	Qp	(2)
60.1 Cu 39.1 Zn 0.7 Sn	5	Qp	(2)
63 Cu 27 Zn 6 Al			
3 Fe 1 Mn	25	Qp	(2)
Field tests, gases ⁶ at 95 deg. C.:			
85 Cu 15 Zn	25	G	(2)
70 Cu 29 Zn 1 Sn	10	G	(2)
66 Cu 33.5 Zn 0.5 Pb	25 ¹⁰	G	(2)
60.1 Cu 39.1 Zn			
0.7 Sn	25	G	(2)
59 Cu 39 Zn 1.2 Fe			
0.7 Sn .05 Mn	100	G	(2)
63 Cu 27 Zn 6 Al			
3 Fe 1 Mn	25	G	(2)
Field tests, gases ⁷ at 95 deg. C.:			
85 Cu 15 Zn	—	G	(2)
70 Cu 29 Zn 1 Sn	—	G	(2)
66 Cu 33.5 Zn			
0.5 Pb	100 ¹⁰	G	(2)
60.1 Cu 39.1 Zn			
0.7 Sn	—	G	(2)
59 Cu 39 Zn 1.2 Fe			
0.7 Sn .05 Mn	—	G	(2)
63 Cu 27 Zn 6 Al			
3 Fe 1 Mn	—	G	(2)

¹— See first table.
²— 90% acid (85 Cu 15 Zn) and Yellow brass (65 Cu 35 Zn) pipe satisfactorily handled dilute and concentrated acid under service conditions.
³— Considered unsatisfactory for use as electrode wire in precipitator since 0.1 in. wire lasted only 3 to 7 days.



—save his skin and your product with
Sylphon temperature regulators

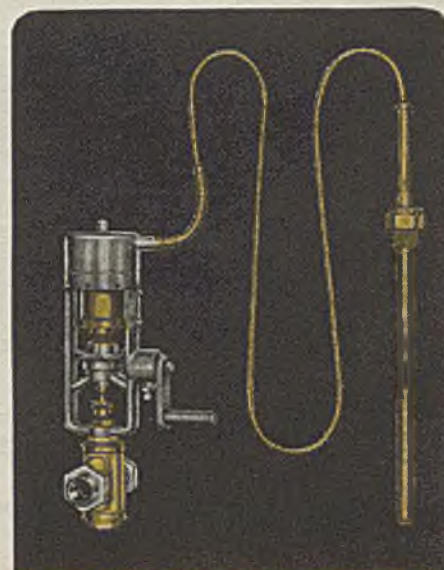
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tions adjacent to elbows, and (3) the installation of deflector or guard plates where the stream enters or leaves a heat exchanger.

Effect of Rubbing and Abrasion—Moving or sliding parts should be avoided as much as possible since in the presence of an acid, rapid local changes in dimensions may be expected to occur in these areas.

Effect of Contacts and Crevices—The crevices at threaded joints and in corners may be troublesome since localized corrosion may occur in such areas. The avoidance of such crevices through design and welding usually keeps difficulties due to crevice or contact corrosion at a minimum.

Effect of Solution Composition—Variations in the concentration of phosphoric acid do not have as marked an effect on the rate of corrosion as the concentration of other materials. The impure phosphoric acid produced by the sulphuric acid process may contain a markedly higher concentration of ferric, sulphate, sulphite, chloride and fluoride ions than the acid produced by the electric furnace process. The presence of these ions increases the rate of corrosion considerably; up to 150 fold increase has been reported as probably being due in the main to the presence of other

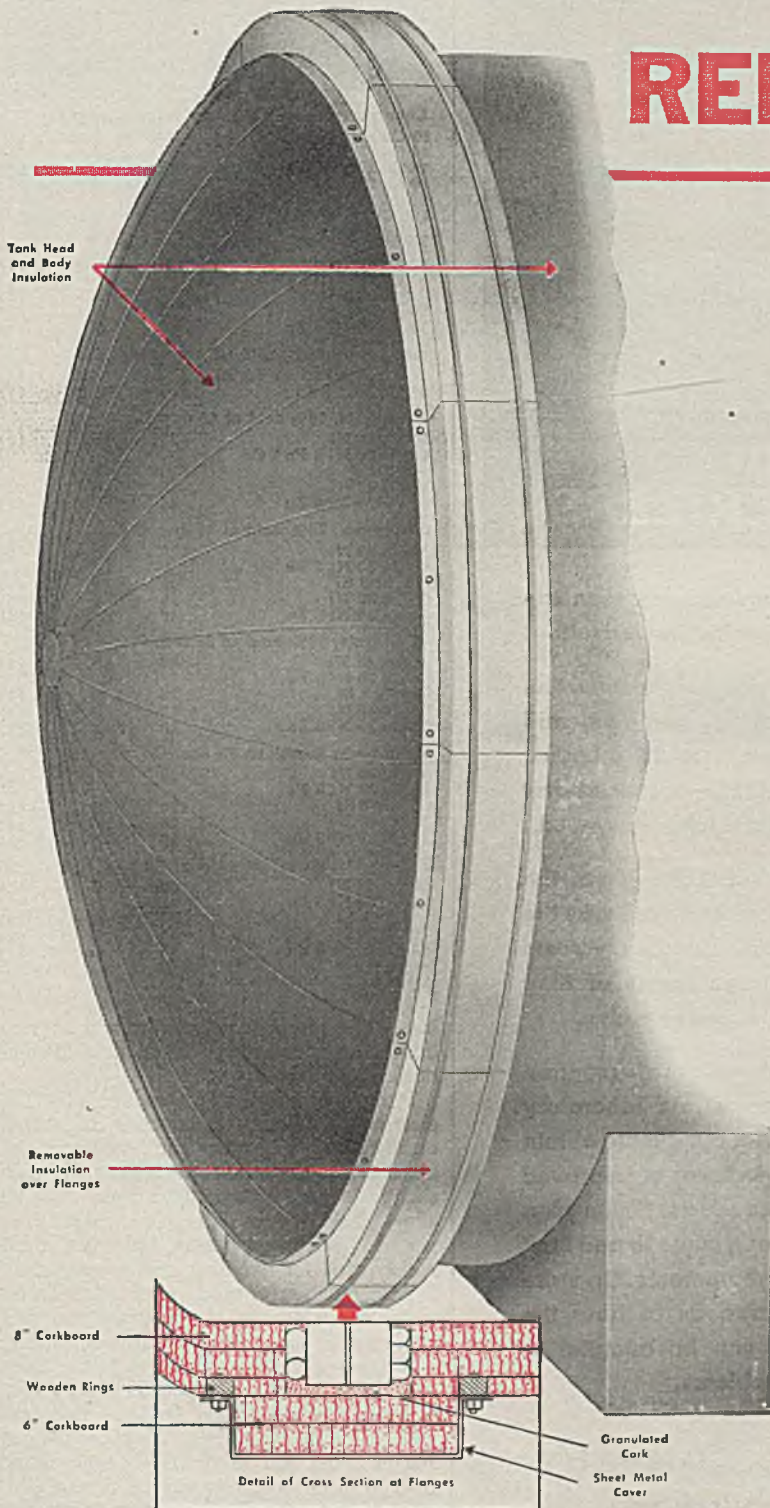
Rates of Corrosion of Copper-Aluminum, Copper-Silicon Alloys and Modifications of These Alloys in Pure Phosphoric Acid

Alloy Composition	Corrosion Rate, Mills Per Yr.	Degree of Aeration ²	Reference
Laboratory tests, 6.5% acid at room temp.:			
90.5 Cu 7.5 Al 2.0 Si	38	W	(6)
90.5 Cu 7.5 Al 2.0 Si	11	Q	(6)
91.7 Cu 6.5 Al 1.8 Si	50	W	(6)
91.7 Cu 6.5 Al 1.8 Si	12	Q	(6)
96.8 Cu 2.8 Al 0.4 Si	97	W	(6)
96.8 Cu 2.8 Al 0.4 Si	17	Q	(6)
98 Cu 2.0 Si	37	W	(6)
98 Cu 2.0 Si	11	Q	(6)
97 Cu 3.0 Si	14	W	(6)
97 Cu 3.0 Si	9	Q	(6)
96.4 Cu 2.8 Si 0.3 Mn	19	W	(6)
96.4 Cu 2.8 Si 0.8 Mn	11	Q	(6)
Field tests, 10% acid at 65 deg. C.:			
88 Cu 10 Al 2 Fe	5	S	(2)
98.3 Cu 1.5 Si 0.3 Zn	5	S	(2)
96 Cu 3 Si 1 Zn	5	S	(2)
Laboratory tests, 25% acid at 95 deg. C.:			
87 Cu 7.8 Al 3.7 Fe	320	Ar	(5)
89 Cu 8 Al 2.8 Fe	970	Ar	(5)
86 Cu 10 Al 4 Fe	52	Ar	(5)
95.5 Cu 3 Si 1.2 Mn	1,560	Ar	(5)
Field tests, 78% acid at 60 deg. C.:			
88 Cu 10 Al 2 Fe	10	S	(2)
98.3 Cu 1.5 Si 0.3 Zn	5	S	(2)
96 Cu 3 Si 1 Zn	25	S	(2)
Field tests, 78% acid at 85 deg. C.:			
95 Cu 5 Al	10	S	(2)
88 Cu 10 Al 2 Fe	10	S	(2)
92 Cu 4 Al 4 Ni	5	S	(2)
98.3 Cu 1.5 Si 0.3 Zn	10	S	(2)
96 Cu 3 Si 1 Zn	50	S	(2)
Field tests, 90% acid at 85 deg. C.:			
88 Cu 10 Al 2 Fe	10	S	(2)
98.3 Cu 1.5 Si 0.3 Zn	5	S	(2)
96 Cu 3 Si 1 Zn	10	S	(2)
Field tests, gases ⁶ at 95 deg. C.:			
95 Cu 5 Al	50	G	(2)
88 Cu 10 Al 2 Fe	25	G	(2)
92 Cu 4 Al 4 Ni	100	G	(2)
98.3 Cu 1.5 Si 0.3 Zn	25 ¹¹	G	(2)
96 Cu 3 Si 1 Zn	25	G	(2)
Field tests, gases ⁷ at 95 deg. C.:			
95 Cu 5 Al	300	G	(2)
88 Cu 10 Al 2 Fe	50	G	(2)
92 Cu 4 Al 4 Ni	100	G	(2)
98.3 Cu 1.5 Si 0.3 Zn	50 ¹¹	G	(2)
96 Cu 3 Si 1 Zn	50	G	(2)

¹⁻⁸ See first table this section.

¹¹ Considered unsatisfactory for use as electrode wire in precipitator since 0.1 in. wire lasted only 20 to 33 days.

How to insulate a tank head that's **REMOVABLE**



HERE'S A WAY to insulate continuous filters and other low-temperature vessels so that dismantling and cleaning can be done easily without damaging the insulation.

To help maintain correct internal temperatures, Armstrong's Corkboard in the proper thickness should be applied to the tank and head in hot asphalt or adhesive, and banded in place. But the insulation over the flanges can't be applied this way, for the flanges must be accessible. To omit the insulation would mean excessive refrigeration loss, frost formation, and damage to the insulation on tank head and body.

The problem of accessible, insulated flanges is solved by installing the insulation so that it can be removed easily and quickly. Curved segments of Armstrong's Corkboard are built up and fitted around the flange. Each segment is covered with sheet metal for extra protection and easy removal. When they're bolted and banded on, the segments fit tightly, keep heat away from the flanges, prevent condensation and frost damage.

If you have any problem involving maintenance of temperatures, whether low or high, Armstrong's engineers will be glad to help you solve it. Feel free to call on them at any time. Armstrong Cork Company, Building Materials Division, 3308 Concord Street, Lancaster, Pa.



AT LEFT: Diagrammatic view of insulation on removable head of continuous filter maintaining temperatures of -40° to -60° F. Head is insulated with Armstrong's Corkboard 8" thick, protected with sheet metal. Tank body insulated with 8" Corkboard, finished with Armstrong's Asphalt Emulsion. Removable flange is 2 layers of Armstrong's Corkboard each 3" thick, covered with sheet metal, and bolted to wooden rings in tank head and body insulation. Granulated cork fills the void around flanges.

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Complete Contract Service
For All Temperatures

From 300°
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There was shown the full line of MIKRO-PULVERIZERS—from the small Bantam, to the larger production units. Also displayed was the Paddle Feed MIKRO-PULVERIZER for wet filter cake and heavy paste materials—the new Pre-Crusher for breaking large lumps of filter cake—and the Rotary Air Lock, or continuous unloading valve.

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Rates of Corrosion of Copper-Nickel and Modified Copper-Nickel Alloys in Pure Phosphoric Acid

Alloy Composition	Corrosion Rate, Mills Per Yr.	Degree of Aeration:	Reference
Laboratory tests, 8.4% acid at room temp.:			
55 Cu 45 Ni	20	Ar	(7)
67 Cu 33 Ni	20	Ar	(7)
75 Cu 25 Ni	23	Ar	(7)
80 Cu 20 Ni	23	Ar	(7)
90 Cu 10 Ni	21	Ar	(7)
100 Cu	31	Ar	(7)
Field tests, 10% acid at 65 deg. C.:			
55 Cu 45 Ni	5	S	(2)
60 Cu 30 Ni 3 Fe			
3 Cr 3 Si	1	S	(2)
70 Cu 30 Ni	1	S	(2)
74 Cu 20 Ni 5 Zn	5	S	(2)
Laboratory tests, 25% acid at 95 deg. C.:			
74 Cu 16 Ni 3.7 Fe 5.5 Al	1,770	Ar	(5)
88 Cu 6 Ni 5 Sn	1,285	Ar	(5)
Field tests, 78% acid at 60 deg. C.:			
55 Cu 45 Ni	25	S	(2)
60 Cu 30 Ni 3 Fe 3 Cr			
3 Si	10	S	(2)
70 Cu 30 Ni	10	S	(2)
74 Cu 20 Ni 5 Zn	25	S	(2)
Field tests, 78% acid at 85 deg. C.:			
55 Cu 45 Ni	25	S	(2)
60 Cu 30 Ni 3 Fe			
3 Cr 3 Si	25	S	(2)
70 Cu 30 Ni	10	S	(2)
74 Cu 20 Ni 5 Zn	10	S	(2)
Field tests, 90% acid at 85 deg. C.:			
55 Cu 45 Ni	10	S	(2)
60 Cu 30 Ni 3 Fe			
3 Cr 3 Si	10	S	(2)
70 Cu 30 Ni	10	S	(2)
74 Cu 20 Ni 5 Zn	10	S	(2)
Field tests, gases ⁶ at 95 deg. C.:			
55 Cu 45 Ni	25	G	(2)
60 Cu 30 Ni 3 Fe			
3 Cr 3 Si	100	G	(2)
70 Cu 30 Ni	25	G	(2)
74 Cu 20 Ni 5 Zn	10	G	(2)
Field tests, gases ⁷ at 95 deg. C.:			
55 Cu 45 Ni	50	G	(2)
60 Cu 30 Ni 3 Fe			
3 Cr 3 Si	50	G	(2)
70 Cu 30 Ni	50	G	(2)
74 Cu 20 Ni 5 Zn	50	G	(2)

1-8 See first table this section.

ions. The life of copper alloys will be very limited when handling phosphoric acid solutions of this type.

Pure phosphoric acid produced by the electric furnace process contains only small quantities of impurities such as ferric and fluoride ions and therefore is generally only slightly corrosive towards copper and its alloys. Yellow brass piping (65 percent copper, 35 zinc) apparently has been most widely used for handling such solutions.

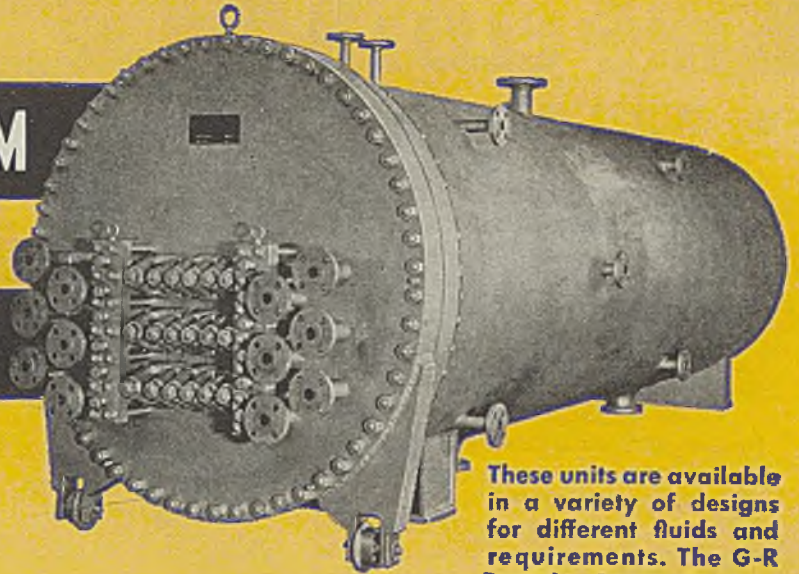
Accumulation of products of corrosion on metal surfaces may also increase the rate of corrosion and the possibility of pitting. The low copper alloys, such as yellow brass and Naval brass (60 copper, 39 zinc, 1 tin) and other alloys appear to have thin and adherent corrosion films. Copper, copper-silicon alloys and other high copper alloys tend to form more voluminous, porous films or scales beneath which roughened or pitted surfaces will be found.

Corrosiveness of Phosphoric Acid Vapors—The phosphoric acid vapors in electrostatic precipitators at 95 deg. C. are noticeably more corrosive than pure phosphoric acid solutions at the same or lower temperatures. The rates of corrosion encountered under these conditions are too high for satisfactory service in the form of electrode wire. The high rate of corrosion presumably is due to the abundant supply of oxygen. While the

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from

WASTE HEAT



These units are available in a variety of designs for different fluids and requirements. The G-R Bentube Steam Generator shown above has submerged, scale-shedding heating elements.

G-R STEAM GENERATORS

submerged and heater types

Recovery of heat from cracking coil tar, hot gas oil, or other heavy, dirty or clogging fluids presents no difficulties in a G-R Steam Generator. In many instances, these units have proven highly successful in recovering heat which formerly had to be wasted.

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GR-115

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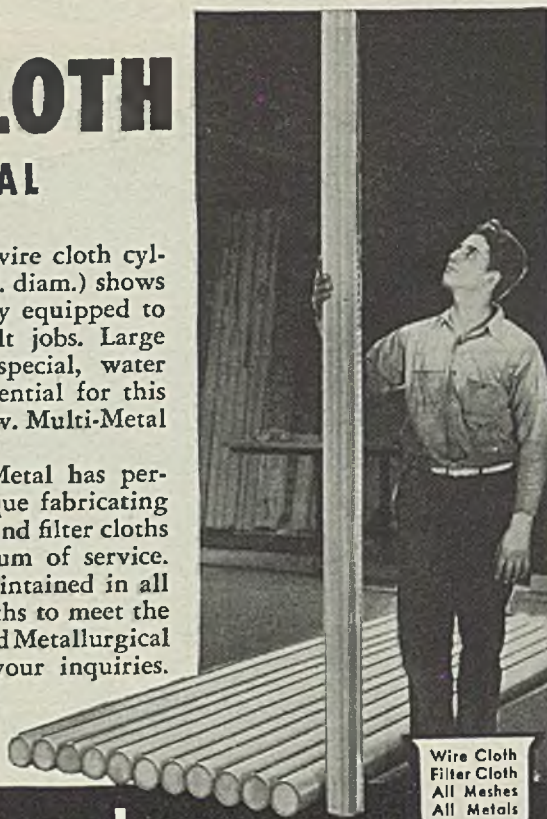
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THE NORTHERN BLOWER COMPANY
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corrosion rate of copper cooling tubes in phosphorus combustion chambers (400 mils per year) is high, the rate is appreciably lower than that characteristic for some other materials. For this reason, the use of copper tubes is feasible for this purpose.

Conclusion—The preceding discussion suggests that the keeping of service records which note the influence of the various corrosion accelerating factors mentioned should help considerably in maintaining equipment in good working order. Such records aid in (1) anticipating repairs, (2) making changes to minimize the effect of some of these factors in either old units or units on the drawing board and (3) selecting materials for replacement.

References

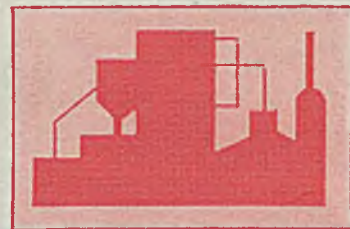
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Rates of Corrosion of Copper-Tin Alloys and Modified Copper-Tin Alloys in Pure Phosphoric Acid

Alloy Composition	Corrosion Rate, Mils Per Yr.	Degree of Aeration ^a	Reference
Laboratory tests, 5% acid at room temp.:			
89 Cu 7 Sn 4 Zn	50	Ag	(8)
85 Cu 6 Sn 9 Zn	24	Ag	(8)
86 Cu 10 Sn 4 Zn	45	Ag	(8)
82 Cu 10 Sn 7 Zn 0.1 Pb	47	Ag	(8)
84 Cu 9.5 Sn 6 Pb	52	Ag	(8)
83 Cu 10 Sn 7 Pb	53	Ag	(8)
87 Cu 9.5 Sn 3 Sb	42	Ag	(8)
85 Cu 9.7 Sn 5 Sb	55	Ag	(8)
Laboratory tests, 6.5% acid at room temp.:			
98.7 Cu 1.3 Sn	40	W	(6)
98.7 Cu 1.3 Sn	15	Q	(6)
98.2 Cu 1.8 Sn	36	W	(6)
98.2 Cu 1.8 Sn	14	Q	(6)
97.5 Cu 1.5 Sn 1.0 Si	27	W	(6)
97.5 Cu 1.5 Sn 1.0 Si	11	Q	(6)
95 Cu 5 Sn 0.1 P	22	W	(6)
95 Cu 5 Sn 0.1 P	9	Q	(6)
Field tests, 10% acid at 65 deg. C.:			
92 Cu 8 Sn	1	S	(2)
90 Cu 10 Sn	5	S	(2)
75 Cu 10 Sn 15 Pb	1	S	(2)
Field tests, 78% acid at 60 deg. C.:			
92 Cu 8 Sn	5	S	(2)
90 Cu 10 Sn	10	S	(2)
75 Cu 10 Sn 15 Pb	25	S	(2)
Field tests, 78% acid at 85 deg. C.:			
94.5 Cu 5.4 Sn .01 P	5	S	(2)
92 Cu 8 Sn	10	S	(2)
90 Cu 10 Sn	10	S	(2)
75 Cu 10 Sn 15 Pb	25	S	(2)
Field tests, 90% acid at 85 deg. C.:			
92 Cu 8 Sn	10	S	(2)
90 Cu 10 Sn	5	S	(2)
75 Cu 10 Sn 15 Pb	10	S	(2)
Field tests, gases ^b at 95 deg. C.:			
94.5 Cu 5.4 Sn .01 P	50	G	(2)
92 Cu 8 Sn	50	G	(2)
90 Cu 10 Sn	25	G	(2)
75 Cu 10 Sn 15 Pb	50	G	(2)
Field tests, gases ^c at 95 deg. C.:			
94.5 Cu 5.4 Sn .01 Pb	150	G	(2)
92 Cu 8 Sn	100	G	(2)
90 Cu 10 Sn	50	G	(2)
75 Cu 10 Sn 15 Pb	100	G	(2)

1-8 See first table this section.

selective
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* 

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FROM THE LOG OF EXPERIENCE

DAN GUTLEBEN, Engineer

THE OLD MAN SWORE that the dust from the vicinity of the sugar pulverizers and screens on the third floor was a sin and an abomination and a befouling of the entire melter and pan house all the way to the skylight above the eighth floor! The hygroscopic property of sugar dust makes a nauseating and embarrassing mess. Moreover, heavy concentrations have caused distressing explosions. If any brother desires to view some pyrotechnics, let him go to an ill kept sugar refinery, if any there be, where the housekeeping practice permits the accumulation of sugar dust on ceiling beam flanges or on top of piping. And then let a heedless repair gang drop a spark into the dust and presto a flash travels on the beam or follows a sprinkler pipe as if it were a fuse. In a few seconds all of the ceiling beams are cleared of sugar and there is a deluge from the sprinklers. By good fortune and the promptness of the sprinkler system the house is saved but it gets a thorough purging. In an old East Coast refinery only as recently as 1940 a little explosion kicked up a big cloud of dust and thereby induced a secondary explosion that blew out the windows and a part of the wall.

Anyhow the Old Man threatened that a remedy must be speedily applied or he would order the third floor walled from the rest and provided with a large fan. Letting the dust spread out from the place where it is produced and then applying enough fan capacity to capture it, is like trying to suck in the guinea pigs after they scatter away from the hutch. Closed rooms even invite danger by confining the dust. In some refineries these rooms have been provided with a light window wall towards the outside in the expectation of relieving the inevitable explosive force.

AND SO WE SAT DOWN with Sandy-the-Tinner and decided to steal the idea that the practical wood worker applies, i.e., to suck the dust right out of the machine where it is made and before it has an opportunity to expand into a large volume. This called for hoods over pulverizers and over the filling end of packing machines. Screens are purged of dust by connecting induced draft fans directly to the housing. In the case of dry sugar elevators a vigorous air suction above the head wheel extracts the dust produced at both the intake at the bottom and the delivery at the top. An important difference in the behavior of sawdust and sugar is that sugar attracts moisture and tends to build a deposit in the pipe. To ameliorate this, the suction pipe is made vertical or as nearly so as possible. For each machine a small fan (15-in. rotor dia.) is installed with vertical piping rather than a large one with a network of horizontal piping. The fan discharge, if not too large, will

keep reasonably free of deposit but the vertical arrangement is more trouble-free.

EVERY DEVICE however simple requires a modicum of attention, and to provide for the operator's convenience, Sandy inserted numerous cleanouts. Frequently the operator shows lack of interest in an addition to his duties (without increase in pay). It's not his funeral if a little cloud of dust rises to the pan floor! The pipe gradually fills and becomes inoperative. Finally the Old Man chances to pass through and squawk! Sandy, the culprit who built the system, has to take down the pipe and clean it out!

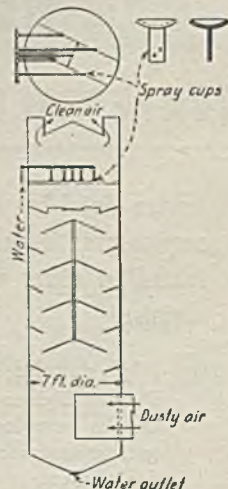
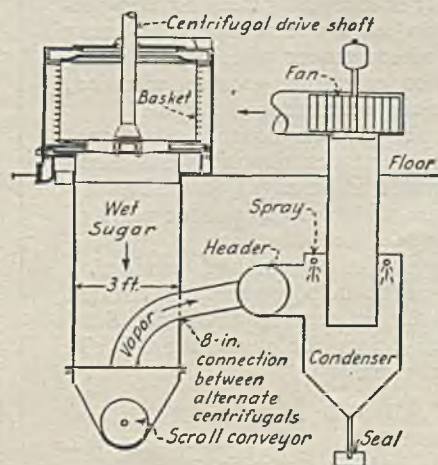
STEAM IS ANALOGOUS to dust except that the particles are water. Elevator heads for hot wet sugar condense the vapor in cold weather and then the surface may rust and rusty water may trickle into the product. Here the same induced fan serves satisfactorily with the addition of a small unit heater fan at the bottom of the elevator. In the case of hot wet sugar conveyors under the centrifugals we have provided tight hoppers between the bottom of the centrifugals and the top of the scroll conveyors, and further, fitted removable steel covers on the conveyors between the hoppers, and finally, attached suction pipes on the conveyors or hoppers. The centrifugal curbs are covered to avoid chilling the sugar. In addition, a 6-in. suction pipe is in some cases added on the curb of the centrifugals to create a downward draft for the comfort of the operator when the centrifugal cover is open. For sucking vapor, the efficiency of the fan is increased if a simple spray condenser is installed in the suction line. In the byproducts centrifugals where the vapors are corrosive, the piping is made of asbestos and the fittings of stainless steel sheets. The fans also

require to be made of stainless steel. Under our priority rights we were permitted to retain our prewar stock of stainless steel sheets but the manufacturer's schedule for new fans was filled. Accordingly Sandy made the housings and sent the scraps, cut to the size of the blades, to the fan builder who made the wheels "for old times' sake." A horizontal motor-fan on a common base can be arranged vertically by the addition of a ball step bearing and thereby avoid an elbow.

SMALL FANS and vertical pipes are also used in the char house for capturing the impalpable char dust. The dust is salvaged and bagged. Improvements were made in the conveyors and elevators (*Chem. & Met.*, Aug. 1945, page 183) which by more kindly treatment of the granular char reduced the production of dust. Straightway Tony-the-Bagger reported a decrease in the efficiency of production!

THE VALUE OF SUGAR DUST is only a fraction of a cent below that of the commercial crystals. Whatever the cyclones and the stocking collectors do not catch dry is melted by means of spray. The wet collector for this purpose is a cylindrical shell provided with a spray near the top and a few baffles below. The spray starts with water on Monday morning and is recirculated till it overflows continuously as sirup of a density that resists inversion of sucrose and corrosion of the metal. The ever watchful pH control adds a small quantity of lime milk from time to time to neutralize acidity, thereby inducing production of a little more end molasses through the inhibitive property of the lime to crystallization. The wet collectors, 7 ft. dia. x 26 ft. deep, for a pair of 6-ft. granulators are made of copper or galvanized iron (not steel). The iron installations which Sandy built in 1923 are still in use although some of the interior baffles have required renewal. These baffles are attacked on both sides by corrosive liquid or vapor and should have been made thicker. Originally the circulating sirup was continually reheated and subsequently cooled by the large volume of air. Frank Harvey discovered that the heat encouraged inversion of sucrose and bacterial

Suction system for vapor removal from white sugar centrifugals



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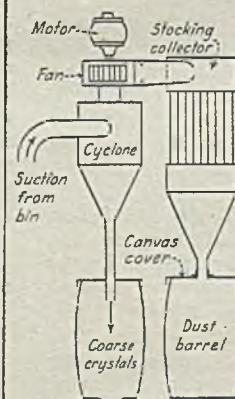
AMPCO
Metal
The Metal without an Equal

P-11

growth and so the heating was cut out and it was noted that the pH controller opened the lime milk supply cock less frequently.

ACQUIRING ACQUAINTANCE with the hazard of dust explosions in the sugar refinery now requires small effort, as the pioneers long ago paid the price and left a log of experience. Now and then some cadet operator shows an inclination to add corroborative experience. Horrendous pictures are published by the insurance companies but the incriminating evidence of the cause is not available. The insurance carriers hesitate to offend a good customer by severe investigations and besides the man who may have the facts about a spark from a welder, a cigarette or the illegal use of an unprotected extension lamp, keeps his knowledge unto himself! Flat dust collecting surfaces should be avoided as far as possible. Cabinets can be extended to the ceiling or provided with steep roofs. Sandy has even built his ventilating ducts with the top shaped like a Gothic roof and he has covered large diameter piping with a steep inverted V.

A **THREE-MILLION-LB. BIN**, 60 ft. deep, accumulates the refinery output at night so as to make packing a daylight job only. A heavy concentration of dust is produced in this bin as the sugar surface recedes and increases the height of fall. This bin has returned profits for 20 years; then one Friday night when the bin had been made nearly empty for the week-end shutdown, an atomic bomb hit the place! The trap doors blew open and tongues of fire leaped out of the bin opening. A few "polanders," having strong imaginations and weak nerves were gripped with panic. One said the bin walls had bulged six inches! "Frank-the-Mex" reported that the force of the blast flattened him to the floor—and he was 50 ft. away from the bin! The matter of the tongues of fire, however, was corroborated by the fact that sprinklers around the outside of the bin



Dust removal from sugar to the Fire-refined sugar bin

went off, the dust on the pipes having served as the fuse. Fifteen minutes later when the chronicler arrived the bin was still there. There was no structural damage. The sprinklers were still gushing forth and the firemen were exercising their obsession of pouring on the water. By the aid of a little diplomacy and the contribution of a few small bags of sugar to the "Firemen's Canteen" the firemen were induced to play their 175-lb. stream on the walls so as to wash off the gooey sirup. The walls of the bin were of wood but one end had been covered with galvanized steel and found to be easier to free of adhering sugar at the week ends. Fourteen tons of prewar galvanized plates were on hand waiting for an opportunity for covering the rest—and under the piping times of WPB control, thank Providence for that! The planks were somewhat charred and impregnated with the flavor of smoked ham and so these were

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scraped and covered with the new plates. The old steel-clad end required only a little brushing. Every man and the cook worked through Saturday and Sunday so that the loss was limited to slightly reduced production for three days while the bin was bypassed. Then a small crusher which was discharging crushed lumps into the bin was re-arranged with a magnetic separator above and a screen below. It was subsequently found that the magnet separated an occasional elevator bolt which got by the war-conditioned mechanics. To reduce the hazardous dust concentration, the bin was also provided with a suction fan which discharged through a cyclone and returned the crystals into the bin while the dust was caught in a stocking collector. Cotton stockings require occasional washing to clean the meshes of caked sugar.

AN IMPORTANT INGREDIENT in good sheet metal work (or any of the mechanic arts) is the handiwork of an able and faithful craftsman like Sandy. The proper procedure is to sit down with him in his shop to determine the requirements and then let him interpret them in his own way and enjoy the exhilaration of accomplishment without the kibitzing of the boss. The exhilaration is enhanced when the boss's log records Sandy's successes for the edification of the Old Man.

PULLING DRY AIR through the sugar profits the customer. In the good old days "before the war" a ton of commercial sugar at a nickle a pound contained about 0.2 lb. of water and accordingly the statistical consumer was gypped one twentieth of a cent annually. Through improved technique this loss to the consumer is now cut by half.

THE MACHINE SHOP, requiring accurate weighing of a piece of steel, sent it to John-the-Packer whose department possesses the sensitive equipment. The answer did not satisfy the shop. On investigation, it was learned that John had made the standard deduction of 4 lb. for the empty sugar carton.

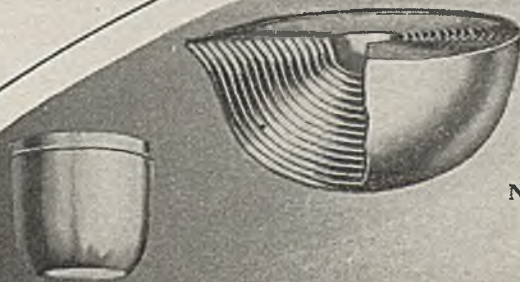
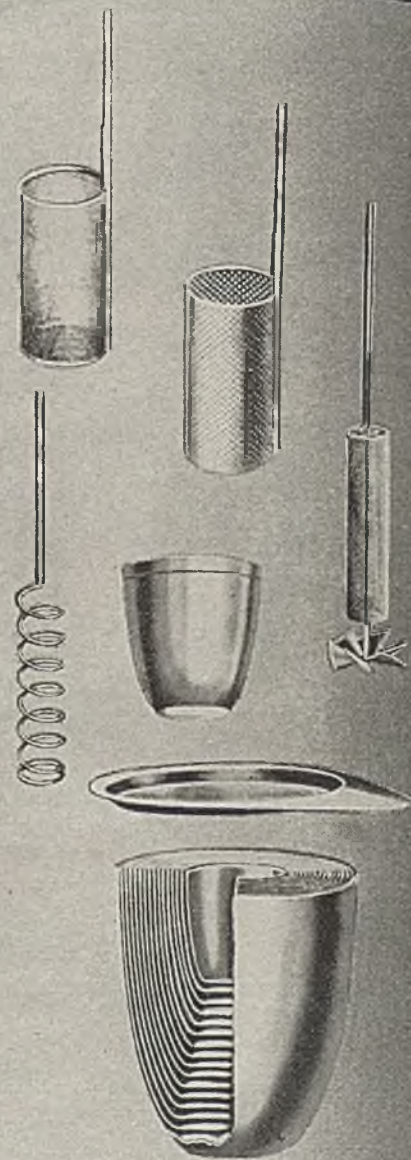
AN OLD DEVICE for "saving cement" suggested 40 years ago by a newly acquired concrete foreman is illustrated herewith. Hand mixing was then common and even now there are some isolated jobs where it is practiced. The procedure for a mix of 1:2:4, for example, is to lay frames on the mixing platform 8, 4, and 2 in. deep, and to fill these with stone, sand and cement respectively. As each frame is filled it is struck off with a screed before the next frame is laid on. The profit comes by use of a warped screed. When discretion is employed in the presence of the inspector, a 1/4-in. deflection in a 6-ft. length is not readily noticeable. The technique is to use the screed to make the sand surface convex and the cement surface concave, thus making the 2-in. cement layer only 1 1/2 in. deep at the center. If the inspector is particularly obtuse, the deflection can be increased. If by chance he discovers the ruse, no harm is done, for the contractor then registers surprise and corrects the situation with an apology. With a mixing platform 16 ft. long each batch would "save" one barrel of cement for the contractor.

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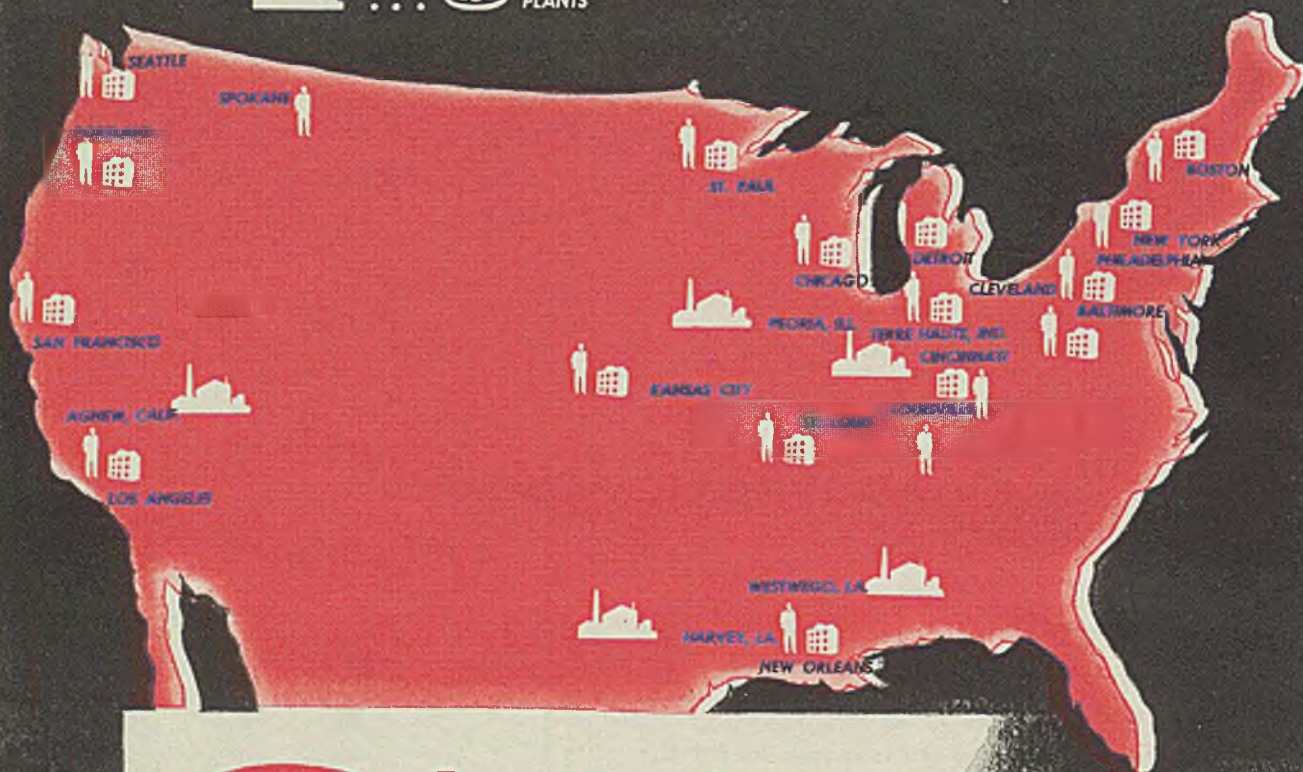
Since that time, we have had no complaints of rupture or cracking from this cause.

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NAMES IN THE NEWS



O. N. Miller

O. N. Miller has been appointed general manager of the manufacturing department of Standard Oil Co. of California, San Francisco, to have charge of the Richmond, El Segundo and Bakersfield refineries. Miller joined Standard of California in 1934 after receiving his doctor's degree in chemical engineering at the University of Michigan. He first worked in research and development, specializing on cracking problems.

Gustav Egloff left early this month for England at the invitation of the Institute of Petroleum of Great Britain. Dr. Egloff delivered a series of lectures before various local chapters of the Institute in England, Scotland and Wales. He also lectured at Oxford and Cambridge Universities, and addressed the Catalyst Club of England, in London.

Gordon B. Zimmerman has joined the firm of Bechtel Brothers McCone Co. as chief process engineer. Mr. Zimmerman, a chemical engineering graduate of the University of Wisconsin, was formerly with the Universal Oil Products Co. where he participated in a number of important advancements in the field of petroleum processing.

Walter Dannenbaum has been appointed general manager of the ammonia department of E. I. du Pont de Nemours & Co. He succeeded F. A. Wardenburg who has retired after 39 years with the company.

Jack J. Gordon has recently been employed as chemical engineer by the Chemical Process Co. at Millbrae, Calif. Mr. Gordon, formerly in the research and development division of Tennessee Eastman Corp. in Kingsport, graduated from Stanford University in 1932. He has been active in AIChE affairs for some time.

R. P. Rossman and George J. Duffy have been transferred from the laboratories of Godfrey L. Cabot, Inc., Boston, to Pampa, Tex., where they will direct research at a new laboratory of the company.



Underwood & Underwood

Campbell Osborn

Campbell Osborn has left for Japan to take charge of the chemical and petroleum industries of Japan in General MacArthur's organization.

F. J. Emmerich, formerly controller and vice president of Allied Chemical and Dye Corp., is now president. He succeeded H. F. Atherton who resigned from the presidency but who continues as chairman.

Edward F. Wesp, assistant director of viscose rayon research at the Spruance plant of E. I. du Pont de Nemours & Co., Richmond, Va., has been appointed technical superintendent of the Yerkes rayon plant at Buffalo, N. Y. Dr. Wesp will be succeeded by Emerson A. Tippetts, formerly research manager at Richmond.

Orville O. Kenworthy, until recently with the Chemical Warfare Service, has been added to the staff of the color division of Ferro Enamel Corp., Cleveland, Ohio. A former Lieut.-Colonel, Mr. Kenworthy will engage in research and development work on inorganic coloring materials for glass, pottery and plastics.

Thomas O'Shaughnessy, a research chemist in the pioneer research section, rayon division of E. I. du Pont de Nemours & Co. in Buffalo, has been appointed assistant professor of physical chemistry at the Polytechnic Institute of Brooklyn.

Winton Patnode, liaison representative for the research laboratory of the General Electric Co., Schenectady, has been elected chairman of the American Chemical Society's Eastern New York Section. He succeeds Wolfgang Huber, chemical director of the Electronized Chemicals Corp. of New York.

W. C. Gross has been appointed general superintendent of the Los Angeles refinery of the Wilshire Oil Co., Inc., and J. H. Ouding has been named assistant general superintendent.



Willard H. Dow

Willard H. Dow has been awarded the Chemical Industry Medal for 1946. President and chairman of the Dow Chemical Co. and president of the Ethyl-Dow Chemical Co., Dr. Dow was cited for conspicuous service to applied chemistry. The medal will be presented at a dinner at the Hotel Commodore in New York on November 8.

Harold R. Mighton and Thomas G. Fox, Jr., have joined the staff of the research laboratory of the Goodyear Rubber & Tire Co., Akron, where they will work in the field of fundamental research on high polymers.

Ralph Nickerson, authority on cellulose, has been appointed to the textile research department of the Merrimac Division of Monsanto Chemical Co. Donald H. Powers has been promoted to director of the division's textile chemical department and Sawyer Sylvester now heads the department's technical section.

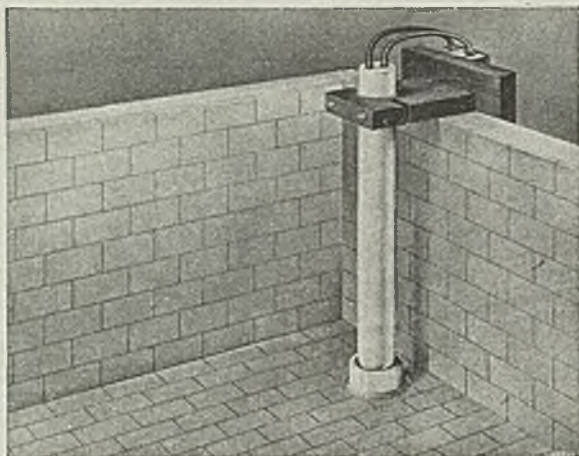
Ralph W. Feil has joined the staff of the Institute of Textile Technology, Charlottesville, Va., to work in the engineering division. Previous to joining the Institute he was for seven years with the Eastman Kodak Co. as a quality control engineer.

Alexander Redniss, formerly chief chemical engineer with American Home Products Corp., has organized Technical Enterprises, Inc., New York. The new company is engaged in consulting engineering in the food, pharmaceutical and chemical industries as well as the design and sale of special pilot plant process equipment.

J. J. Press has been appointed director of textile research of the Manufacturers Research Laboratories, Inc., Jersey City, N. J.

William F. Tuley, formerly assistant general sales manager, Naugatuck chemical division, has been appointed operations manager for the synthetic rubber division, United States Rubber Co. With headquarters at the com-

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New York 17, N. Y.

pany's New York office, Dr. Tuley will supervise production, production schedules and production costs of the three synthetic rubber plants operated by the company at Naugatuck, Conn., Institute, W. Va., and Los Angeles, Calif. In addition, he will maintain close contact with the company's synthetic rubber research and development program.

Edwin H. Amick, Jr., research chemical engineer for the past five years with the Standard Oil Development Co., has been appointed associate professor of chemical engineering at Columbia University. In his last post, Dr. Amick's work concerned technical and economic studies of new processes, design and operation of organic chemical plants, and supervision of process engineering on chemical plants. He was responsible in 1939 for developing processes for the cracking of hydrocarbons.

Grant R. Fernelius has been appointed plant manager of the Elyria, Ohio, plant of Harshaw Chemical Co. Paul Hines, formerly manager of the Elyria plant, has become manager of the El Segundo, Calif., plant of the company.

Richard T. Nalle of Philadelphia, executive vice-president of the Midvale Co., has been elected to the board of directors of the Pennsylvania Salt Manufacturing Co.

Colin C. Reid, organic chemist and Garvin Bawden, Jr., market analyst, are among recent additions to the staff of Arthur D. Little, Inc., Cambridge, Mass.

Samuel A. Abrahams, formerly factories manager of the Plant Rubber & Asbestos Works, Emeryville, Calif., a subsidiary of the Paraffine Companies, Inc., has been appointed manufacturing manager of the insulations division. Mr. Abrahams will manage manufacturing facilities of both the plant Rubber & Asbestos Works and the Schumacher Division of the Paraffine Companies, Inc.

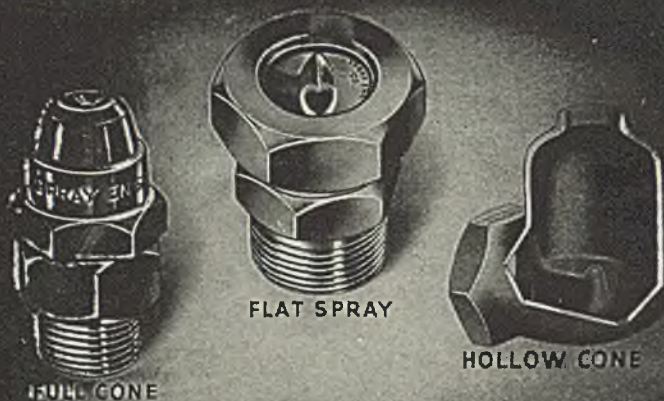
Robert I. Thieme, recently discharged from the Navy with the rank of Commander, has been made technical director of the Soundview Pulp Co., Everett, Wash., succeeding N. W. Coster who was promoted to general superintendent. Adof Orup was made director of research.

Stanley C. Adams, formerly assistant professor of chemistry at the University of Oregon, has been appointed chief chemist at the Fernstrom Paper Mills, Inc., Pomona, Calif.

John C. Morris is now superintendent of manufacturing of the resin and insulation materials division of the General Electric chemical department at Pittsfield, Mass.

Eugene Wainer has resigned as associate director of research of the Titanium Alloy Mfg. Co. to establish a research and development organization in chemistry and ceramics.

John G. Thompson, chief of the Bureau of Standards chemical metallurgy section in Washington since 1930, has been appointed



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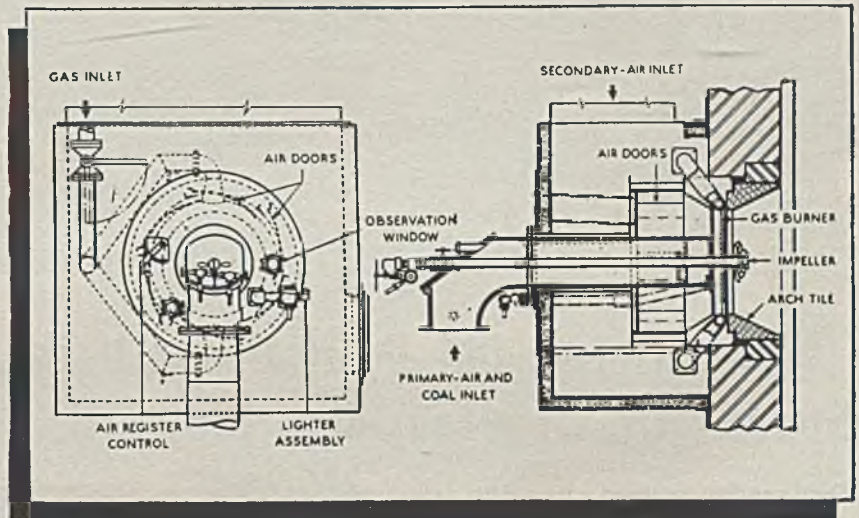
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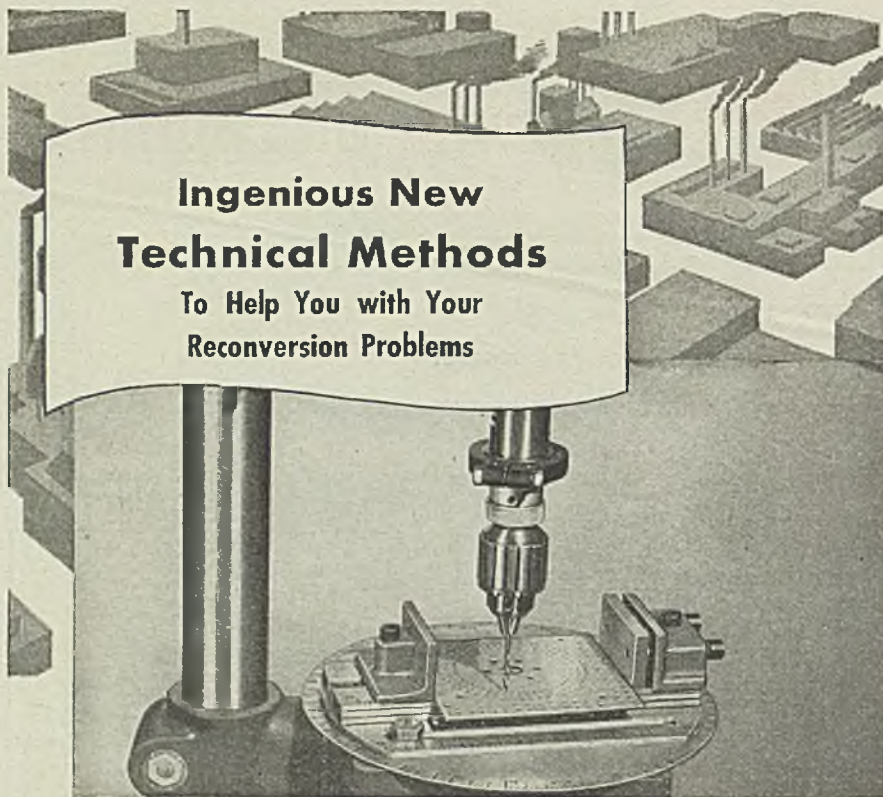


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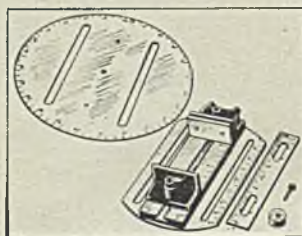
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chief of the metallurgy division. He organized and directed the recent investigations at the bureau on the metallurgy of uranium. From 1924 to 1929 he was employed in the fixed nitrogen laboratory of the Department of Agriculture on metallurgical and corrosion problems in connection with ammonia synthesis.

John R. Musgrave of the research laboratories of the Eagle-Picher Lead Co., Joplin, Mo., has been elected chairman of the Southeast Kansas Section of the American Chemical Society.

H. K. Babbitt, production manager of the special products section of E. I. du Pont de Nemours & Co. retired last month. The special products section has been consolidated with the black powder section under H. C. Peinert, production manager.

Mark M. Luckens, recently discharged from the regional hospital at Fort McClellan, Ala., has been appointed chief of the medical inspection branch at Fort Jackson, S. C. Capt. Luckens' department is in charge of such activities as water supply, sanitation, food and nutrition, and insect and rodent control.

Arthur H. Burkhardt has been named manager and Frederic B. Sackett assistant manager of the Du Pont photo products plant in Parlin, N. J. Mr. Burkhardt succeeds the late Karl R. Myers as plant manager. Mr. Sackett has been production superintendent at Parlin since 1944.

Robert K. Summerbell, head of the department of chemistry at Northwestern University, has been elected chairman of the Chicago Section of the American Chemical Society for 1946-47.

Sidney Sussman and Marvin Lane are now chief chemist and assistant chief chemist respectively of the Liquid Conditioning Corp., New York. Dr. Sussman was formerly chief research chemist and Mr. Lane was research chemist group leader with the Permutit Co.

William M. Springer has been appointed x-ray products manager of the photo products department of E. I. du Pont de Nemours & Co.

Edward W. Lang, chemical engineer recently released from the armed forces, has joined the staff of Southern Research Institute in Birmingham, Ala.

Albert E. Marshall, president of the Rumford Chemical Works, Rumford, R. I., has been elected chairman of the American Chemical Society's Rhode Island Section. Mr. Marshall is a former president of the American Institute of Chemical Engineers and a former chairman of the Society of Chemical Industry.

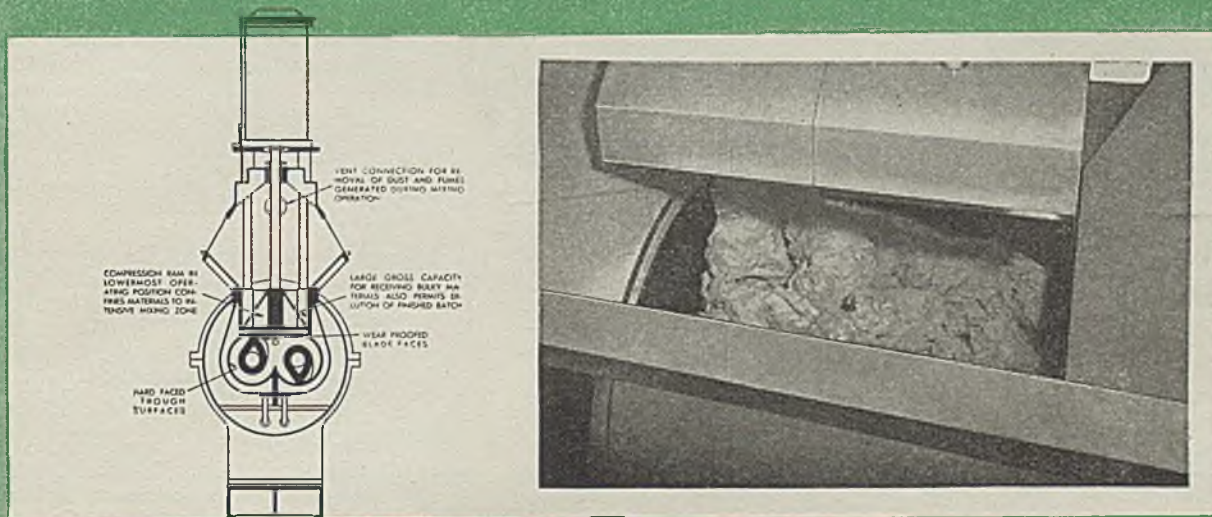
V. F. Hribar has returned to his position as chief chemist of the American Lumber and Treating Co., Chicago, after 3 years of duty with the Navy.

S. F. Bowlby, formerly assistant production manager for the Shell Oil Co., Inc., in Los Angeles, has been appointed vice presi-

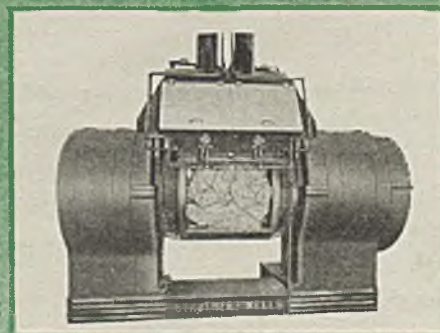
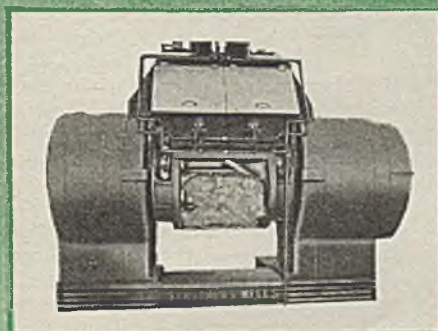
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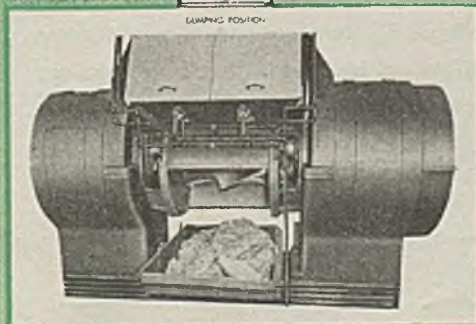
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dent in charge of the firm's Los Angeles activities. Mr. Bowlby has had more than 20 years' experience in petroleum production, engineering and management.

Robert M. Evans, who has been manager of the division handling the Du Pont Co.'s part in the atomic energy project, is now assistant manager of the industrial division of Du Pont's plastics department. In his new position, he will be assistant manager of the division which has charge of the manufacture and sale of plastic materials. He succeeds Calvin R. MacBride, who has been appointed assistant manager of the plastics department's products division. Mr. MacBride, who has been assistant manager of the industrial division since 1929, has transferred his headquarters from the plant at Arlington, N. J., to the division's offices in New York.

Edgar C. Bain has been awarded the Albert Sauveur Achievement Award for 1946. Dr. Bain is vice president in charge of metallurgy and research of the Carnegie-Illinois Steel Corp., Pittsburgh. Award of the scroll and plaque will be made November 21 at the American Society for Metal's annual banquet, held as part of the National Metal Congress and Exposition at Atlantic City, N. J.

Everett B. Evleth has been named president of Ray Control Co. of Pasadena. Mr. Evleth was formerly vice-president and general manager of Brown Instrument Co. of Philadelphia.

Victor M. Mantz has been promoted to the post of director of research of R. M. Hollingshead Corp., Camden, N. J., and Albert E. Moore has been appointed chief chemist.

C. B. Harston, agricultural chemist, has been named to the staff of Battelle Memorial Institute, Columbus, Ohio, where he will participate in a program of research on the effects of metals on soils.

Edward Hans Zeitfuchs, internationally-known authority on the physical properties of petroleum products and inventor of a viscosity meter widely used in the oil industry, is retiring from California Research Corp., Standard of California subsidiary, after 25 years' service.

Royal K. Abbott has left this country for Rio de Janeiro, Brazil, where he will be laboratory director for General Electric, S. A. While at the Pittsfield laboratory, Dr. Abbott's work has been in the field of synthetic organic dielectrics, which work he will continue in his new post.

W. F. Moore has joined the Davis Filtration Equipment Co., Inc., New York, as vice president in charge of manufacturing and technical director on filter processes.

G. J. Dekker has been elected a vice president of the Ohio Chemical & Mfg. Co. Mr. Dekker has been affiliated with Air Reduction, of which the Ohio Chemical & Mfg. Co. is a subsidiary, since 1919.

Frank C. Mathers has been named interim chairman of the department of chemistry, Indiana University, Bloomington, Ind., to



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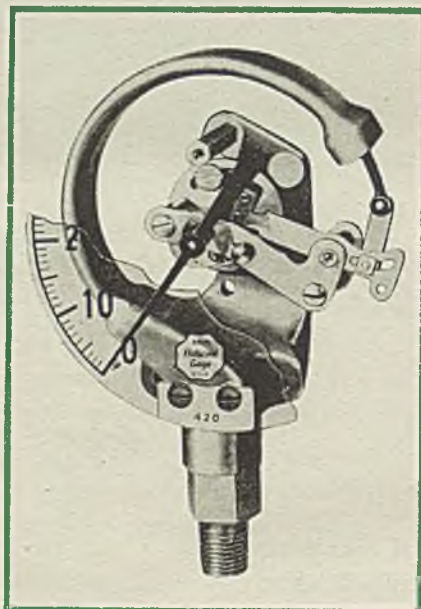
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succeed Ralph L. Shriner, who resigned July 1. Dr. Mathers has served as a member of the Indiana faculty for 43 years, and is widely known for his chemical research. A permanent successor to Dr. Shriner will be made later.

B. S. Pressburg has returned to Louisiana State University as assistant professor of chemical engineering after a leave of absence of approximately four years. During this period Major Pressburg served in the Chemical Warfare Service and the Signal Corps.

Benton Dales and Carl S. Williams, of Du Pont's rubber laboratory at Deepwater Point, N. J., have retired.

Carlyle J. Stelman of the central research department of the Monsanto Chemical Co., Dayton, Ohio, has been elected chairman of the American Chemical Society's Dayton Section. He succeeds John W. Wright of Dayton.

Clyde Williams, director of Battelle Memorial Institute, Columbus, Ohio, was presented the honorary degree of doctor of science at recent convocation ceremonies of the University of Utah, at Salt Lake City.

Ian D. Patterson has been named to fill the newly created post of assistant manager, chemical product development division, Goodyear Tire & Rubber Co.

Clifford T. Butler, former superintendent of Hercules Powder Co. plant at Bessemer, Ala., has been appointed superintendent of the Hercules, Calif., plant, to succeed Leroy P. Hall who has resigned.

Murray E. Othmer, associate professor of chemical engineering at Tufts College has left for the interior of China where he will confer with Chinese authorities on the rebuilding of chemical industries in the Honan Province.

P. M. Rapiet, for past several years in charge of Atlanta office of the Dicalite Co., has been transferred to Los Angeles where he will be connected with the research and service laboratories of that office. The Atlanta office will be under the management of E. V. Crossin.

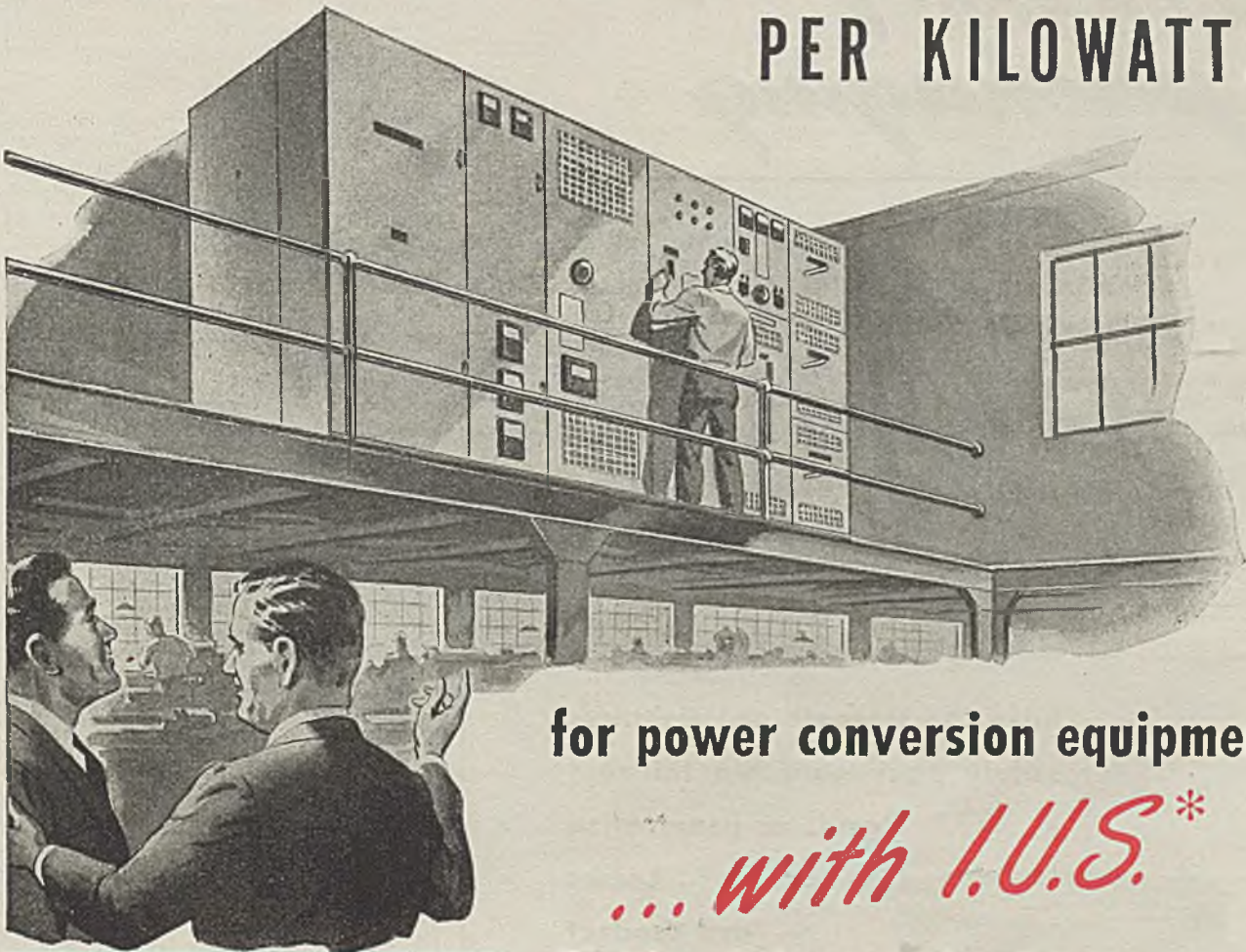
W. A. Kutsch, general superintendent of the A. E. Staley Manufacturing Co., Decatur, Ill., has been elected vice-president in charge of production. Other company changes include the elevations of R. E. Greenfield from technical superintendent to general superintendent and William B. Bishop from the director of the chemical engineering laboratory to technical superintendent. George Cornell has been named director of the chemical engineering laboratory.

R. W. Mason, Jr., formerly associated with the Lithium Co., Newark, N. J., has joined the development and research division of The International Nickel Co., Inc. He will make his headquarters at the Detroit technical section of the division.

Clement M. Gile has been elected vice-president of the Gulf Refining Co. and a


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vice-president and director of the Gulf Oil Corp. and the Gulf Research and Development Co., succeeding W. V. Hartmann, retired.

Thomas L. Reiling, chemical engineering graduate from the University of Dayton and formerly a lieutenant in the Navy, has joined the technical service division of Brown Co., producers of cellulose and allied products, Chicago.

Arthur Batts, president of the Carborundum Co., Niagara Falls, N. Y., and M. W. Thompson, treasurer and general manager of the Hall China Co., East Liverpool, Ohio, have been elected to the board of trustees of Industrial Hygiene Foundation.

Bennett S. Ellefson has been appointed director of the central engineering laboratories of Sylvania Electric Products, Inc.

Arthur D. MacNutt has been named technical director of the roofing granule division of the Minnesota Mining & Manufacturing Co., St. Paul.

Malcolm M. Haring has been appointed laboratory director of two sections of Monsanto Chemical Co., Dayton. He has replaced W. C. Fernelius, who has returned to his position on the faculty at Purdue University.

OBITUARIES

Nelson E. Lamus, 73, superintendent and engineer of Bonneville, Ltd., potash producers located at Wendover, Utah, died in Salt Lake City last month.

Ernest C. Wheeler, member of the firm of L. M. Demarest and Associates, New York, died very suddenly on July 2.

John J. Potts, chemist of the American Steel & Wire Co., Cleveland, died July 3.

C. A. Peterson, 58, a member of the research staff of the Armstrong Cork Co. for more than 35 years, died in Lancaster, Pa., July 5.

Samuel A. Salvage, founder and former president of the American Viscose Corp. and "father" of the rayon industry in the United States, died at his home at Fishers Island, N. Y., July 10.

H. M. K. Grylis, 52, special assistant to the manager of the South Chicago plant of E. I. du Pont de Nemours & Co., until his retirement July 1, died in Pasadena, Calif., July 14.

William P. Newman, retired purchasing agent of Robins Conveyors Inc., division of Hewitt-Robins Inc., died after a brief illness on July 17.

A. M. Lindenfesler, secretary of American-British Chemical Supplies, Inc., New York, died July 18.

Lancaster Morgan, 79, who was treasurer of the General Chemical Co. from 1913 until his retirement in 1924, died in New York July 22.

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Velsicol Corp., Chicago, has promoted Noble L. Mooneyham to the position of western district sales manager. The corporation has added Frank C. Peters to its eastern sales staff with headquarters in the New York office.

American Car and Foundry Co., New York, has elected Robert W. Ward vice president and moved him from Huntington, W. Va., to New York where he will be in charge of manufacturing. W. E. Lunger, general superintendent at Huntington, has been made district manager there.

Allis-Chalmers Mfg. Co., Milwaukee, has opened a new branch office in the Claremont Hotel Bldg., Evansville, Ind., and placed it under the management of R. W. Gillmore.

General Electric Co., Schenectady, N. Y., has expanded its chemical department at Pittsfield, Mass., through the formation of a metallurgy department. Dr. Zay Jeffries is general manager of the chemical department.

Paisley Products Co., Inc., Chicago, has appointed J. F. Sequin as its representative in Texas and Oklahoma with his office at 1410 Main St., Dallas, Tex.

Adel Precision Products Corp., Burbank, Calif., has added Ed. J. Towey to its staff in the capacity of sales manager of the in-

dustrial division. Mr. Towey formerly was executive vice president of the Diamond Iron Works of Minneapolis.

Mathieson Alkali Works, New York, has rearranged two southern sales areas with Harold R. Dinges in charge of one with headquarters at Charlotte, N. C., and Fred O. Tilson in charge of the other with headquarters at Chattanooga, Tenn. A new sales area in New England centers in Providence, R. I., with William H. Eastburn in charge.

Parker Appliance Co., Cleveland, has named J. E. Murphy manager of distributor sales. He joined the company in 1943 as sales representative in the Dallas territory.

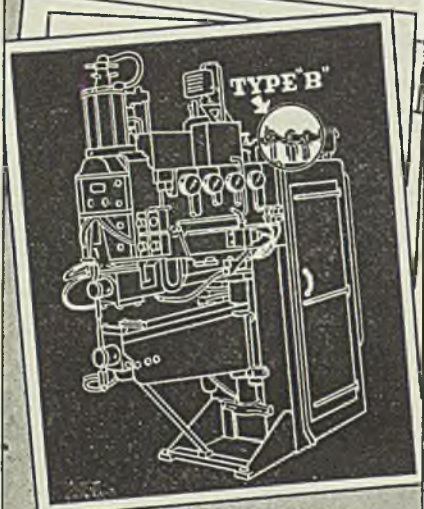
Wyssmont Co., New York, is now represented in the Chicago area by Raymond J. Solomon of the Selwyn Engineering Co.

Central Soya Company, Inc., Fort Wayne, Ind., announces that H. W. McMillen, vice president and a member of the board, is now serving as director of sales for the company and all its divisions.

C. P. Hall Co., Akron, has appointed Herbert S. Karch technical sales representative to take over the work of the late vice president, Arthur E. Warner.

Hammel-Dahl Co., Providence, R. I., has made Arthur J. Koch assistant sales manager. Mr. Koch holds a degree of chemical

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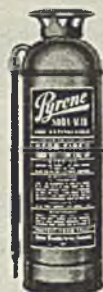
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Lukens Steel Co., Coatsville, Pa., has moved Robert H. McCracken from Boston where he was manager of sales, to the new branch recently opened in the Citizens Bank Bldg., Cleveland, where he also will serve as manager.

Electric Machinery Mfg. Co., Minneapolis, has appointed Russel Ransom as sales representative for North and South Carolina. His office is located at Charlotte, N. C.

Acme Protection Equipment Co., Pittsburgh, has sold its interests in the Acme Mask to a partnership headed by G. M. Glidden. Mr. Glidden will supervise production and sales as general manager. The gas mask division operations have been transferred from Pittsburgh to new quarters at 3035 W. Lake St., Chicago.

Hg Electric Ventilating Co., Chicago, has made four new appointments. F. H. Bigelow is now manager of the Atlanta office. H. H. Wilson is manager of the Memphis office. The Knoxville office has been reopened under the supervision of E. Lloyd Widner, while Henry M. Lutes has been established as manager of the Louisville office.

Carbide and Carbon Chemicals Corp., New York, has a new Albany office located at 50 State St.

Yale & Towne Mfg. Co., New York, has promoted Robert J. McGreevy to the position of assistant district manager of industrial truck sales engineering for the metropolitan New York area. Mr. McGreevy was recently released from active duty in the Navy.

Elliott Co., Jeannette, Pa. has named J. N. McClure manager of the petroleum division with headquarters in Houston, Tex. C. F. McGinnis is now Kansas City district manager. J. E. Walsh has been appointed manager of the Houston district office.

Unexcelled Chemical Corp., New York is the new name of Unexcelled Mfg. Co., Inc.

American Brake Shoe Co., New York, has appointed J. F. Weller to the newly created post of sales assistant to the president.

Gotham Instrument Co., New York, has appointed Glenn O. Carson to the position of regional sales manager for the West. Mr. Carson will make his office at 331 Kinnear Place, Seattle 99, Wash.

Glidden Co., Cleveland, has promoted Charles M. Dunn, Jr., to the position of manager of aviation sales, and James C. Rankin to the post of assistant to the district manager of industrial and transportation sales. Both men will be located at the Cleveland plant.

Warren Steam Pump Co., Inc., Warren, Mass., has appointed Jarvis Equipment Co. as district agents in Kentucky and the southern sections of Ohio, Indiana and

Chromy says:



Fit the Heat to Your Process

Chromalox *Electric* RING HEATERS

Heat Users

Complete data on all types of CHROMALOX *Electric* Heaters . . . their uses and applications . . . are in

Chromalox
CATALOG 42

The Contents:

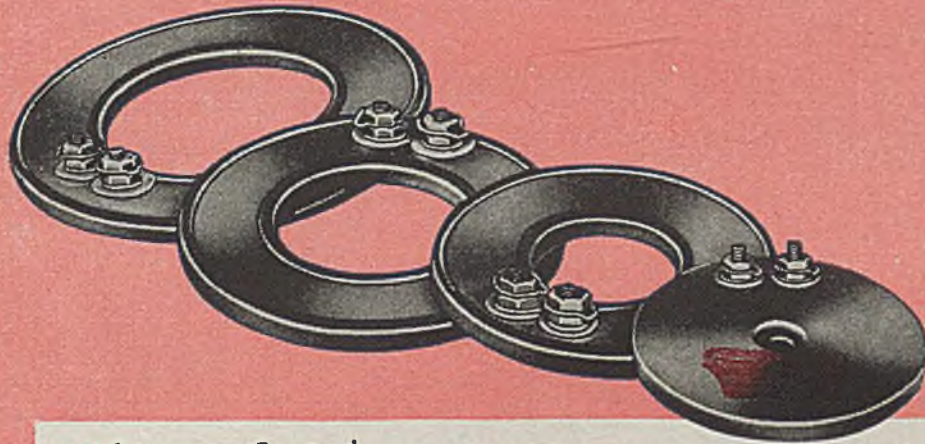
- The advantage of *Electric Heat*
- When and where to use *Electric Heat*
- Description, construction, rating, etc., of CHROMALOX *Electric Heaters*
- How to select the proper Heater
- Procedure for calculating heat requirements
- Heat-absorption calculator, wiring and installation diagrams
- CHROMALOX Application Engineering service

and additional technical data of value to electrical engineers, plant superintendents, foremen and other users of electric heat.

Send for Catalog 42, the *100 Ways to Apply Electric Heat* booklet and the address of CHROMALOX Application Engineer serving your territory.



EDWIN L. WIEGAND COMPANY
7514 THOMAS BOULEVARD
PITTSBURGH 8, PA.

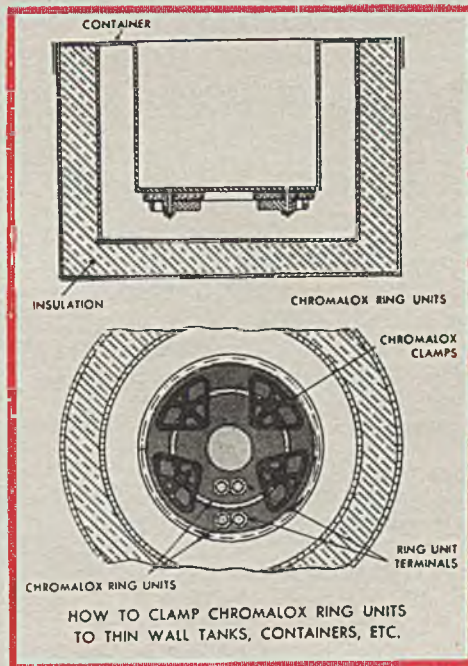


- Accurate Control
- Economical Operation
- Easy Installation

CHROMALOX *Electric* Ring Heaters give uniform heat distribution at the exact operating temperatures you want in your processes.

Rings are clamped to the flat surfaces of tanks, boilers, vats, kettles, hot-plates, platens, presses and other applications needing continuous heat. They may be nested inside each other when large watt-capacities are needed. Temperatures maintained manually or thermostatically.

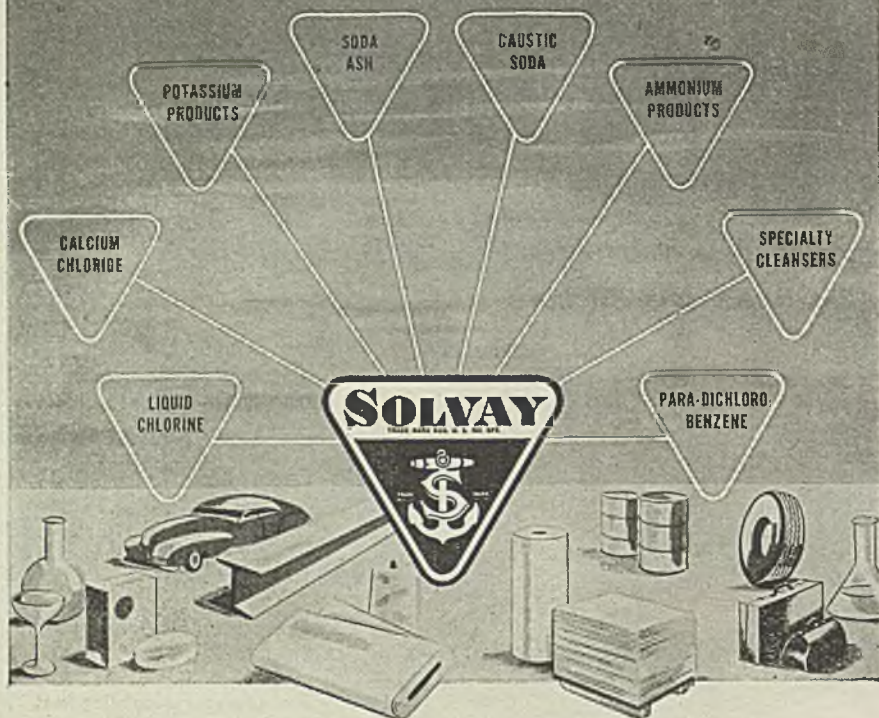
Your CHROMALOX Application Engineer will work with you in selecting efficient CHROMALOX *Electric* Heaters to fill your heat requirements.



CHROMALOX

Electric Heat for Modern Industry

FOR AMERICAN INDUSTRY...



THE FINEST IN ALKALIES and related products

When your new product development or new process calls for the use of alkalis, SOLVAY, the largest makers of alkalis in America, is a source you can trust. . . . The quality of SOLVAY products—backed by intensive research and extensive experience—has resulted in sixty-five years of continuous leadership in our field. This extensive knowledge of alkalis worked out by the SOLVAY Technical Staff is at *your* service to help you in new product development. We will welcome the opportunity to work on your chemical problems, in strict confidence, or co-operate with your own research staff. Why not call or write today? There is no obligation.



SOLVAY SALES CORPORATION

Alkalis and Chemical Products Manufactured by The Solvay Process Company

40 Rector Street

New York 6, N. Y.

West Virginia, with offices at 795 East McMillan Street, Cincinnati.

Girdler Corp., Louisville, has appointed Boyd R. Hopkins as eastern district manager of the Thermex Division. His headquarters are at 150 Broadway, New York. Robert Smith Logan, Jr., is now central district representative with offices in Cleveland. Capt. Logan was recently released from active duty in the U. S. Marine Corps.

General Electric Co., San Francisco, has announced that Charles T. Haist, Jr. has joined the staff of the electronics department where he will handle federal and marine equipment for the department's western district. Mr. Haist worked under Dr. Ernest O. Lawrence, University of California, as an electronics design engineer on the atomic bomb project.

Reynolds Metals Co., Seattle, has named Thomas A. Murphy as manager of a newly established western division of aluminum sales, with headquarters at Los Angeles. Mr. Murphy's territory will include the West Coast, Rocky Mountain States and Texas.

E. I. du Pont de Nemours & Co., Wilmington, has promoted Ambrose R. Chantler to the new position of general director of sales of the dyestuffs division. He is succeeded as director of sales by Eric J. Monaghan with Dr. Miles A. Dahlen as assistant director.

Air Reduction Sales Co., New York, has appointed A. C. Brown, Jr., manager of its Cleveland office. He succeeds Stephen H. Newborn who has been placed in charge of the Detroit office.

Robins Conveyors, Inc., Passaic, N. J., has moved its Philadelphia office to that of the parent organization, Hewitt-Robins, Inc., at 401 N. Broad St.

De Laval Separator Co., New York, has opened an office at 7212 Oak Grove Blvd., Minneapolis, with R. E. Thrush in charge and at 4746 Roanoke Parkway, Kansas City, with P. W. Perry in charge.

Graver Tank & Mfg. Co., East Chicago, Ind., has transferred Edward W. Welp from technical director of the process equipment division to sales manager of water conditioning equipment.

Kerotest Mfg. Co., Pittsburgh, has acquired the Wiljack Co. of South Pasadena, Calif., manufacturers of bar stock valves in carbon and stainless steel.

U. S. Industrial Chemicals, Inc., New York, has placed E. C. Phillips in charge of its newly-created St. Louis-Kansas City division. Mr. Phillips will make his headquarters in the company's office at 1600 Clark Ave., St. Louis.

Lovejoy Flexible Coupling Co., Chicago, has acquired in entirety, the manufacture and sales of the mechanical power transmission department of Ideal Industries of Sycamore, Ill.

Ceco Steel Products Corp., Chicago, has moved John W. Anderson from Birmingham, Ala., where he served as assistant man-

Straight-through

FLOW

for small pipe lines

For small lines where straight-through flow is required, here is an ideal valve. Especially suitable for sampling, viscous fluid and instrument line service.

Body and bonnet are forged steel and the disk is a truncated cone swivel plug, giving full contact against a borized conical seating surface. A diagonal pressure relieving hole is drilled below the disk to facilitate seating or unseating. It may also be used to open a passageway for cleaning out the valve.

Three styles are available

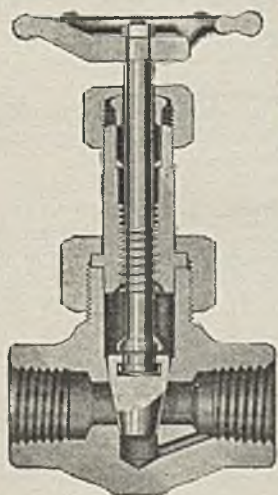
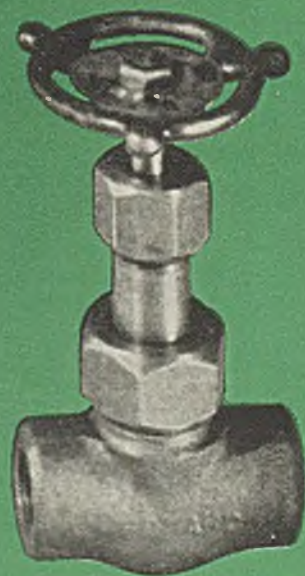
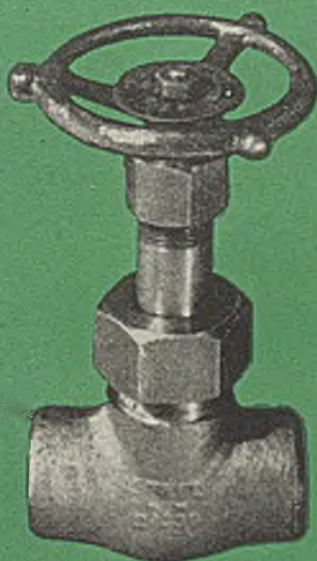
Fig. 150—Carbon steel body and bonnet, stainless steel trim.

Fig. 2150—All stainless steel.

Fig. 4150—All "18-8" steel.

Built in $\frac{1}{8}$ in. to 1 in. sizes inclusive.

Write for Catalog No. 103.



Edward Valves, Inc.

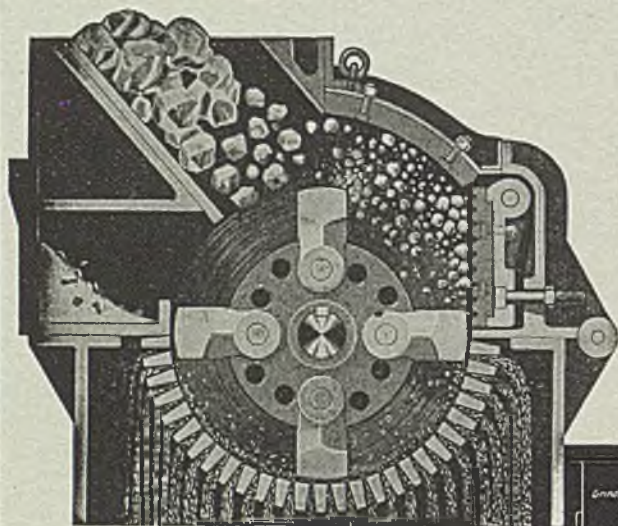
Subsidiary of Rockwell Manufacturing Co.

EAST CHICAGO, INDIANA

WILLIAMS

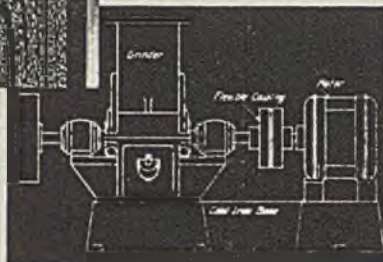
HEAVY DUTY HAMMERMILLS

FOR INDUSTRIAL USE . . . Grind Chemicals
 . . . Crush 4 feet Cubes of Rock . . . Shred
 Steel Turnings



Sectional view of Williams over-running hammermill with heavy liners and grinding plate for limestone and other hard material. Particular attention is directed to the grinding plate adjustment which assures uniform close contact of hammers and grinding plate at all times. Also note the metal trap which provides an outlet for the escape of tramp iron.

Williams Hammer Grinder direct connected to motor, all mounted on heavy cast base. This type of drive is economical to operate and easy to install.



Reduces

**ANIMAL . . . MINERAL
 VEGETABLE MATTER**

Capacity from 50 pounds to 300 tons per hour

● Williams is the world's largest organization of crushing, grinding and shredding specialists and have developed standard machines for the reduction of practically every material whether animal, mineral or vegetable. Capacities range from 50 pounds to 300 tons per hour permitting selection of exactly the proper size for your work. Whether you wish to grind chemicals to 400 mesh, crush 4 feet cubes of rock or shred steel turnings, you can profit by Williams' experience.

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO.

2706 North Ninth St.

St. Louis, Mo.

Sales Agencies Include

Chicago

New York

Oakland, Calif.

37 W. Van Buren St.

15 Park Row

1629 Telegraph Ave.



WILLIAMS
 OLDEST AND LARGEST BUSINESS OF HAMMERMILLS IN THE WORLD
WILLIAMS
 PATENT CRUSHERS GRINDERS SHREDDERS

ager, to Oklahoma City where he will act as manager, replacing R. K. Alexander who has been put in charge of the office and warehouse at Houston, Tex.

Bakelite Corp., New York, a unit of Union Carbide & Carbon Corp., has announced the acquisition of the plant site of the Inland Rubber Co., northwest of Ottawa, Ill.

Enterprise Engine & Foundry Co., San Francisco, Calif., has appointed W. S. Everett as sales engineer. Formerly with Standard Oil of California and Colgate-Palmolive-Peet Co., Everett has recently returned from Naval service.

Durham Chemical Co., Los Angeles, Calif., will erect a 5,000 sq.ft. building at 4124 E. Pacific Way, for increased manufacture of agricultural chemicals and insecticides.

Kaiser Co., Inc., has opened a new export division at 30 Church St., New York, to supplement its west coast offices in Oakland, Calif. The office will be under the direction of William F. Pelletier.

Turco Products, Inc., Los Angeles, Calif., has appointed Thomas G. Franzreb and Donald Keating to the technical service division staff. Both men have recently been released from Naval duty.

Food Machinery Corp., San Jose, Calif., announced the appointment of Ralph W. Cook as sales manager of the Bean-Cutler Division in San Jose. Mr. Cook has formerly been in the company's pump division and worked during the war with the Amphibian Tank program.

C. P. Hall Co., Akron, has promoted Thomas L. Stevens to the vice-presidency of the company.

Globe Steel Tubes Co., Milwaukee, has appointed Gilbert H. Krohn, manager of sales for the Detroit district sales office. Willard C. Christianson has been transferred to the Chicago district sales office as sales agent. Frederick K. Krell has been appointed sales service supervisor.

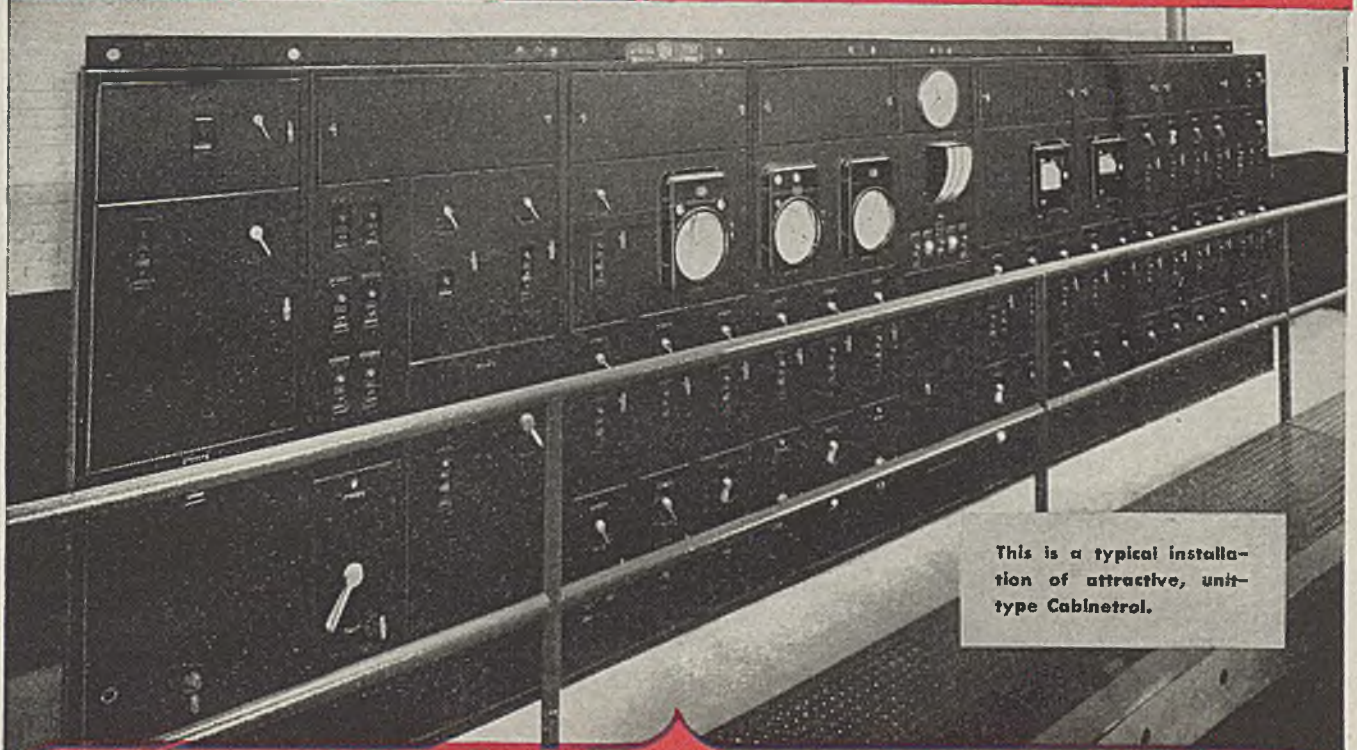
Victor Chemical Works, Chicago, has elected Tolman G. Everett assistant secretary. Frank A. Schwerdt was elected treasurer.

Proctor & Schwartz, Inc., Philadelphia, has made Stanley Whiteway director of publicity for the corporation.

Tube Turns, Inc., Louisville, Ky., has appointed C. C. McDermond representative of the welding fittings division in Venezuela and Colombia. Mr. McDermond and his assistant, C. T. McCoy, will make their headquarters in Apartado No. 331, Maracaibo, Venezuela.

United States Rubber Co., New York, has appointed Walter C. Burns district sales manager of the mechanical goods division in San Francisco. He will have supervision over mechanical goods sales in northern California and most of Nevada, including the cities of San Francisco, Sacramento, Stockton, Fresno and Reno.

HODGE-PODGE CONTROL IS EXPENSIVE!



This is a typical installation of attractive, unit-type Cabinetrol.

Trim, Modern CABINETROL Cuts Installation Time and Cost

Rambling, space-taking racks are a thing of the past. Control in the *modern* chemical plant is compact, centralized G-E Cabinetrol. It's attractive in design, safe to operate, and it costs no more!

Cabinetrol saves installation time and expense because it's a single, self-supporting unit. No cumbersome frames—no cluttered walls. Just one attractive, all-metal unit that will greatly enhance the appearance of your mill.

The savings in installation cost that you get with Cabinetrol usually far outweigh its higher original cost. Only two operations are necessary—placing the unit in the designated location and connecting external power, motor, and control leads.

IT'S PRE-ENGINEERED

Cabinetrol is based on the use of standard enclosures equipped with the right combination of standard control devices. Each unit is pre-engineered to meet your specific requirements. All starters and accessory equipment necessary to your application are incorporated in the Cabinetrol unit before it is shipped.

PROTECTS YOUR OPERATORS

Because metal-enclosed Cabinetrol is completely deadfront, it offers your operators and servicemen maximum protection. Each motor control is installed in an individual sheet-steel compartment with an interlocking door. Operating mechanisms for motor-circuit switches and air circuit-breakers are available from the front of the panel.

LET US HELP YOU equip your plant with co-ordinated control. We'll be glad to work with you now—to provide a Cabinetrol system specially engineered for your plant—and, if you desire, to help you fit Cabinetrol into your over-all plans.

If you'd like more facts about Cabinetrol ask for Bulletin GEA-3856. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

G-E INDUSTRIAL CONTROL

GENERAL ELECTRIC



*"You CAN
take it with you..."*

if it's a

BROOKFIELD SYNCHRO-LECTRIC VISCOSIMETER

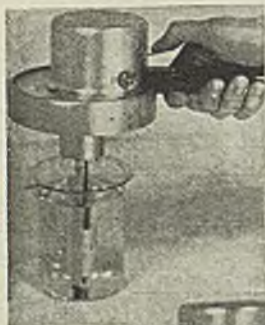
Making Viscosity tests at point of process is a snap with the Brookfield Viscosimeter. All you need is a convenient electrical outlet and you're set to take readings of high accuracy in 30 seconds.

Readings given directly in centipoises over wide ranges. Temperatures up to 600 F. No adjustments necessary. Requires no technical skill.



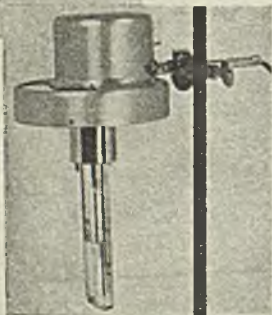
PORTABLE!

USE IN PLANT OR LAB



Same instrument can be used in both plant and lab. Use as a portable instrument shown at left. Operates on 60 cycle 110 volt current.

When instrument is needed for stationary use only it may be mounted on a rod clamp as shown at right. Handles are interchangeable.



BROOKFIELD
ENGINEERING LABORATORIES
BOX 603-C, SHARON, MASS.

CONVENTION PAPER ABSTRACTS

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OXYGEN UTILIZATION IN GAS MAKING PROCESSES

DEVELOPMENTS in large scale oxygen production by methods of air separation give promise of supplying oxygen at a low enough cost for gas production for public utility distribution. Electrolytic and chemical absorption methods cannot compete at the present time with large scale modern air separation plants.

A number of gasification processes have been developed for the utilization of oxygen. These replace the alternate blasting and steaming of the water gas machine

with continuous producer gas operation in which oxygen is substituted for air.

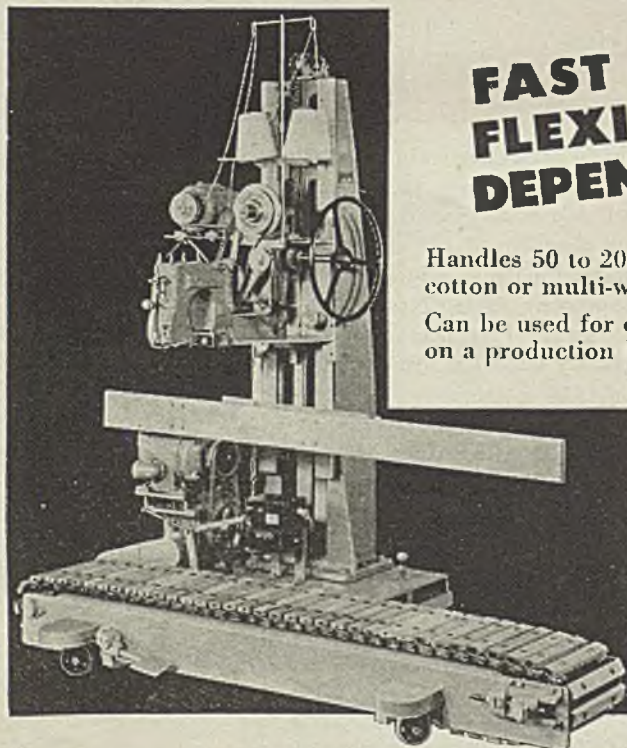
The Winkler type of generator operates with a fixed-fluidized bed. It is a high capacity unit on the basis of cross-section area, but probably occupies as much volume as other types of water gas generator having the same total capacity. The Winkler type generator requires reactive fuel and yields a lean gas which is costly to scrub, if no compression is otherwise required. On the clean gas basis the oxygen requirements are very high. Means for carburetion must also be provided. Powdered fuel types of generator operate with the fuel in suspension. They give promise of being more economical in fuel and oxygen consumption, and of being adaptable to any coal of suitable grindability. The problem of carburetion may be solved by the injection of oil into the generator.

Fixed fuel bed types of generator operate under high pressure with mechanical grates or under normal pressure with mechanical grates or slagging.

The pressure type yields a richer gas and has lower oxygen requirements. These advantages are offset by the high capital cost and the high fuel and steam consumption. It is not suitable for coking fuel. For the gasification of highly reactive low cost non-caking fuels the pressure type appears to be an excellent solution. However, there still remains the problem of enrichment if the standards of distribution are not to be lowered.

The normal pressure types operating with

The CONSOLIDATED Model 105 HEAVY DUTY PORTABLE BAGGER



**FAST
FLEXIBLE
DEPENDABLE**

Handles 50 to 200 lb. bags of burlap, cotton or multi-wall paper.

Can be used for continuous operation on a production line or moved to any point in the mill for intermittent operation. 6' or 9' slat conveyor. Floor space required: 4'x6'10".

•
Write
for
Information
•

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N. Y.

"CAN DO" *Erection*



All
Or Any Step
In Design,
Engineering,
Fabrication
Or Erection
of
Process Plants
for the
Oil, Gas
and Chemicals
Industries

★
P. O. BOX 2634
HOUSTON 1, TEXAS

All Around Experience
That Saves Time and Money

Produces Results!

The years that have made Brown & Root, Inc., the oldest firm of engineers and constructors in the Southwest, have given them wide experience in erecting structures of every type.

Chemical plants, petroleum plants, dehydration plants, dams, power plants, compressor stations; shipyards, hydro-electric plants, tire factories, steam plants, office buildings are just a few of the vast and complicated erection projects completed quickly, economically and well by Brown & Root, Inc.

Problems from foundations which must bear astronomical weights to valves that must withstand 10,000 pounds pressure have been met and solved by a team of management, engineers and mechanics seasoned by many years of working together on the Southwest's greatest erection jobs.

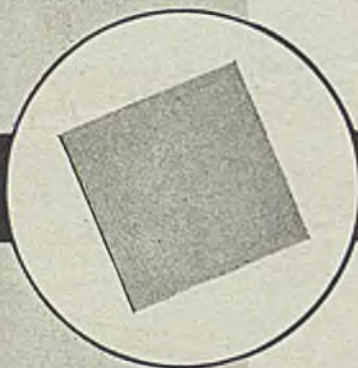
Bring your erection problems to the firm which experience has proven can do any type of erection and leave it entirely in our hands, or take advantage of the perfect cooperation we can give your management and engineers.

BROWN & ROOT, Inc.

NEWARK WIRE CLOTH

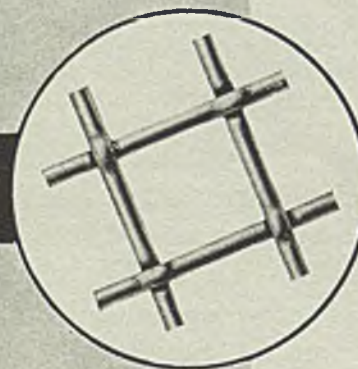
NEWARK
for ACCURACY

Best by
Test
for



FINE POWDERS

Newark—precision manufacturers of Wire Cloth and Wire Cloth Fabricated Products—has a complete selection of wire cloth available! For sifting everything from fine powders to large lumps, we have the proper mesh wire cloth.



LARGE LUMPS

Securely double-crimped, extremely accurate and, if desired, highly-corrosion resistant, NEWARK WIRE CLOTH will meet your most exacting standards.

Newark Wire Cloth
COMPANY

350 Verona Avenue • Newark 4, New Jersey

mechanical grates or slagging require non-caking coal. Mechanical agitation may make their use possible for caking coal. The ash fusion temperature of the fuel must be high in generators equipped with mechanical grates, but is not quite as important in slagging operation; the composition of the ash will determine the amount and kind of material required for fluxing.

Mechanical generators require more oxygen when operating at normal than at high pressure, and slagging still more principally because of heat losses in the slag. However, the oxygen requirements of fixed bed generators are likely to be lower than of generators with fixed fluidized beds or with beds in suspension.

The high investment cost of oxygen plant will make the production of gas by the use of oxygen economical only as a base load proposition. The unit costs of oxygen produced in small plants are bound to be higher than in large plants, principally because the investment costs are disproportionately higher. Large plants may, therefore, be the first to find the use of oxygen economical and the first commercial installations will probably be made by the larger utility systems.

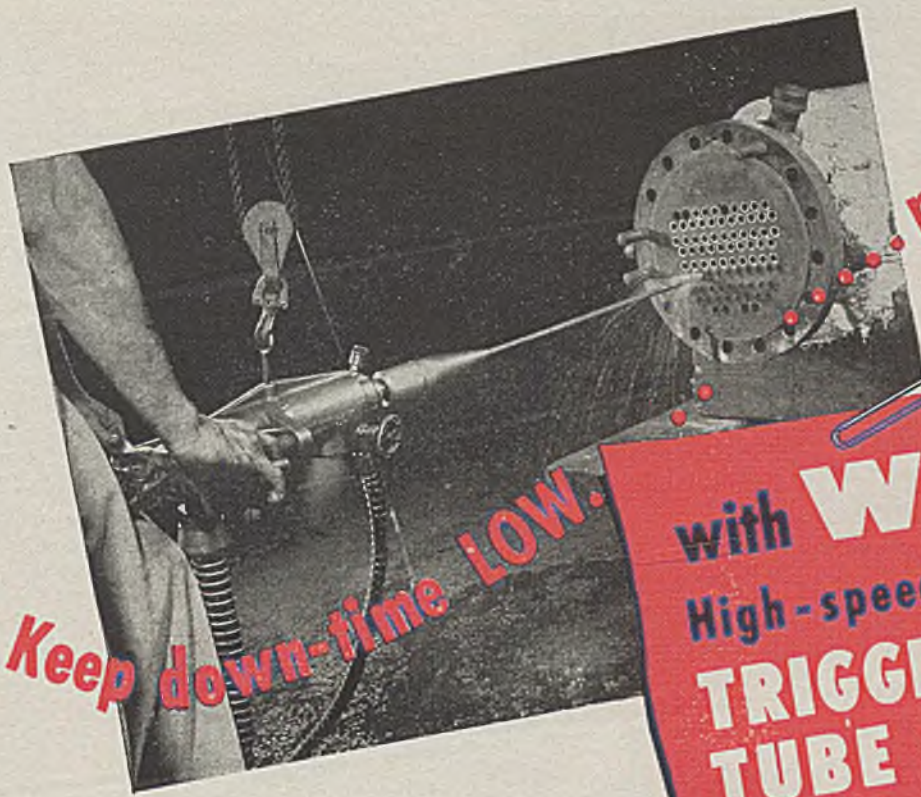
L. L. Newman, Bureau of Mines, before American Gas Association, New York, June 5, 1946.

USES AND LIMITATIONS OF DE-IONIZED WATER

Raw water varies a great deal in composition according to the sections in which it is pumped, and often times there is great divergence within the same locality. Some manufacturing processes are further complicated by having one water supply which in itself will show seasonal variations. De-ionizing produces on such supplies a water free of dissolved solids which is the equal of, and often considerably better than, single distilled water in so far as total solids are concerned. This mineral-free water costs but a fraction of that produced by steam stills, and it is supplied under line pressure in volumes that would be, from a cost standpoint, prohibitive to distill. The mineral-free water is supplied at the temperature of the raw supply. In general, then, the de-ionizing resinous exchangers eliminate a variable water condition.

While it is true that the quality of many products has been benefited by de-ionized water and that costs have been reduced in operations where large volumes of water are needed, it is only fair to state that some limitations were observed in the early exchangers. These troublesome factors have been thoroughly investigated and new resins formulated to overcome the objection of the earlier ion exchange materials. The objection of color throw, observed during intermittent operation of the exchanger in the de-ionized effluent, is almost entirely eliminated by using nuclear sulphonic acid groups in the hydrogen resin base. The presence of amines is now completely eliminated in the effluent by employing a more completely C stage polymerized amine formaldehyde resin for acid adsorption.

Heretofore, the use of de-ionizing resins has been confined to a low, close temperature range. This limitation has been overcome in the course of resin improvement, and there are now available exchangers



Keep down-time **LOW.**

production **HIGH**

with **WILSON**
High-speed, High-torque
TRIGGER POWER
TUBE CLEANERS



Wilson Vibromatic Attachment in place on front of Trigger Power Tube Cleaner.



Close-up of finger-tip "trigger" control.

Tube cleaner working speed is one highly important factor in cutting down-time to a minimum — but unless the job is done thoroughly, without damage to tube walls, cleaner speed has no significance.

In the Wilson Trigger Power tube cleaner, not just one, but every essential feature is incorporated in the design, with the result that it cleans tubes from $\frac{3}{8}$ " I.D. to $1\frac{3}{4}$ " I.D. with a speed, efficiency and safety never before attained. These essential features are:

- ① High working speed — up to 3500 rpm — permits use of standard Wilson accessories such as expanding brush, expanding cleaner, cutter-bits, etc.
- ② Direct drive eliminates complicated construction and attendant maintenance problems.
- ③ Vibromatic attachment speeds up cleaning of completely plugged tubes by delivering 1900 pulsations per minute to the cutter bit. This enables the bit to get a "bite" on flint-hard carbon or rock-like deposits — yet causes no damage to tube walls.
- ④ The hollow shafting of the Wilson Trigger Power tube cleaner "gives" sufficiently to follow the contour of sagged tubes — thus preventing wall damage.
- ⑤ Rotary-type mechanical seal at point of introduction of scavenging agent eliminates packing troubles and permits use of any scavenging agent at high pressure . . . even coal oil may be used when it is economically available.
- ⑥ Instantaneous, finger-tip control of speed and power.

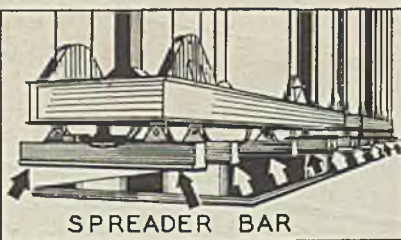
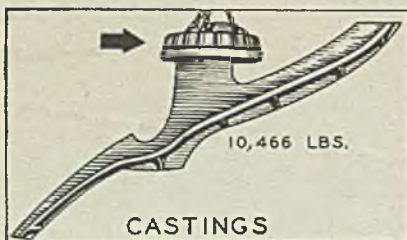
Take advantage of the *Wilson Trigger Power* tube cleaner! You can depend on its many exclusive features to help you cut down-time and increase production.

Order *Wilson Trigger Power* tube cleaners from stock — or write today for additional information. Please address department A.

THOMAS C. WILSON, INC.
21-11 44th Ave., Long Island City 1, N. Y

WILSON
TUBE CLEANERS

TV-710



Lifting Magnets FOR ALL PURPOSES

You get definite saving of time and labor in moving material inside and outside of your plant with Stearns Lifting Magnets.

Will speed your loading and unloading operations—obviate hand labor on dangerous and difficult jobs—increase storage capacities—reduce your costs.

Let Stearns give you a lift with sturdy, dependable, low initial and operating cost magnets. Can be had in all practical sizes and shapes to suit your requirements.

Stearns Magnets are being successfully and profitably used in handling scrap iron, loose or baled; steel plates, coils, bundles, strips; rails, slabs, billets, pig iron, castings, borings, turnings, finished products, etc., as well as for road and floor sweeping purposes. Can be installed on industrial crane trucks for out of the way spots not reached by overhead cranes.

Stearns Magnets pay for themselves in a short time, require surprising little attention, are your best bet for economical, fast and safe moving of material.

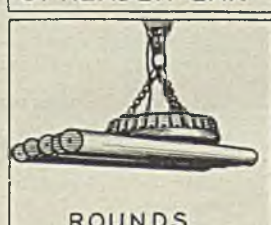
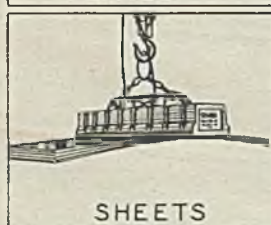
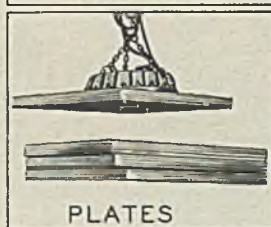
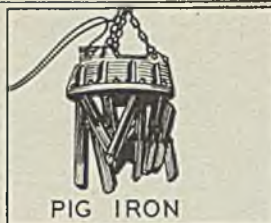
And—we can furnish Suspended Separation Magnets also in sizes and shapes to do your work.

SEPARATORS
DRUMS
PULLEYS
CLUTCHES
BRAKES
MAGNETIC
EQUIPMENT



MAGNETIC MFG. CO.

629 S. 28th Street
MILWAUKEE 4, WIS.



which permit the treatment of water up to 160 deg. F., with the possibility of still higher temperatures being permissible in the near future.

Possibly the chief limitation of the exchange phenomenon has been in its inability to remove silica from natural raw water. There is no doubt that the scope of de-ionizing has been narrowed by the fact that any silica in the reactions remain unexchanged.

In those few processes where it is deemed necessary, silica can now be removed by the use of sodium fluoride ahead of the hydrogen exchange reactor. The sodium fluoride is converted to hydrogen fluoride in the first stage which then converts silica to fluosilicic acid, which is adsorbed with the other mineral acids of the reaction on the acid binding resin in stage two. De-ionized effluents also will contain some dissolved carbon dioxide as any carbonates in the natural water will have been converted to carbonic acid which, to a large degree, passes through as a solution of carbon dioxide. The amount is dependent on the carbonate content of the raw supply. If this carbon dioxide content is objectionable, it may be eliminated to a degree which is governed by requirement.

It is not to be presumed, however, that all limitations have as yet been corrected. Water containing pyrogens, for example, cannot be passed through the exchangers to obtain complete pyrogen removal. Conversely, however, water free of these complex bodies is not contaminated in the reaction of ion exchange.

W. S. Morrison, Illinois Water Treatment Co., before American Pharmaceutical Manufacturers Association, Lake Louise, Alberta, Canada, June 11, 1946.

INTENT OF THE McMAHON BILL

THE COMBINATION of scientist and engineer which brought us such unparalleled success in wartime, can carry us to greater achievements in peacetime. Just as in baseball it would be bad judgment to break up a winning pitcher-catcher combination, just so is it necessary to maintain and even extend the teamwork of the researcher and the applier. Dealing in research, the scientist discovers all sort of facts about the world we live in and the universe beyond. Sometimes these discoveries lie dormant for years, or even for centuries. Sooner or later the engineer comes along and puts these discoveries to practical use for the benefit of man.

Discoveries of science, when developed and harnessed by the engineer, have brought about new ways of life and higher standards of living. They have helped to make it possible for men to be free, to a greater degree than ever before in history, from the evils of slavery, poverty, drudgery and insecurity.

The widespread utilization of nuclear energy for peaceful industrial purposes is inevitable. The question is, shall it come about in an orderly and evolutionary manner, one which will substitute new industries as the old ones become obsolete, one which will provide new jobs as the old ones are done with? Or shall it come about in an uncontrolled, chaotic and revolutionary manner?

The intent of the McMahon Bill is not to restrict or retard development or utiliza-

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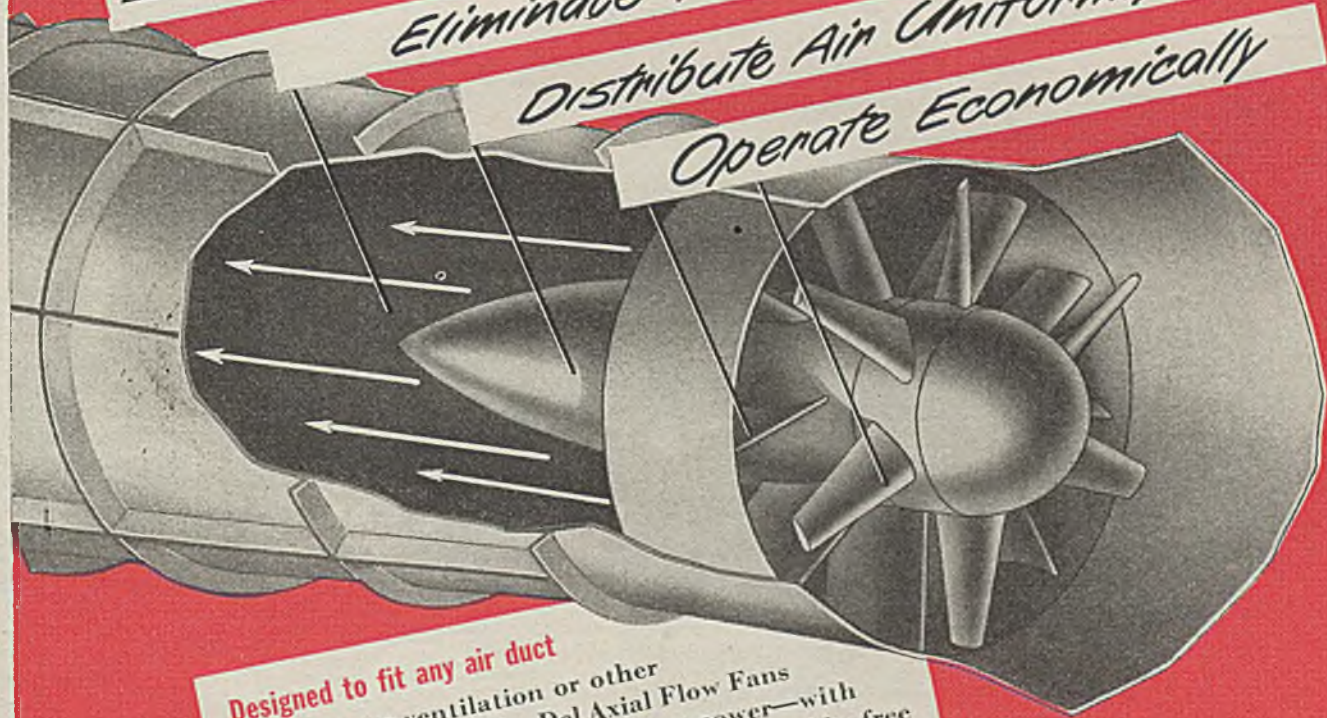
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tion; its purpose is to bring about development and utilization, to give the people who invested billions of dollars in this project the dividends on their investment, but to do it in a manner which will make it a blessing rather than a curse because of needless suffering and misery. The unlocking of the atom was a revolution. There can be no dispute about that. Now we must do something new in human history. We must police a revolution for the protection of the people.

Senator McMahon, before American Society of Mechanical Engineers, Detroit, June 17, 1946.

MATERIALS OF CONSTRUCTION FOR AIRPLANES

REVOLUTIONARY developments, particularly in the military field, are creating new and stringent requirements for construction materials in the aircraft industry. More speed, increased range and the use of automatic control and guidance systems are outstanding current trends, and each poses special problems with regard to materials.

Flying speeds already are exceeding the most enthusiastic predictions of a few years ago, and they necessitate very compact and lightweight power plants operating at high efficiency.

There is a tremendous amount of research still to be done in the field of high-temperature alloys for the use of gas turbines to enable them to operate for long periods at the desirable high temperatures.

Because of the high speeds which are or will be involved, all electronic equipment must be housed inside the main structure of the aircraft but, in order to be operative, the solid structure in front of them must be of non-metallic material. This is one of the prime reasons for the increased activity in the development of fiberglas cloth and plastic.

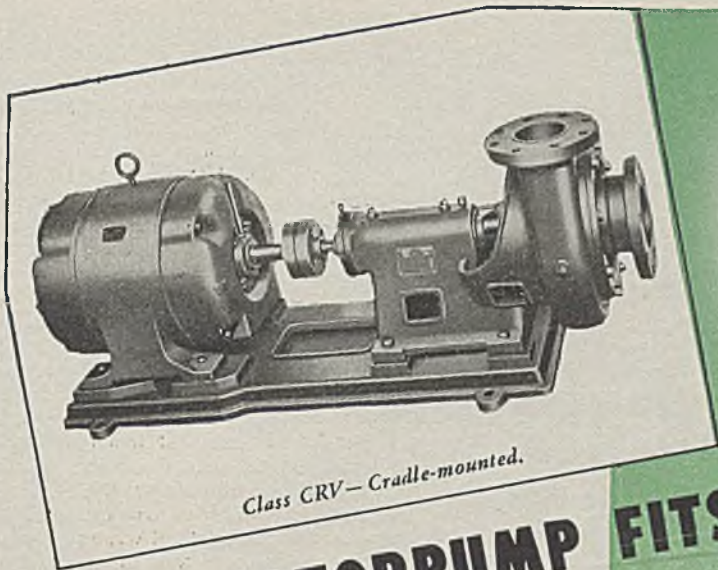
During the last 15 years the standard material of construction for airplanes has been the lightweight aluminum alloys. There is every indication that these will always maintain a prime position in the field. When certain research and development problems have been solved, it is quite likely that other materials, such as the still lighter weight magnesium alloys, or non-metallic materials, such as fiberglas cloth and plastic, will enter into the construction in a very substantial degree.

There are still many problems to be solved in developing methods to cut down the cost of construction in the use of these newer materials. The optimum of resistance to corrosion and other forms of deterioration much be achieved. This all adds up to the need for a tremendous amount of research and development before the full possibilities of the newer types of materials can be realized.

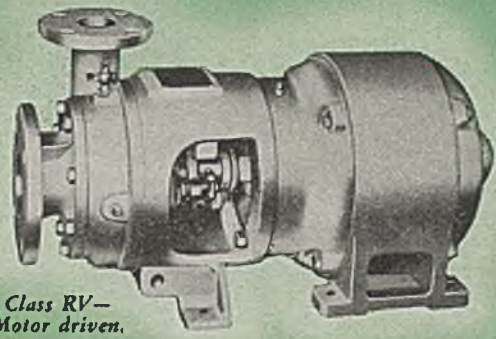
C. C. Furnas, Cornell Aeronautical Laboratory, before Oklahoma Section, American Chemical Society, Tulsa, May 11, 1946.

RESEARCH AND DEVELOPMENT PROGRAM OF CWS

IN ADDITION to the primary purpose of perfecting means of waging biological and chemical warfare offensively and defensively, other benefits derive from the research and development program of the Chemical Warfare Service. The civilian applications



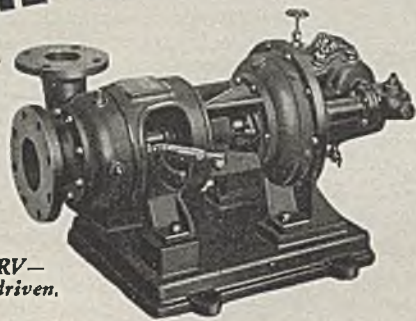
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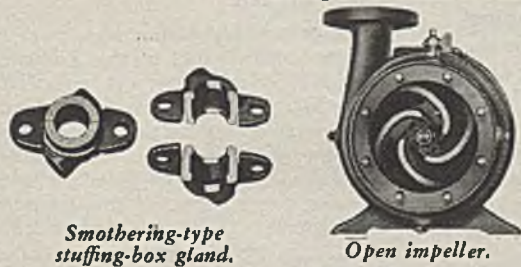
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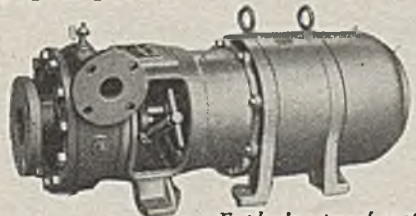
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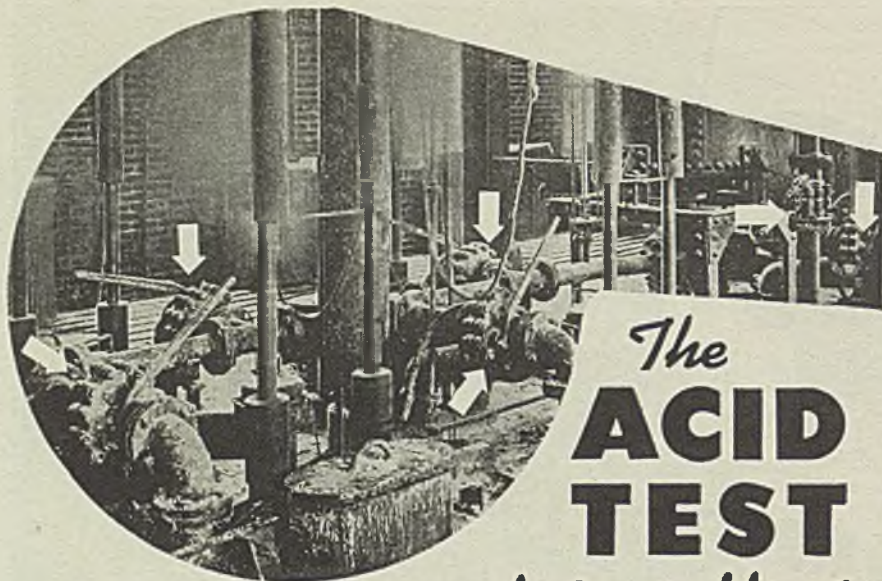


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of various CWS developments have been pointed out. In addition to those, it is felt that important contributions have been made by publishing technical articles in many of the scientific journals. Since the war, many more articles have been published or prepared. The Technical Division has sent over 1,400 reports to the Department of Commerce for release.

Although there is some need for improvement of munitions and methods used or contemplated during the war, it is the policy of CWS to develop means of fighting the next war, if it comes, with the most modern weapons that science can devise. This policy calls for much basic research. When research is of such general nature that many discoveries and much information having limited military significance are produced, CWS will release the facts as they become available. A considerable volume of such material is likely to develop from the research which is in progress or under consideration. It will not be hidden if it lacks military importance.

In order to maintain close liaison with industry and educational institutions, so that CWS may secure the best information and so that the research may be of highest quality, the policy has been adopted of placing research contracts with such agencies. The contracts call for work in a particular field, but the methods of directing and performing the work are left largely in the hands of the organization doing the work. A substantial portion of CWS’s funds for research and development will be used to finance this program. Some contracts have been let and others are being negotiated.

Brig. Gen. Charles E. Loucks before First Annual Meeting of Chemical Warfare Association, Edgewood Arsenal, Md., May 24, 1946.

PRODUCTION OF GERMANIUM

TRACES of germanium have been noted in zinc sulphide ores of the Tri-State district for many years, but no effort was made to recover the metal until about five years ago. By spectroscopic analyses, germanium was found to be concentrated in the cadmium fume produced in sintering the zinc concentrates. During treatment at the Henryetta, Okla., cadmium recovery plant, this fume is dissolved in sulphuric acid and the cadmium is separated from other metals, such as zinc, lead, copper, iron, germanium, indium and gallium. It was found possible, by coordinating spectroscopic analyses with different possible treatments, to concentrate most of the germanium into one or two residues which would make eventual recovery feasible.

The properly prepared residue is shipped to the Joplin Research Laboratory, where it is distilled with excess strong hydrochloric acid (at least 31 percent HCl). The volatile GeCl_4 , with some HCl and volatile chlorides of some other metals, distills over and is caught in ice-cooled containers. The treatment of the raw tetrachloride is rather complicated and involves many steps. Eventually, a pure water-white GeCl_4 is obtained which is spectroscopically pure.

From the pure tetrachloride, germanium hydroxide is formed by simple hydrolysis. One volume of GeCl_4 is diluted with ap-



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Answer: Send Alloy your piping layout. They will quote you on a complete installation.

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proximately five volumes of dilute ammonia. After standing for 24 hr., using extreme care to prevent contamination with dust, the hydroxide is almost completely precipitated. It is filtered on a large Buchner funnel, washed with a small amount of water, dried at 150 deg. C. to form the dioxide, and stored for shipment.

The metal is obtained from the dioxide by reduction with sodium cyanide, carbon, or hydrogen. For extreme purity, reduction with hydrogen at 900 deg. C. is much the best method. For normal uses, reduction with either cyanide or carbon at 1,200 deg. C. is satisfactory, but some impurities are bound to be picked up from the crucible.

R. I. Jaffee, E. W. McMullen and B. W. Gonser, before The Electrochemical Society, Birmingham, Ala., April 1946.

GERMAN SCIENTISTS WILL COOPERATE

GERMAN scientists as a class believe they have a major responsibility to restore their country to a leading position. It is the opinion of those who entered Germany immediately after the collapse that the academic scientists, although loyal to their country, took no active part in political affairs and in only rare instances approved the appointment of the party tools to university professorships. It appears that they have been influenced to a certain extent by proletarian propaganda, but their supreme interest is in finding ways and means of returning to their research problems.

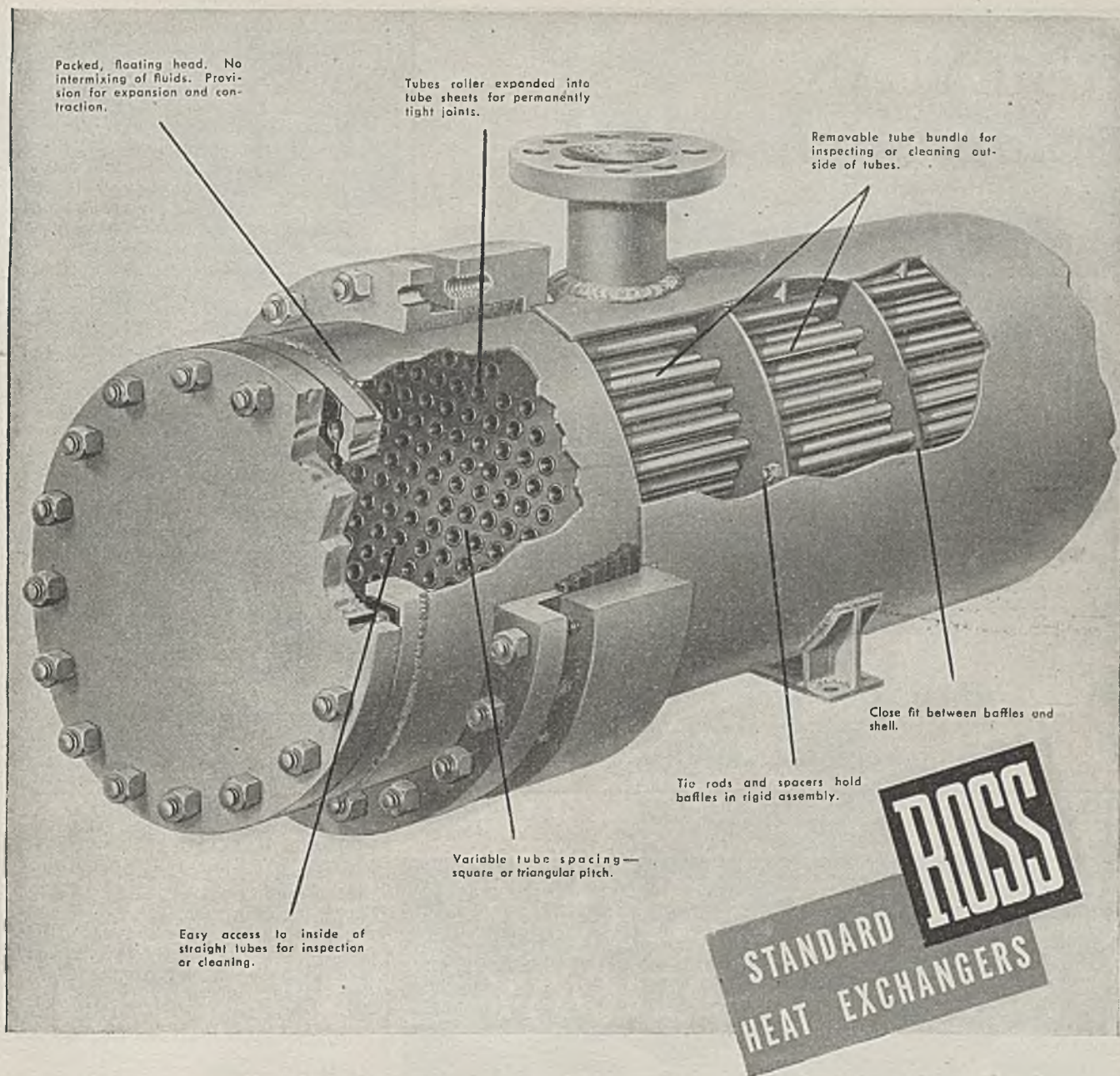
Although the ideal conditions that formerly existed in Germany for facilitating research are gone, and perhaps may never be recovered, the will to succeed has not yet disappeared, and scientists, notably ambitious, will do their best to produce with whatever facilities are available to them.

Roger Adams, University of Illinois, Remsen Memorial Lecture before Maryland Section, American Chemical Society, May 24, 1946.

RESEARCH AND LEADERSHIP

ALTHOUGH this country emerged from the war with great advances in science and technology, leadership is required in the handling of international problems and domestic industrial and political troubles. Men who were leaders in the war are those who can and must provide the type of guidance required. Former members of the armed forces and their colleagues in industry and science will do well to organize into groups according to their particular interests and experience in national defense matters.

Looking ahead, we know we must preserve our military resources. National defense, being a part of our national life, places an obligation on each in his own field. The Chemical Warfare Association is regarded as an indispensable adjunct to our chemical corps as a source of advice and other means of aid. Achievements during the war have brought to the Chemical Warfare Service a greatly improved and expanded technical organization, most if not all of which can be applied to research and development in the period ahead. New compounds discovered and developed during the war must be reckoned with. The application of atomic energy to warfare, rather than making gas obsolete, may well extend



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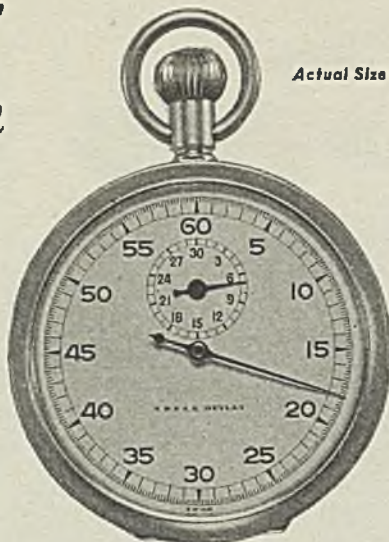
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the field for atmospheric attack. Biological warfare is still in its infancy.

In the future the efforts of CWS must follow two main lines: (1) Prosecution of research and development of new and better means, (2) assurance of chemical preparedness in all aspects, which includes maintenance of stocks of standard munitions and supplies in war reserve, and the continued training of the Army in chemical warfare. The research and development program is under way. Project plans have been laid out, and the recruitment of scientists and technicians for the conversion from a war to a peace basis is well advanced. Munitions and equipment required for war reserve have been determined and arrangements for long storage are in hand. Education of our officers is of great importance; we will have no need in CWS for the so-called reactionary and stand-pat military mind of the past. In any new war we will have no time for gathering ourselves and our resources, and recognition of this fact is guiding the future efforts of chemical warfare work.

To cooperate intelligently, the civilian world must know our plans, our responsibilities and our objectives to the extent necessary to serve effectively in civilian specialties. It is intended that the scientist will be given a free hand in working out the problem. The military's job is to determine the nature of the problem. When it comes to research itself, that is a job for the civilian scientist and he must not be interfered with in his work.

Maj. Gen. Alden E. Waite before First Annual Meeting of Chemical Warfare Association, Edgewood Arsenal, Md., May 24, 1946.

STORAGE BATTERY SEPARATORS

WARTIME shortages of wood battery separators, which bottlenecked production of electric storage batteries, were relieved when the Forest Products Laboratory showed how woods other than Port Orford white-cedar could be made into satisfactory separators. Research at the laboratory made possible the use of noble fir, Alaska yellow-cedar, and Douglas fir and at the same time developed a more economical process than that previously used for the Port Orford white-cedar.

Separators are necessary to keep the positive and negative plates in storage batteries apart without making the batteries unnecessarily bulky. They also prevent short-circuiting between plates. Wood used for separators must be chemically treated to remove various extractives, such as tannins, oils, resins, fats, waxes, and acetic acid. If these extractives are not removed, they will contaminate the battery solution and destroy its serviceability. Besides removing extractives, chemical processing makes the separator porous enough to permit easy passage of the electrolyte solution and flexible enough to stand up well in service. Separators are extremely thin, 0.070 in. in over-all thickness and 0.035 in. in web thickness.

The chemical treatment used for prewar separators functioned best with Port Orford white-cedar, although some Douglas fir was used. Wartime demands, however, exceeded the supply of this white-cedar and put separator wood on the critical list.

The laboratory process uses less chemical than was used in the prewar process.

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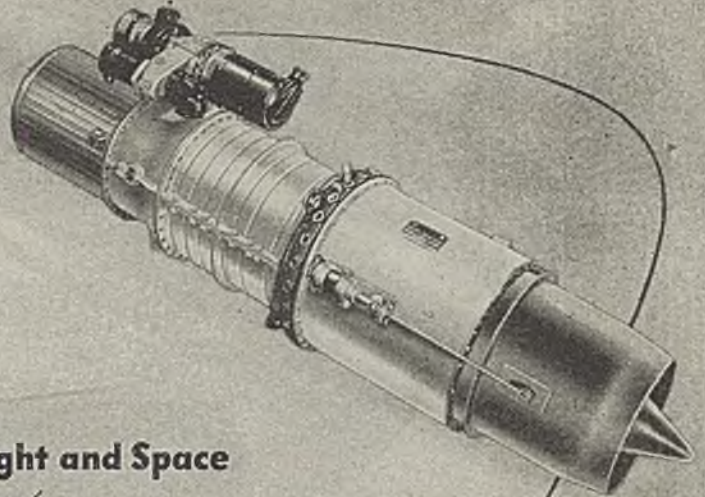
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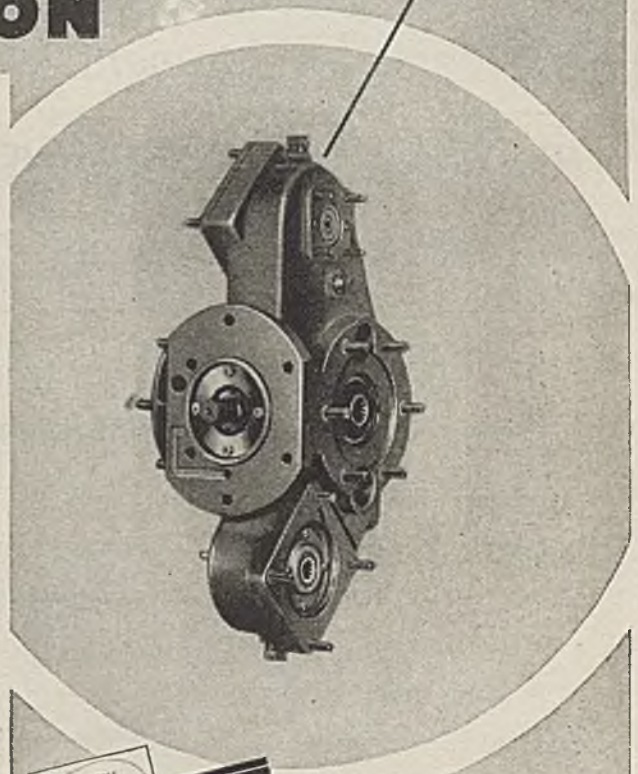
Working closely with manufacturers of these new engines, Foote Bros. have produced accessory drives which are geared to the shaft of the turbine and which provide the power necessary to operate pumps, starter motors, generators and other equipment.

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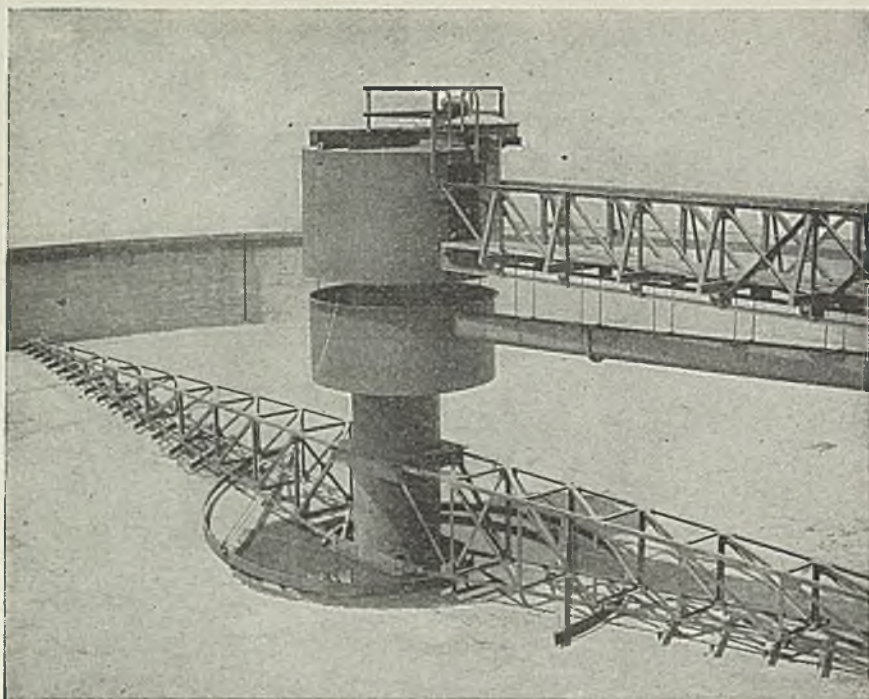
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A 1.6 percent sodium hydroxide solution was found suitable for both the Port Orford white-cedar and the three alternate woods. The separators are soaked in the solution long enough to remove the extractive material, after which they are placed in clear water at about boiling temperature and then transferred to cooling water.

G. J. Ritter, Forest Products Laboratory, before Cellulose Division, American Chemical Society, Atlantic City, April 11, 1946.

INFRARED SPECTROSCOPY APPLIED TO DDT

A quick method for the analysis of DDT has been developed which makes possible a better control of the quality of DDT compositions.

As used in the manufacture of insecticides, commercial DDT consists chiefly of three isomers, although 45 are theoretically possible. The most effective commercial products are composed largely of 1,1,1-trichloro-2,2-bis(p-chlorophenyl) ethane. The proportions of various isomers in a particular lot of DDT influence the effectiveness of the product as an insecticide.

Application of the infrared spectrograph to the study of DDT was developed during the war at the Du Pont experimental station. Infrared light is made to pass through a DDT solution, and the intensity of the various wave lengths of light that emerge is automatically plotted. The arrangement of the atoms in the molecules of the sample is thus indicated in graphic patterns.

By the spectrographic method it is possible to detect the presence of certain isomers and other materials not readily identified by analytical methods now in use. In addition, it is possible to analyze a sample of DDT by the infrared technique in about thirty minutes, an operation that would require days by conventional chemical procedures.

W. V. Freed, J. R. Downing, I. F. Walker and G. D. Patterson, E. I. du Pont de Nemours & Co., before the Organic Division, American Chemical Society, Atlantic City, April 11, 1946.

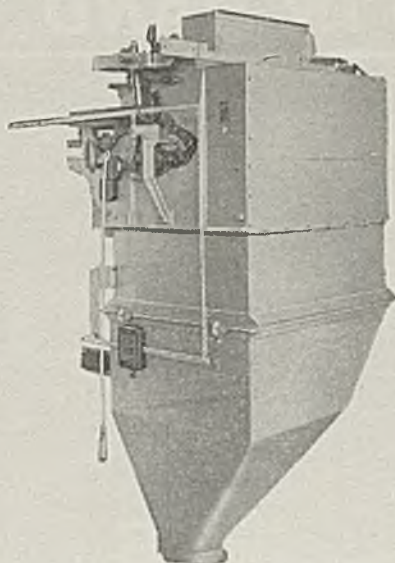
AIR STERILIZATION BY TRIETHYLENE GLYCOL

TRIETHYLENE glycol was well established and in practical use as a delumidifying agent in air conditioning before its germicidal properties were discovered. The indication of it was presented by the first glycol installation we made. This installation was made in a large bank in New York where the banking space and offices were conditioned. The system originally operated with a mixture of calcium and lithium chlorides. The year before it was converted to glycol there were 965 employee absences due to illness of all kinds and this was about normal for them. After the first year of operation with glycol there were only 496 absences. This represented the lowest absence rate they ever had and there had been no change in employees or conditions other than the change from chloride brine to glycol.

A few months later Dr. O. H. Robertson of the medical department of the University of Chicago discovered that an aerosol of propylene glycol produced almost instantaneous sterilization in a test chamber infected with a high concentration of staphylococcus and streptococcus germs. This discovery was made as a continuation of the work

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The Richardson Bagging Scale—result of years-long improvements in machinery designed for continuous automatic weighing of materials in motion—accelerates production many ways. It weighs pre-set amounts precisely, releases its contents quickly into bags or other containers by means of a simple pull on a chain. The weighing hopper automatically fills again with another exact pre-set charge, while the operator is closing the bag on the previous load. A mechanical counter makes an accurate recording of the number of bags filled.

Accuracy is assured, even when operated by unskilled labor, by means of the equal-arm balance—the most accurate system of weighing known. For weighing chemicals, all platework in contact with material being weighed is made of stainless or non-corrodible metal.

Richardson Scales are built to specifications, to the needs of your individual processes. They're dustproof, rustproof, corrosion-proof. Controls and operating mechanisms are located outside the housing, accessible and free from danger of clogging. Richardson Scales are equipped with agitators to suit the type of material bagged, to keep sluggish material flowing freely.



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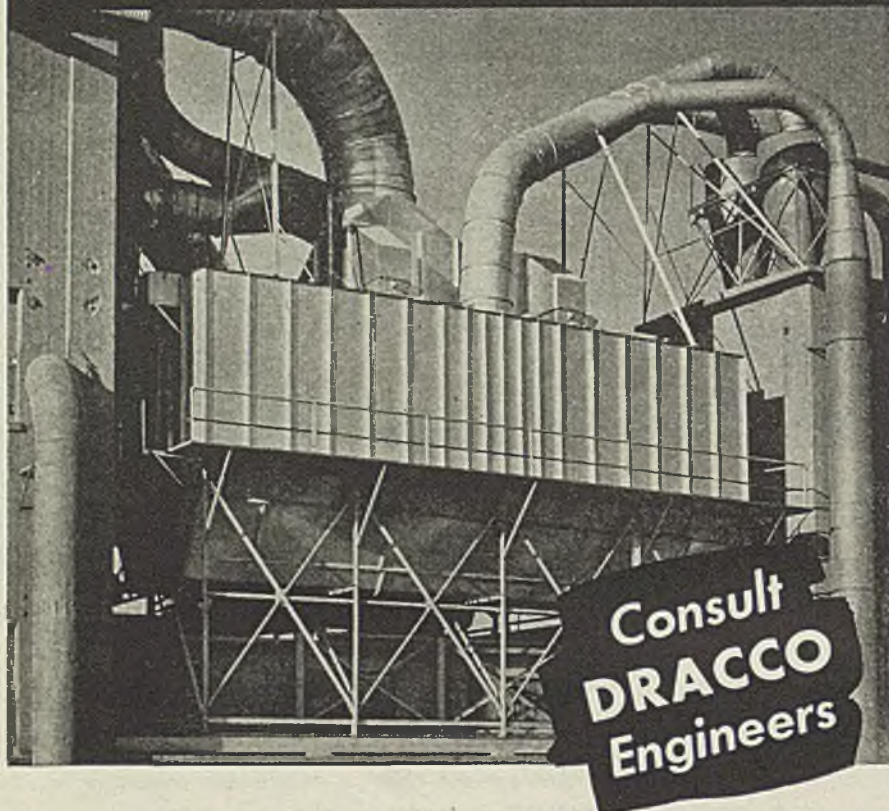
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In some plants dust adds greatly to cost... in other plants there may be only a moderate addition... but in EVERY plant dust ADDS to COST. Dust and high cost ALWAYS go hand in hand. DRACCO Dust Control creates better working conditions, decreases maintenance expense, and adds to the life of equipment... all important steps toward greater production and lower costs. Why not discuss your dust problems with DRACCO Engineers; they have saved millions of dollars for industry. Their recommendations are based on more than thirty years of experience in dust and fume control.

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DUST CONTROL EQUIPMENT
PNEUMATIC CONVEYORS • METAL FABRICATION

done in London by a group of British medical scientists who successfully employed an aerosol of hexylresorcinol suspended in propylene glycol in crowded air raid shelters.

Dr. Robertson and his associates attempted to find the minimum amount of hexylresorcinol that would be effective and no matter how much he reduced the quantity of it, the aerosol was just as effective and when he used the glycol vehicle alone it sterilized the test chamber as before.

The ideal air sterilizing agent should be non-toxic, non irritating to the respiratory tract and yet possess marked killing action on bacteria suspended in air, odorless, tasteless, relatively inexpensive, easily obtainable and the substance should not be corrosive or injurious to paper, fabrics or other materials commonly used in treated spaces. The best all around results were obtained with hexylresorcinol in propylene glycol and further investigation of the various glycols was indicated. On the list for study were propylene glycol, dipropylene glycol, ethylene glycol, diethylene glycol, triethylene glycol and butylene glycol.

Of all the compounds investigated, triethylene glycol is the only one which meets all of the specifications. However, work will continue in this field and it is entirely possible that some as yet unknown property of one of the other compounds will outweigh the economic advantage of triethylene glycol.

In the meantime the problem of the development of an entirely new specialty in the field of sanitary engineering to develop properly this new art of air disinfection for the common good is worthy of our most serious attention.

F. R. Weaver, Air Research Associates, before Metropolitan Section, American Society of Mechanical Engineers, New York, March 27, 1946.

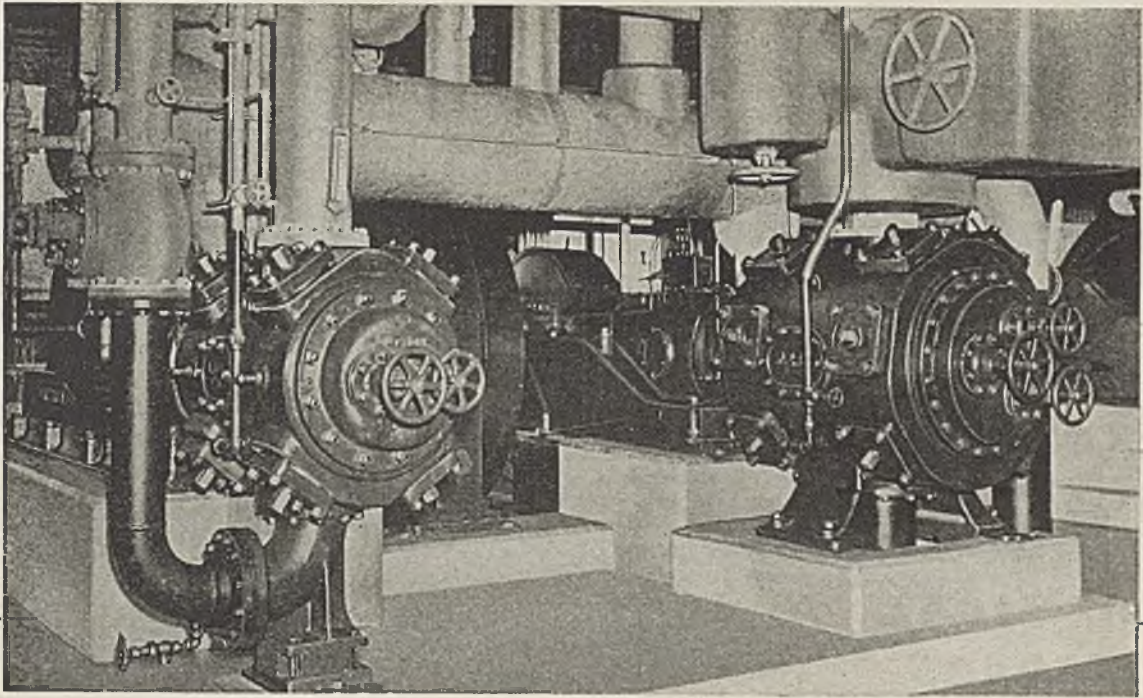
AMERICAN CHEMICAL INDUSTRY TODAY

A YEAR ago it was thought probable that the reconversion and expansion program of our industry would involve some two hundred million dollars. The latest indications are that in excess of one-half billion dollars will be spent from V-J Day throughout the succeeding two or three years in increasing our industry's manufacturing facilities.

This is in addition to the utilization of many of the plants built under the direction of government agencies for the output of chemicals used for war purposes. While much of the financing was done by the government, the responsibility for construction and operation fell on the shoulders of the chemical industry. During this period of approximately four war years the operating companies were called upon to triple their operations—this at a time when the selective service draft and wartime scientific developments were drawing heavily on their technical and labor supply.

A striking feature of the chemical industry's wartime expansion was its regional distribution. Nearly 50 percent of this increase in plants was in the South and Southwest, although prior to the war only about 23 percent of chemical production in the United States was in that area. There were two principal reasons for this shift to the South and Southwest; the nature of the

WHEN HEAVY DUTY DOES DOUBLE DUTY



Real huskies, these Worthington Heavy Duty Compressors . . . built to "put the pressure on" in a big way . . . to deliver economical, trouble-free refrigeration — and lots of it—year after year, under toughest conditions.

And versatile! *Double suction* can be built into the standard design, enabling maintenance of two different temperatures in different parts of the plant — *at the same time*. Or, a single, over-all temperature can be maintained with the same unit, if required.

Worthington Compressors are the horizontal duplex type, motor-driven with hp's up to 1500. Smooth, balanced operation is assured by force-feed lubrication and adjustable bearings throughout, and by Worthington's Automatic Variable Capacity Control — an exclusive feature for positive, flexible pressure regulation. And, like all Worthington compressors, they provide a sure, steady gas-flow through the famous Feather* Valve — the lightest, simplest, most efficient compressor valve ever made.

For EVERY Refrigeration Job

Besides these heavyweights, Worthington makes compressors of every type and size, for high and low pressures

and all refrigerants. Whether your refrigeration job is large or small, simple or involved, you'll find the right compressor for it in this complete line. Remember, too, that Worthington makes most of the "inner vitals" of the entire system for the integration that assures un-failing performance — and that Worthington engineering is always available to you for expert aid in the solution of any refrigeration problem.

Worthington Horizontal Duplex Compressors are fully described in Bulletin C-1100-B20. Write for it, or let us know your requirements and we'll send details on other compressor-types of interest to you. Better still, for further proof that *there's more worth in Worthington*, get the story first-hand from your nearby Worthington District Office. *Worthington Pump and Machinery Corporation, Harrison, N.J. Specialists in air conditioning and refrigeration machinery for more than 50 years.* *Reg. U. S. Pat. Off.

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A6-19

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While we haven't yet tried to feed a hippopotamus, we've handled some mighty big chemical feeding problems! Omega has just the right volumetric or gravimetric feeder to meet your requirements. Our engineers will work with you to select the proper Omega feeder for the utmost dependability and economy in your chemical feeding.



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A volumetric feeder of the most accurate type... without valves, diaphragm or pump, it feeds 1/25 to 200 g.p.h. within 1% of rate set. No electricity is required and meter-paced control is easily accomplished for flow proportional feeding.

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products being developed, and the military necessity for scattering the output of munitions.

The future of the American chemical industry is indeed bright, in spite of the many serious handicaps which now prevail. All are familiar with the many new developments which are bound to play a large part in expanding the chemical business. The new plastic materials and molding compounds are only one example of these chemical developments, and the source of many of these plastics gives a clear indication of another recent and drastic change in the chemical industry which will probably increase in the years to come.

Whereas, after World War I, a large percentage of synthetic organic chemicals stemmed from coal-tar raw materials, the war itself witnessed, and in fact stimulated, a change to petroleum as a source of raw materials.

This change in the source of synthetic organic chemicals, which has so largely stimulated the interest of petroleum refiners in the chemical industry, is not, however, a one-sided proposition. While we are witnessing the entrance of petroleum refiners into the chemical industry, either alone or in partnership with chemical companies, we are also witnessing the entrance of a chemical company into the field of synthetic lubricating oils. This overlapping of the fields of these two large industries is certain to develop some interesting new products of benefit to the consumer.

All this reflects the rapidity of change which is inherent in our industry. It frequently happens that through development of some new and better process, plant facilities representing large investments become obsolete before they are amortized. It has been estimated that the American chemical industry now is spending in excess of fifty-five million dollars per year for research. This large expense is warranted if we can continue to rely on patent protection to safeguard ownership of inventions. The great changes which may come within the industry in the next few years will open new fields of development both for peace and for national security. The progress of the chemical industry will be interrelated to that of the Nation as a whole. At no time in our history has this country had greater opportunities for service and advancement.

If sound judgment is exercised and those in political authority have the courage to carry out their responsibilities without re-

gard to influence from pressure groups, or the applause of organized minorities, our country should resume its traditional advance and continue as the leading nation of the earth.

H. L. Derby, American Cyanamid & Chemical Corp., before Manufacturing Chemists Association, Skytop, Pa., June 6, 1946.

DEVELOPMENT OF SOVIET RESEARCH

UNLESS the United States speedily overcomes its current shortage of scientific manpower, and unless much more intensive support of fundamental research is provided by either the government or private industry, or both, the time may not be far off when American scientific research, and also its industrial applications, may be lagging behind the U.S.S.R. (and possibly England).

The development of Soviet research in both depth and scope compares favorably with that carried out in this country and in England, although the general statement may be made that the Soviet Union is not in the lead.

One of the principal reasons for the progress now being made in Russian laboratories, is the fact that they are amply supplied with researchers, as young Russian scientists have not been drafted into the armed services, even during the war.

Most research in the Soviet Union is conducted in special institutes sponsored by the government. They have no connection with the universities except that graduate students may do research for doctor's degree in the laboratories under the supervision of institute personnel. The laboratories were well equipped, although some used German apparatus which was inferior to American equipment, the buildings were old and unattractive, but the Soviet government has made large funds available to the Academy of Sciences for new buildings as well as for new equipment and general expansion.

Russia's invitation to scientists from all over the world to be guests of its Academy of Sciences is helping to re-establish international scientific relations after the war. The American government should consider whether we could not follow Russia's example in organizing scientific meetings, not only as a matter of prestige and good will but also for our own benefit.

Dr. I. M. Kolthoff, University of Minnesota, before Delaware Section, American Chemical Society, May 15, 1946.

FOREIGN LITERATURE ABSTRACTS

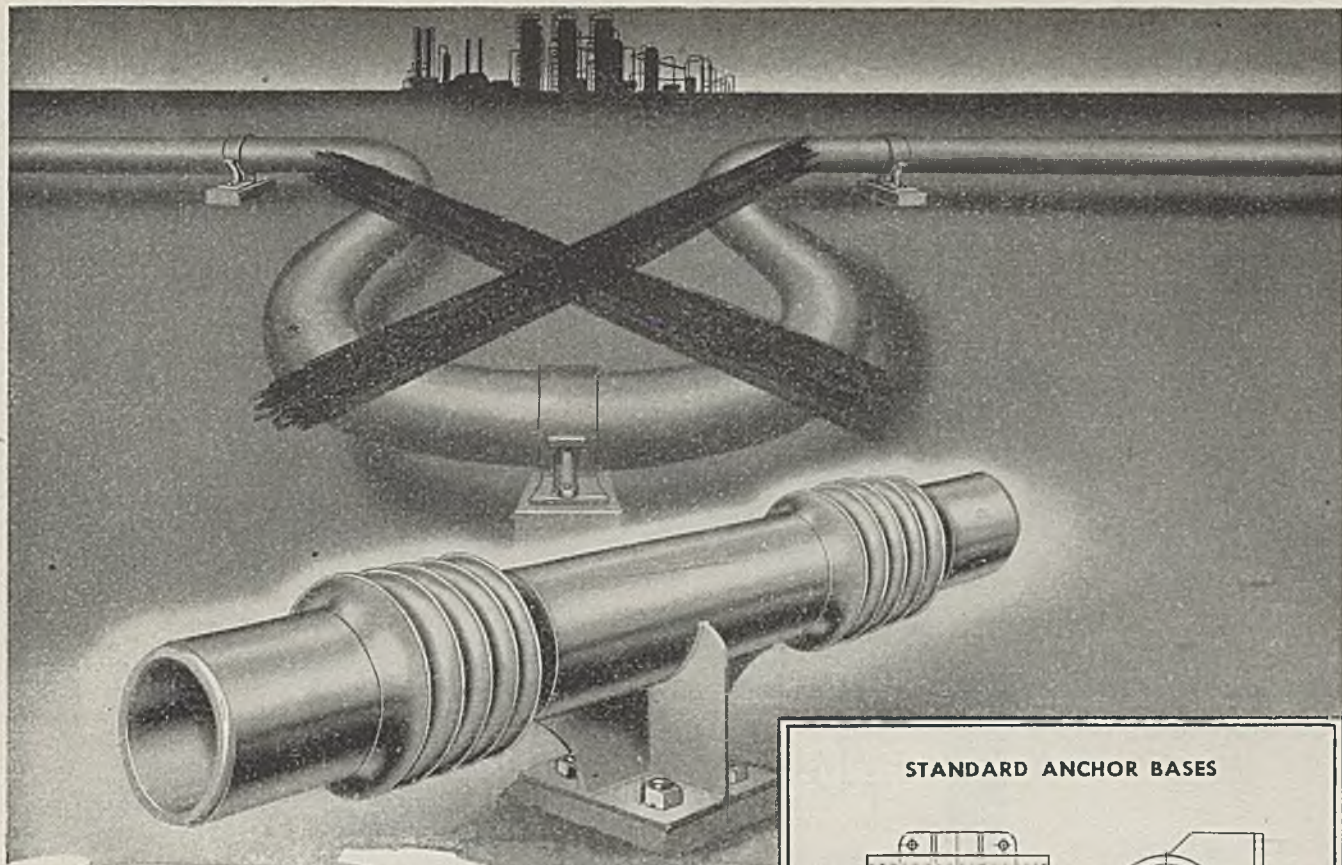
VITAMIN C IN VEGETABLES

ASCORBIC acid is well known for its instability, which makes it oxidize readily to dehydroascorbic acid and then to 2, 3-diketogulonic acid and finally to levo-thronic and oxalic acid. This instability is retarded

in an acid medium with a pH of less than 4, and greatly accelerated if the pH increases beyond 5, especially in the presence of certain metallic ions such as copper. The methods for extracting ascorbic acid from plants are therefore based on the use of different acids and different concentrations.

Vitamin C Content in Vegetables and Fruits, Mg. of Ascorbic Acid per 100G.

Avocado	26.4	Cashew nut		Carrot	8.8
Squash	3.5	(white)	267.5	Mamsee apple	82.7
Swiss chard	13.2	Cashew nut (red)	271.9	Green corn	21.1
Celery	2.6	Onion	66.8	Cucumber	10.5
Lettuce	3.8	Chicory	10.5	Pepper (spice)	119.6
Water cress	24.6	Spinach	21.1	Green pepper	186.5
Banana	17.6	Guava (red)	165.4	Red pepper	125.8
Garden beet	32.3	Currant	387.2	Head cabbage	114.4
Broccoli	43.1	Mango	123.2	Tomato	41.3



ANCHOR JOINTS

Simplify Piping

MAGNILASTIC ANCHOR JOINTS permit rigid anchoring of pipe lines while permitting thermal expansion and contraction. Piping can now be anchored at a number of accessible points, to maintain alignment. But . . . varying amounts of contraction and expansion, due to differences in pipe lengths and temperatures, take place on each side of the anchor point. MagniLastic Anchor Joints, by varying the number of bellows diaphragms at either end as required, absorb this unequal movement and yet permit the anchor point to remain stationary.

DAMAGING SURGE PRESSURES ABSORBED . . . In systems where severe hydraulic surges occur, MagniLastic Anchor Joints minimize the transmission of shock to the base and adjacent equipment.

IMPORTANT SAVINGS TO USERS . . . Anchor Joints produce worthwhile savings in installation costs, number of fittings and space required. Even more important are reductions in maintenance costs due to damaged piping and fittings.

CUSTOM FEATURES . . . MagniLastic Anchor Joints are available in all standard pipe sizes and for pressures to 1000 p.s.i. Welding ends are regularly supplied; pipe flanges and inner liners are optional. Special anchor mounts can be designed to user's specifications.

Write today for new catalog containing full information on Anchor Joints and MagniLastic's complete line of Expansion Joints for all temperatures, pressures, pipe sizes and corrosive conditions. Address MagniLastic Division, Dept. 2-A, 2700 Southport, Chicago 14, Illinois.



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MagniLastic Anchor Bases of standard design as shown are supplied with Anchor Joints in pipe sizes from 1/2" to 24". Complete dimensions are given in the new catalog described below.

SPECIAL ANCHOR JOINT UNITS

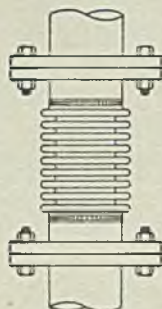


MagniLastic Expansion Joints and Anchor Bases can be furnished with a variety of fittings such as elbows, tees, ells, Y's, etc., for special applications. Two typical units are illustrated. In this way a single installation can satisfy several of these requirements at once: 1) rigid mounting, 2) accessibility, 3) minimum space, 4) allowance for thermal expansion and contraction, 5) thrust, and 6) misalignment. See your local distributor, or let the nearest MagniLastic field engineer suggest a solution to your problem.

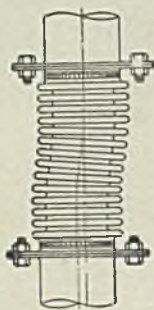
MAGNILASTIC

DIVISION OF
COOK ELECTRIC COMPANY
Chicago

Sales and Engineering Offices in Principal Cities

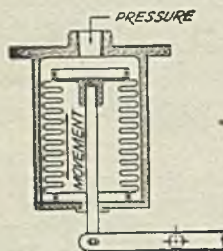


Expansion Joint

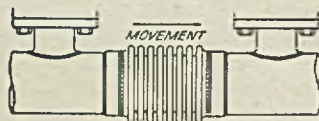


MOVEMENT

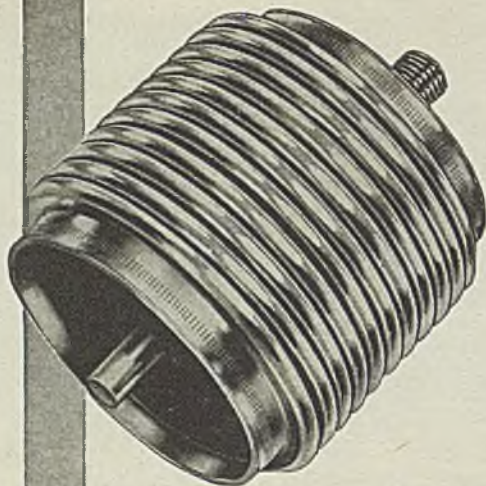
Flexible Connector



Pressure Motor



Compensator for Headers



C. M. H. STAINLESS STEEL BELLOWS

Assure

long life
low maintenance

The outstanding features of corrosion-resistant 18-8 Austenitic *Stainless Steel* enable wider application of C. M. H. Bellows. This is because *stainless steel* has the necessary characteristics to assure long life and low maintenance cost.

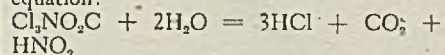
C. M. H. Bellows, for example, with a working range of sub-zero to a scaling-point of 1800° F. are not bothered by temperatures . . . hot or cold. In addition, they have multiple-ply construction for greater strength; ferrous fittings, attached by Circular Seam Welding to insure leakproof joints; uni-metal assemblies which avoid troubles often encountered when bi-metal or solder joints are used. These and other features warrant your consideration. Write for Bulletin SS B-46.

Oxalic acid (0.2 percent) was used in this work, since it was found to have as good a stabilizing effect as metaphosphoric acid, and the advantage of being more stable, more readily available and cheaper. The commonest method of determining ascorbic acid is by reduction. The attached table shows the vitamin C content in a number of vegetables and fruits in mg. of ascorbic acid per 100 g.

Digest from "Vitamin C in Vegetables," by O. Ribeiro, *Anais da Associaçao Quimica do Brasil* IV, No. 2, 95-98, 1945. (Published in Brazil.)

TRICHLORONITROMETHANE FOR AGRICULTURAL USE

TRICHLORONITROMETHANE, or chloropicrin, decomposes in an aqueous solution or in a humid atmosphere according to the equation:



with intermediate formation of carbon oxychloride and nitrosyl chloride, which decompose in hydrochloric acid, carbonic acid and nitrous acid. Sweet worts, milk, arable soil, cereals, etc. favor this decomposition. Dried garden soil is particularly active, although after heating to dark red heat it no longer has any action and behaves like sand. These properties can be used for the destruction of weeds and parasites of the soil (non-microscopic animals) and for mutage of fermentable liquids. The partial sterilization of soils results in remarkable crop yields. It is too expensive to be used on a large scale, but trichloronitromethane can be useful in truck gardens and market gardens. The addition of a very small quantity of trichloronitromethane to fermentable liquids such as grape wort, fruit juices, milk, urine, slows up even impedes all microbial development in these liquids without causing any change in their composition and their properties. The portion to be added varies with the state of contamination of the liquid, the surrounding temperature and the planned duration of the preservation.

Digest from "Some Useful Properties of Trichloronitromethane," *C. R. Acad. Sc.* 219, Nos. 6, 7, 8, 230-233, 1944. (Published in France); *Chimie et Industrie* 53, No. 1, 45, 1945.

LUBRICANTS FROM AROMATICS AND PARAFFIN CHAINS

BENZENE is the most interesting of the aromatics, but it is available in limited quantities in France (about 17,000 tons per year) for the preparation of lubricants, since it is also in much demand as a fuel with high antiknock properties and ability to mix with alcohol and oil. Naphthalene (production 4,000 tons per year) can thus be used and it is probable that the still more condensed aromatics such as anthracene may be used successfully.

National resources in paraffin chains consist principally of ethyl and butyl chlorides, as well as dichloroethane, which is derived from ethylene or ethyl alcohol. These, however, are only short-chain compounds. The country now lacks paraffin radicals with a long chain, aside from those which can be supplied eventually by oils of bituminous rocks and lignites. When the African oils will be used up, the following method will







Flexible Metal Hose for Every Industrial Use



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Plants: Maywood and Elgin, Ill.



AREA OF LEAK	AIR		STEAM		WATER	
	Diameter Inches	Number of cubic feet per month at 75 lb. pressure	Total cost of waste per month 11c per 1000 cubic feet	Pounds wasted per month at 160 lb. pressure	Total cost of waste per month 65c per 1000 lb.	Gallons wasted per month at 60 lb. pressure
 1/2"	13,468,000	\$1,481.44	1,219,280	\$792.53	1,524,100	\$243.86
 3/8"	7,558,500	831.44	684,290	444.79	855,360	136.86
 1/4"	3,366,990	370.37	304,820	198.13	381,020	60.96
 1/8"	824,570	90.70	74,650	48.52	93,310	14.93
 1/16"	213,000	23.43	19,280	12.53	24,110	3.86
 1/32"	52,910	5.82	4,790	3.11	5,990	.96



What does it cost you each month

... for air, steam, water, you never use?

Maybe you've never checked the actual cost of valve leakage. If you haven't, you'll doubtless be startled at these figures.

A single valve leak the size of a pinhead can waste enough air in a month to approximate the cost of a new valve. Steam leaks... water leaks... also take a heavy toll if neglected... not to mention the wastage of such a critical item as fuel.

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Enlarged copies of the above chart for posting in your plant are available on request. Also available are the services of your nearby Lunkenheimer Distributor, who is fully equipped to assist in solution of your operating or maintenance problems.

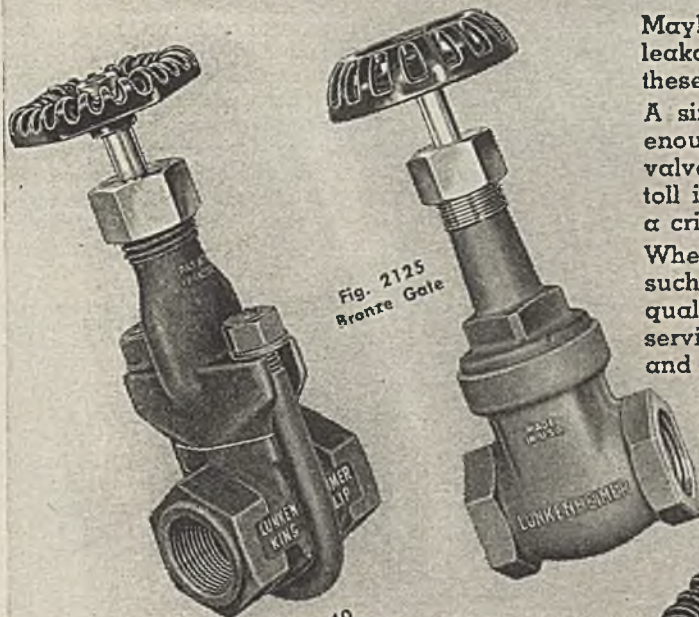


Fig. 2125
Bronze Gate

Fig. 1640
"King Clip" Gate

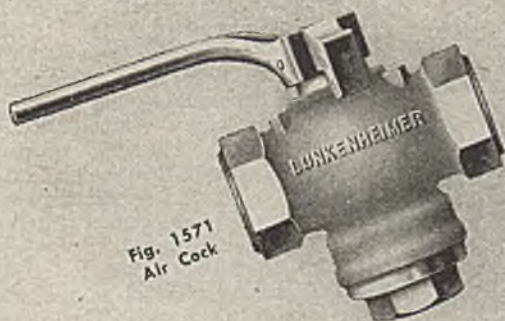


Fig. 1571
Air Cock



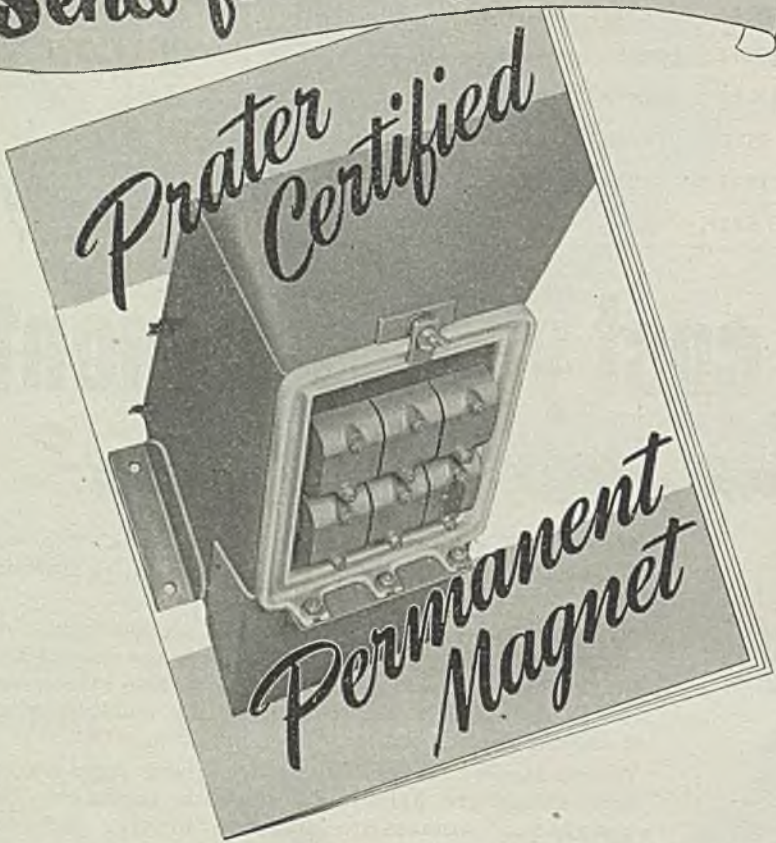
Fig. 16-P
Bronze Globe

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THE LUNKENHEIMER CO.
"QUALITY"
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probably be used most. After deglycerination and chlorination, the fatty acids will be converted to ketones which will be reduced in hydrocarbons. Catalytic coupling, or condensing by additive synthesis of the cyclic nuclei coming from the coal industry and natural fatty chains, seems to have the most promising future. The bringing together of the olefins contained in the gaseous fractions and solid paraffins, both coming from petroleum refineries, with the natural fatty chains can be considered in the same fashion. The raw materials can also be produced from agricultural products. A hectare of land produces 525 kg. of oil per year, starting from alcohol, and 450 kg. of oil, starting from colza. Another solution, in a chemical products plant, consists in preparing aromatics by carbonization of coal, and paraffins by application of the Fischer process. These aromatics are coupled with the paraffins as suggested above. These aromatics can also be combined by polymerization with the ethylene extracted from coal carbonization gas. In addition to the above procedures, the Navarre plan has provided the synthesis of lubricants by polymerization of ethylene, according to one of the two methods: (1) Polymerization in the cold in presence of catalysts; (2) polymerization by electric discharge. The ethylene can be obtained from one of the three following sources: (a) Extraction from coke oven gas or petroleum refinery gas; (b) treatment of an alcohol (ethyl or butyl); (c) Fischer process which will use advantageously the residues of screening and washing coal, gasified on the spot, due to its high ash content (more than 50 percent) and in special generators.

Digest from "Synthetic and Substitution Lubricants," by C. Berthelot, *Chimie et Industrie* 53, No. 3, 160-166, 1945. (Published in France.)

HYDROLYSIS OF CELLULOSE

In a study of the hydrolysis of wood cellulose, the following factors were kept constant: Proportions and concentration of the acid, maceration and heating to 100 deg., whereas variations were made in the times of maceration and heating. Examination of the curves obtained showed that whatever the time of heating t might be, the yield of glucose grew at first with the time of maceration T , then decreased to the same degree for all the curves, starting with a given value of T . It was therefore only during maceration that the cellulose was broken down into hydrolyzable products. The last heating could only hydrolyze that material which was broken down during maceration. The yield of glucose always increased with the time of heating. In view of the industrial application of the process, the time of maceration T was determined first, varying it while always keeping to the same heating time, for example 15 min. When the yield of glucose decreased, the process was stopped. Then, taking the time T which yielded the maximum yield, the time of heating was varied until the maximum yield was obtained. The times T and t which gave the best results in each series of tests were adopted.

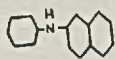
Digest from "Contribution to the Hydrolysis of Celluloses of Wood," by F. Abadie, *C. R. Acad. Sc. 220*, Nos. 10, 11, 12 and 13, 409-415, 1945. (Published in France); *Chimie et Industrie* 55, No. 3, 203, 1946.

B. F. Goodrich Chemical Company

has available for sale these organic chemicals

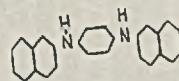
Phenyl B Naphthyl Amine

Distilled—Available in commercial quantities
 M. P. 107°
 Purity 99.5%
 Commercial—Available in commercial quantities
 M. P. 106°
 Purity 98.0%



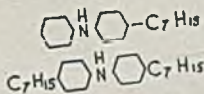
Di B Naphthyl p Phenylene Diamine

Available in commercial quantities
 M. P. 230° C
 Purity 98%



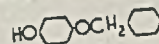
Mixed Mono- and Diheptyl Diphenyl Amines

Available in commercial quantities
 Distillation range—145-245 (3.0 mm)
 Purity 98%



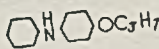
Monobenzyl Ether of Hydroquinone

Available in commercial quantities
 M. P. 113°
 Purity 90%



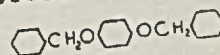
Isopropoxy Diphenyl Amine

Available in commercial quantities
 M. P. 78°
 Purity 92% min.



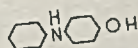
Dibenzyl Ether of Hydroquinone

Available in Pilot Plant quantities
 M. P. 119°
 Purity 85%



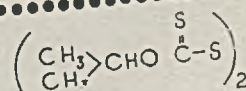
p Hydroxy Diphenyl Amine

Available in commercial quantities
 M. P. 15°
 Purity 92%



Di Isopropyl Dixanthogen

Available in commercial quantities
 M. P. 52°
 Purity 98%



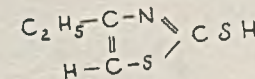
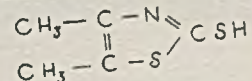
N-Nitroso Diphenyl Amine

Available in commercial quantities
 M. P. 62°
 Purity 97%



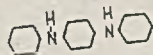
Mixed Ethyl and Dimethyl Mercaptothiazoles

Available in commercial quantities
 M. P. 136-153°
 Purity Approximately 85% dimethyl and 15% ethyl mercaptothiazoles



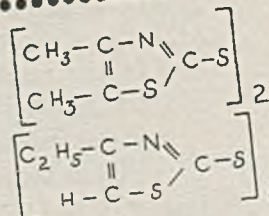
Diphenyl p Phenylene Diamine

Available in commercial quantities
 M. P. 144°
 Purity 92%



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LESTER B. POPE, Assistant Editor

FOR SAFE PACKAGING

WARNING LABELS. *Manufacturing Chemists' Association, Woodward Building, Washington 5, D. C. 63 pages. \$1.*

Reviewed by R. S. McBride

THIS safety manual presents in Part I "a guide for the preparation of warning labels for hazardous chemicals" and in Part II "illustrative warning labels" for approximately 150 important industrial chemicals. It assists the relatively inexperienced manufacturer or shipper in the preparation of safe warning labels for many varieties of industrial goods.

Perhaps the most important contribution made by this Manual L-1 is the establishment and clear presentation of the principles which should guide in this work. Labeling hitherto has been confused and confusing because of inaccurate or indefinite terminology. There is no longer any excuse for that careless practice which increases hazards, because MCA has here defined and interpreted the pertinent words and has given a workable classification of hazards and the way in which they should be determined and announced by labels.

Manufacturing Chemists' Association is to be complimented on this constructive effort. It now remains for all of the chemical industry, producers, shippers and users, to apply the principles made available. The result should be an important advance in the cause of safety. No chemical engineer can afford to be without his personal copy of this manual if he has any responsibility for any phase of chemical handling or utilization.

DOUBLE FEATURE

PERSONALITY AND ENGLISH IN TECHNICAL PERSONNEL. By Philip B. McDonald, D. Van Nostrand Co., New York. 424 pages. \$3.75.

Reviewed by Chaplin Tyler
AS SUGGESTED by the title, Professor McDonald's book covers two subjects—the personality traits of technical personnel and English for technical personnel.

Chapters 9 to 25 comprise a text, and an excellent one, covering report writing, letter writing, common mistakes made by the novice, sentence structure, vocabulary, and cultural reading. These chapters are crammed with practical aids to better English. The author bears down hard on such business letter jargon and clichés as "Answering yours of recent date, beg to advise. . . . Hoping to hear from you soon and thanking you for past and future favors, we beg to remain . . . etc." What the author says is all to the good and could be read profitably by all business men.

The other chapters, 1 to 8 and 26 to 33

comprise a catch-all, part good, part controversial, all presumably having to do with the technical man's welfare. These chapters belabor the technical man at length for shortcomings which though possibly deserved, seem to the reviewer to be defects of adult beings in general.

The reviewer for one is getting weary of those who expect engineers to possess, besides a working knowledge of their field, the business acumen of a Marshall Field, the practical wisdom of a Bernard Baruch, the legal mind of a Blackstone, rounded out with conversational facility concerning the fine arts, international relations, and the Greek philosophers.

Nevertheless, for the good job Professor McDonald has done on English, the book is worthwhile and can be endorsed without reservation.

MICRO-IDENTIFICATION

ORGANIC QUALITATIVE MICROANALYSIS. By Frank Schneider. John Wiley & Sons, New York. 213 pages. \$3.50.

Reviewed by Arthur I. Gebhart

THIS book presents a new and useful field of organic microchemistry. The author has made an excellent adaptation of the systematic macro procedure for the classification and identification of organic compounds, as used in the standard texts of Mulliken and Huntress, Kamm and Shriner and Fuson, for use on a strictly micro basis.

The first half of the book is devoted to a detailed description of the generally simple apparatus used and the various operations involved in purification of the sample such as distillation, crystallization, extraction and drying, followed by an excellent discussion of elementary analysis and the determination of physical constants. This entire section is amply illustrated with more than one hundred simple, clear line drawings, depicting the equipment or operation under discussion, and might, in a sense, be considered as an up to date revision of Professor Schneider's earlier translation of Emich's *Microchemical Laboratory Manual*. This portion of the book provides the foundation in microchemical technique which is to be utilized in the purification, classification and identification of the unknown organic compound.

The second half takes up the systematic classification of the compound based on solubility or functional characteristics and the preparation of suitable derivatives for final characterization.

The book is well printed and there are only a few minor typographical errors. It is up to date and has an excellent bibliography of almost five hundred literature references. Its practical simplicity make it ideal for the novice and yet, because of its comprehensive nature, the expert will cer-

tainly find in it much of interest and value. Systematic qualitative organic analysis has long ago proved its worth on the macro scale. Professor Schneider has now adapted it to the micro scale where it should be equally valuable. The book is a worthy addition to the library of anyone interested in microchemical work.

GOOD TO HAVE AROUND

POISONS: THEIR PROPERTIES, CHEMICAL IDENTIFICATION, SYMPTOMS AND EMERGENCY TREATMENT. By Vincent J. Brookes and Hubert N. Aveya. D. Van Nostrand Co., New York. 209 pages \$3.

Reviewed by Morris B. Jacobs

WITH a minimum of technical language, some 90 of the more common poisons, alphabetically arranged, are discussed under the particular headings of general information concerning the poison itself; identification by chemical means; the symptoms caused or developed, that is, identification of the poison by means of the physiological response induced; and the emergency treatment or first-aid to be rendered. The first, third and fourth headings are also summarized in tabular form. The physiological effects and the permissible working concentration of about 70 more compounds which may be industrial hazards are briefly described. An introductory chapter is devoted to factors to be noted in making a poison investigation and another deals with basic information concerning poisons and poisoning such as their classification by symptoms and general emergency treatment as in the use of emetics and antidotes. A small section is devoted to poisoning from foods, plants, snakes, and spiders, and in

RECENT BOOKS RECEIVED

- The Alkaline-Earth and Heavy-Metal Soaps.** By S. B. Elliott. Reinhold. \$7.50.
The Chemical Aspects of Light. 2nd ed. By E. J. Bowen. Oxford University Press. \$5.
Colloids, Their Properties and Applications. By A. G. Ward. Interscience. \$1.75.
Currents in Biochemical Research. Ed. by D. E. Green. Interscience. \$5.
Enzymes and Their Role in Wheat Technology. Ed. by J. A. Anderson. Interscience. \$4.50.
Modern Organic Finishes. By R. H. Wampler. Chemical. \$8.50.
Protective and Decorative Coatings. Vol. V. By J. J. Mattiello. Wiley. \$7.
Reagent Chemicals and Standards. 2nd ed. By J. Rosin. Van Nostrand. \$7.50.
Textbook of Physical Chemistry. 2nd ed. By Samuel Glasstone. Van Nostrand. \$12.
Two Worlds. By W. B. Ziff. Harper & Bros. \$3.
Violin Varnish. By Joseph Michelman. Cincinnati, Ohio. \$3.75.

A Challenge Met!

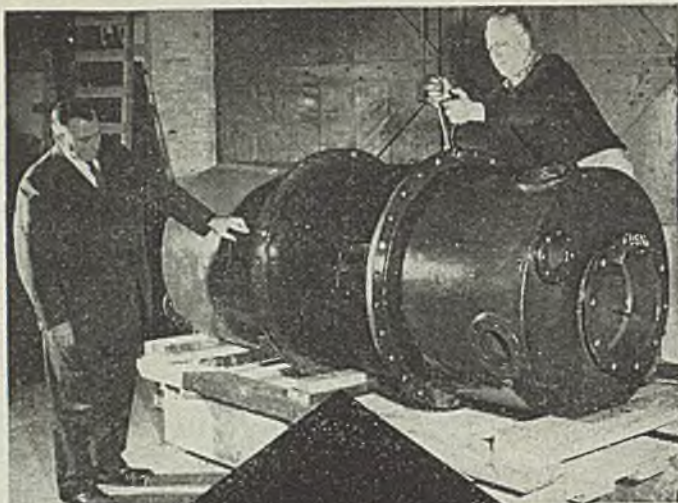


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addition, artificial respiration, the gas mask, the inhalator, and treatment for shock are briefly discussed.

This book contains useful information presented in a systematic manner which should prove to be valuable to police and peace officers, particularly, and also to food and drug inspectors, pharmacists, nurses and physicians. Some chemists may also find the book useful. It has an appendix which includes a glossary and several practical tables of measurement. The very few typographical errors noticed show care in proof-reading and the large bold type used for captions for the poisons discussed should prove helpful in finding a reference. This text is a good book to have around.

RECENT BOOKS and PAMPHLETS

Should the Government Support Science? By Waldemar Kaempfert. Pamphlet No. 119, published by Public Affairs Committee, 30 Rockefeller Plaza, New York 20, N. Y. 32 pages. 10 cents. Long-range planning by a responsible agency such as the proposed National Foundation of Science is inescapable if the United States is not to lag behind other countries in scientific research. "Planning" does not imply control.

Fire Hazards of the Plastics Industry. Published by The National Board of Fire Underwriters, 85 John St., New York, N. Y. 53 pages. Composition, classification and production of industrial plastics; hazards of the industry; flammability and thermal stability; developments in explosion and fire control; bibliography and appendix.

Fiber Drums, Directions for Handling and Storage. Manual Sheet D-50, published by Manufacturing Chemists' Association, 608 Woodward Bldg., Washington 5, D. C. 12 pages. 18 cents. More than half the fiber drums produced are now utilized for packaging chemicals and allied products. The manual covers all phases of fiber drum packing, shipping and storing.

Heat Pump Bibliography. Published by Engineering Research Division, Southern Research Institute, Birmingham 5, Ala. 8 pages. A listing of all articles applying directly to the heat pump. Compiled for Southeastern Electric Exchange.

A.S.T.M. Standards on Electrical-Heating and Resistance Alloys. 1946 edition. Published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 173 pages. \$2. Standards and data on electrical resistance and heating alloys, electric furnace alloys, metals for radio tubes and lamps, heat-resisting alloys, electrical contact materials and thermostat metals.

Carbon Tetrachloride. Chemical Safety Data Sheet SD-3, published by Manufacturing Chemists' Association, 608 Woodward Bldg., Washington 5, D. C. 11 pages. 20 cents. Properties, shipping containers, unloading and emptying, storage, handling, waste disposal, and health hazards and their control.

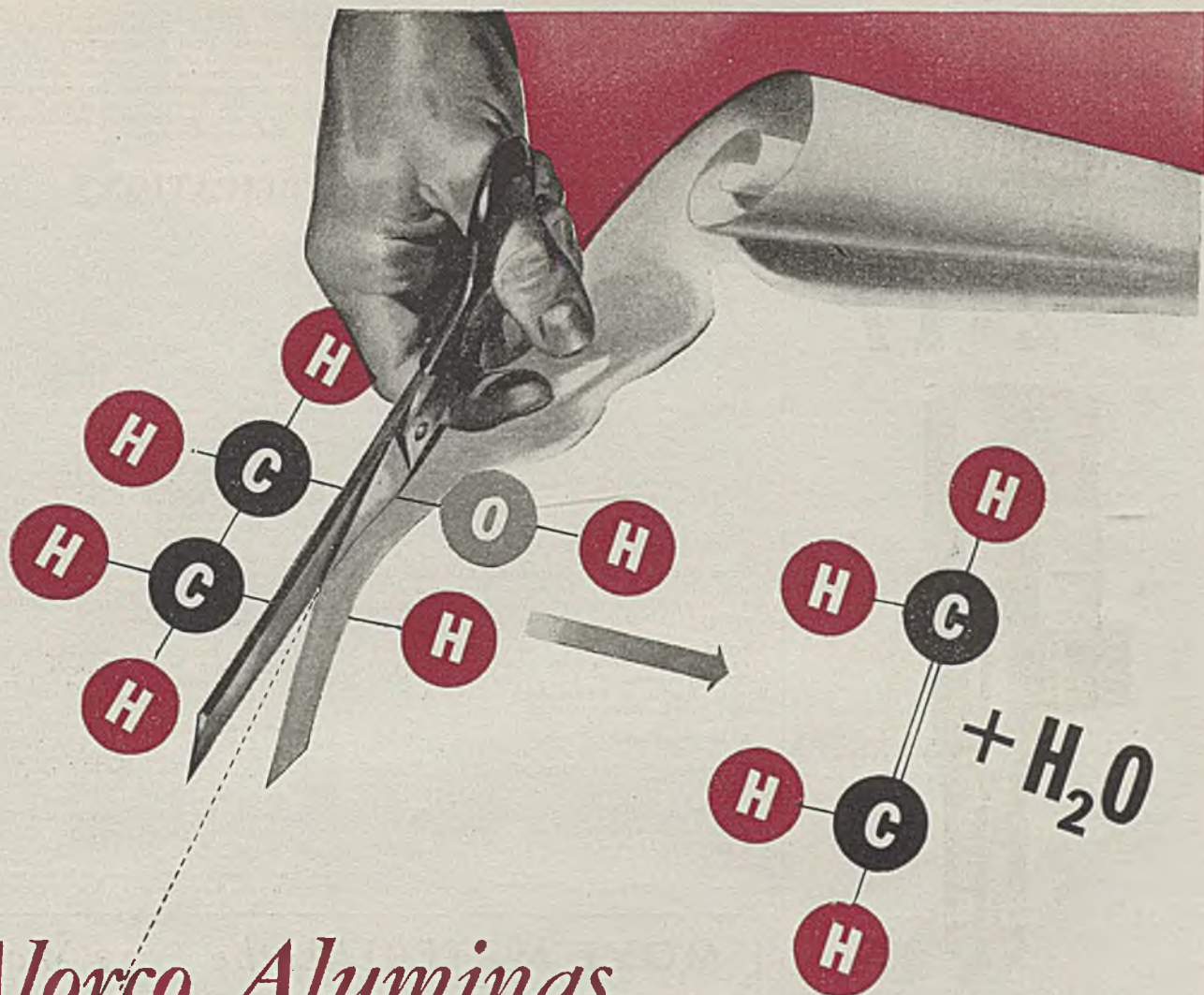
Flow Meter Engineering Handbook. Second edition. By Louis Gess and R. D. Irwin. Published by Brown Instrument Co., Philadelphia, Pa. 151 pages. \$2.50. Fluid measurement including related factors, equipment, equations and computations in terms of steam, water, oil and gas flow.

Economic Base for Power Markets in Benton County, Ore. Published by Bonneville Power Administration, Portland 8, Ore. 56 pages. A survey appraising the prospects for electric power consumption in the Pacific Northwest. Covers the physical base, people and their incomes, production and employment, public facilities and finance. Contains maps, graphs, photographs and appendix tables.

Chemical Industries. Twentieth edition. Edited by L. Ivanovszky. Published by Leonard Hill, Ltd., 17 Stratford Place, London, W. 1. 394 pages. 15s. in the United Kingdom, 20s. overseas. Annual British reference book of materials, equipment and principles.

Luminous Tube Lighting. By H. A. Miller. Published by Chemical Publishing Co., Brooklyn 2, N. Y. 143 pages. \$3.50. A British publication covering theoretical considerations, materials, manufacturing equipment, low and high pressure tubes, fluorescent and neon lighting.

Chemotherapy. Edited by W. H. Powers. Published by Reinhold Publishing Corp., New York 18, N. Y. 156 pages. \$3.25. Vol. II of



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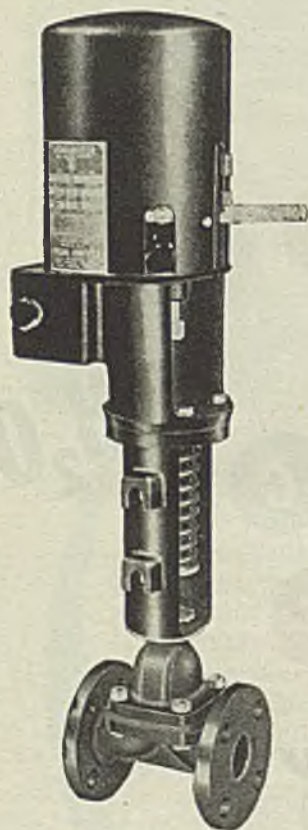
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Mineralogical and Physical Composition of Sands of the Oregon Coast. By W. H. Twenhofel. Bulletin No. 30, published by Oregon Dept. of Geology and Mineral Industries, 702

Woodlark Bldg., Portland 5, Ore. 66 pages. 35 cents. A study of the composition of Oregon coastal sands from Coos Bay to the Columbia River. Contains mineral and mechanical analyses, diagrams of channel and surface samples, position of core samples, an index map showing physiography of the coast with a chapter on factors controlling the deposition of sediments; particularly ilmenite concentrates.

GOVERNMENT PUBLICATIONS

The following recently issued publications are available at prices indicated from Superintendent of Documents, Government Printing Office, Washington 25, D. C. In ordering any publications noted in this list always give complete title and the issuing office. Remittances should be made by postal money order, coupons or check. Do not send postage stamps. All publications are in paper covers unless otherwise specified. When no price is indicated, the pamphlet is free and should be ordered from the bureau responsible for its issue.

Atomic Energy Act of 1946. Senate Report No. 1211, 79th Congress, recommending passage by Senate of S. 1717, and including extended technical appendices. Price 20 cents.

The Chemistry and Therapeutic Use of Rutin. By J. F. Couch, et al. Bureau of Agricultural and Industrial Chemistry, AIC-115. Issued by and available from Eastern Regional Research Laboratory, Philadelphia 18, Pa. Mimeographed.

Some Trends in the Cottonseed Crushing Industry. By Louis B. Howard. Department of Agriculture, Bureau of Agricultural and Industrial Chemistry, AIC-118. Mimeographed.

Summary of 1945 DDT Investigations for Control of Forest Insects with Special Reference to Aerial Application. By F. C. Craighead and R. C. Brown. Bureau of Entomology and Plant Quarantine, E-684. Mimeographed.

A Second Digest of the Literature on DDT. By R. C. Roark and N. E. McIndoo. Bureau of Entomology and Plant Quarantine, E-687. Mimeographed.

The Effect of DDT on the Sweetpotato Weevil. By K. L. Cockerham, et al. Bureau of Entomology and Plant Quarantine, E-691. Mimeographed.

Summary of Results with DDT Against Truck

Crop, Tobacco, and Sugar Beet Insects During 1945. By W. H. White. Bureau of Entomology and Plant Quarantine, E-692. Mimeographed.

The Preparation of Aqueous Solutions of Ethylene Dibromide-Ethylene Dichloride Mixtures for Fumigation of Japanese Beetle Larvae in Soil. By R. D. Chisholm et al. Bureau of Entomology and Plant Quarantine, E-694. Mimeographed.

Nutritive Value of the Per Capita Food Supply, 1909-45. By Faith Clark, et al. Bureau of Human Nutrition and Home Economics in cooperation with Bureau of Agricultural Economics. Un-numbered, mimeographed.

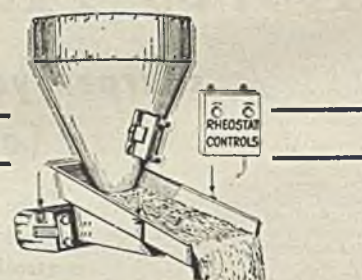
Control of Orchid-Infesting Insects by Vault Fumigation with Methyl Bromide. By J. W. Bulger. Bureau of Entomology and Plant Quarantine, E-690. Mimeographed.

Rubber: Natural, Reclaimed, and Synthetic. Facts for Industry, Series 26-1-1. New series of monthly data on supply, distribution, and stocks. First number is for 1939-45. Bureau of the Census.

Diseases of Cultivated Guayule and Their Control. Department of Agriculture, Circular 749. Price 15 cents.

Prewar World Production and Consumption of Plant Foods in Fertilizers. By K. G. Clark and

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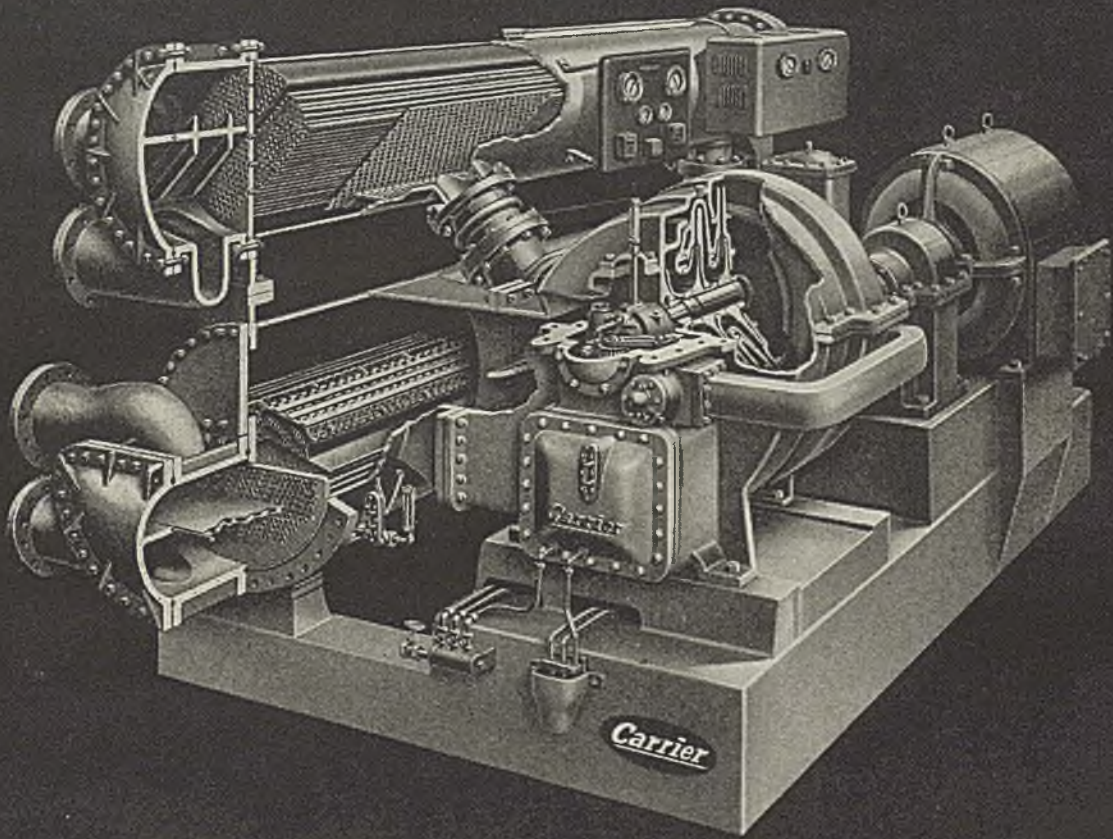
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Mildred S. Sherman. Department of Agriculture, Miscellaneous Publication No. 593. Price 20 cents.

A Vegetable Gardener's Handbook on Insects and Diseases. By W. H. White and S. P. Doolittle. Department of Agriculture, Miscellaneous Publication No. 605. Price 15 cents.

Examination of the Wah Wah Lead-Zinc Mine, Beaver County, Utah. By Robert L. Jones and W. Clifford Dunham. Bureau of Mines, Report of Investigations R. I. 3853. Mimeographed.

Exploration of Stiner and Bunch Hollow Zinc Properties, Powell River Area, Union and Claiborne Counties, Tennessee. By Richard L. Sayrs. Bureau of Mines, Report of Investigations R. I. 3856. Mimeographed.

Exploration of the Mecklenburg County, Va., Tungsten Area. By Ben E. Argyle. Bureau of Mines, Report of Investigations R. I. 3857. Mimeographed.

Exploration of Gallinas Fluorspar Deposits, Lincoln County, N. Mex. By J. H. Soule. Bureau of Mines, Report of Investigations R. I. 3854. Mimeographed.

A Graphical Form for Applying the Rosin and Rammler Equation to the Size Distribution of Broken Coal. By W. S. Landers and W. T. Reid. Bureau of Mines, Information Circular I. C. 7346. Mimeographed.

Operation of Electrolytic Manganese Pilot Plant, Boulder City, Nev. Bureau of Mines, Bulletin 463. Price 55 cents.

Procedure and Apparatus for Determining Carbonizing Properties of American Coals by the Bureau of Mines-American Gas Association Method. By D. A. Reynolds and C. R. Holmes. Bureau of Mines, Technical Paper 685. Price 10 cents.

Explosives-Handling Practices at the Mines of the Anaconda Copper Mining Co. at Butte, Mont. By Edward F. Courtney and John A. Johnson. Bureau of Mines, Information Circular I. C. 7356. Mimeographed.

Explosions and Fires in Bituminous-Coal Mines. Coal Mine Accident-Prevention Course, Section 4. Bureau of Mines, Miners' Circular 50. Price 25 cents.

San José Antimony Mines Near Wadley, State of San Luis Potosi, Mexico. By D. E. White and Jenaro Gonzales R. Geological Survey, Bulletin 946-E. Price 10 cents.

Alien Property Custodian—Annual Report, Fiscal Year Ending June 30, 1945. Includes detailed descriptions of companies seized and companies whose stock has been vested with APC. Price 45 cents.

Federally Owned Plants and Facilities. Senate Document No. 167. A report relative to the continued operation of federally owned plants for processing agricultural commodities and forest products or for manufacturing nitrates for fertilizer. Available free on request to Senate Document Room, Washington 25, D. C.

Seventh Report to the President, by the Director of War Mobilization and Reconversion, July 1, 1946. Price 15 cents.

Estimated Production and Sales of Synthetic Organic Chemicals in 1945. U. S. Tariff Commission. Condensed summary only. Unnumbered, mimeographed.

Industrial Research and Development Division. Statement of policy issued in July by Ely C. Hutchison, Chief. Gives summary of scope and plans for research allocations of this new agency, which is a part of the Office of Technical Services in the Department of Commerce. Mimeographed.

Catholic Protection of Underground Structures. National Bureau of Standards, Letter Circular I. C. 821. Mimeographed.

Structural Clay Products, Stone and Masonry. National Bureau of Standards, Letter Circular I. C. 824. Mimeographed.

List of Selected Publications. Bureau of Foreign and Domestic Commerce, January 1946. Unnumbered, printed.

Federal Specifications. New or revised specifications which make up Federal Standard Stock Catalog have been issued on the following items: Cements; Portland SS-C-192. Cement; Red-Copper, Dental U. C-198. Cement, Insulation; Thermal, Mineral-Wool HH-C-168. Belting; Round, Leather KK-B-211b. Leather; Lace KK-L-201b. Enamel; interior, semigloss, tints and white TT-E508. Enamel; Gloss, Synthetic (for Metal and Wood Hospital Furniture) TT-E-491. Primer, Paint; Synthetic (for Ferrous Metal and Wood Surfaces) TT-P-636. Zinc-Dust (Metallic-Zinc-Powder); Dry (Paint Pigment) TT-Z-391. Price 5 cents each.



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The form your equipment takes is determined by each process. You may employ steam-jacketed kettles like those pictured here, open tanks, or closed pressure-vessels. Alcoa Aluminum can be, and is, fabricated in every form required by the processing industries.

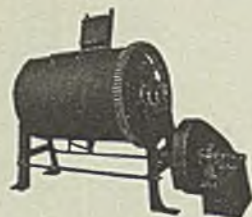
The aluminum used should be an Alcoa Alloy selected to give the best combination of properties for each piece of equipment. It must have been proved able to resist the type of corrosion to be encountered, thereby safeguarding the quality of your product and assuring longest life.

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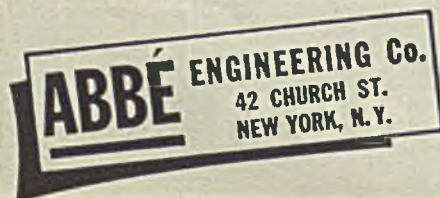


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1

Alloys. Westinghouse Electric Corp., Pittsburgh, Pa.—Bulletin B-3369. 48-page illustrated booklet discusses the physical and electrical characteristics of Westinghouse magnetic metals and alloys.

2

Alloys. Wyndale Mfg. Corp., Indianapolis, Ind.—4-page leaflet featuring Wyndaloy, a hardenable copper, nickel, manganese alloy. Chemical and physical properties are given and some uses for this material are listed.

3

Air Heaters. J. O. Ross Engineering Corp., New York, N. Y.—Bulletin 135-A. 16-page bulletin illustrating and describing the various types of direct and indirect air heaters made by this company. Includes charts, diagrams and tables covering such subjects as operating principle and construction, application of various types, heat ratings and capacities.

4

Air Recovery. W. R. Connor Engineering Corp., New York, N. Y.—12-page booklet featuring use of this company's activated carbon air recovery panels applied to railroad passenger cars.

5

Blowers. Roots-Connersville Blower Corp., Connersville, Ind.—Bulletin 22-23-B-12. 24-page booklet illustrating and describing rotary positive blowers for pressure or vacuum. Operating principles, design and construction features, application of these units in the process industries, are illustrated and described. Includes specification data and a table of standards sizes and capacities.

6

Boilers. Titusville Iron Works Co., Div. of Struthers Wells Corp., Titusville, Pa.—Bulletin B-3050. 4-page illustrated pamphlet featuring the Wee-Scot scotch marine boilers in horsepower from 9.7 to 50 hp. and 100 to 150 lb. working pressures. This boiler is claimed to retain all the practical advantages of construction, economy, efficiency, installation and maintenance of similar power boilers of larger sizes.

7

Boiler Equipment. Cochran Corp., Philadelphia, Pa.—Reprint No. 45—8-page reprint entitled "Continuous Blowoff for Boiler Plants." Publication 4168 is a 20-page booklet illustrating and describing the atomizing type deaerators made by this company. Contains colored diagrams showing principle of operation and gives the advantages of this type of equipment. The various types of equipment are illustrated with diagrammatic sketches.

8

Chemicals. Carbide & Carbon Chemicals Corp., New York, N. Y.—Booklet 4767. New booklet discussing the physical and chemical properties of ten commercially important ketones produced by this company. Specifications and shipping data are given in this booklet which also contains information regarding principal uses for these products. Booklet 6136. 12-page booklet entitled "Physical Properties of Synthetic Organic Chemicals" which gives data on the physical properties and applications for more than 175 synthetic organic chemicals. This booklet was designed as a condensed guide for research chemists, laboratory technicians, and purchasing agents.

9

Chemicals. A. R. Mass Chemical Co., South Gate, Calif. 49-page booklet giving formulas, grades, description and principal uses of chemicals produced by this firm.

10

Chemicals. Standard Oil Co. (Ind.), Chemical Products Dept., Chicago, Ill.—Four bulletins describing a number of organic chemicals manufactured by this company. Bulletin 10 covers aliphatic hydrocarbons including isooctene and dodecene. Bulletin 11 describes the alkane sulphonic acids including methane sulphonic acid, ethane sulphonic acid and mixed alkane sulphonic acid. Bulletin 12 describes the Indopols, a series of polybutenes. Bulletin 13A describes Indonex rubber plasticizers.

11

Chemicals. Witco Chemical Co., New York.

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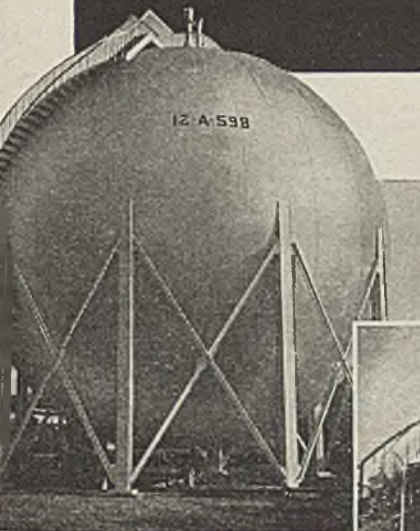
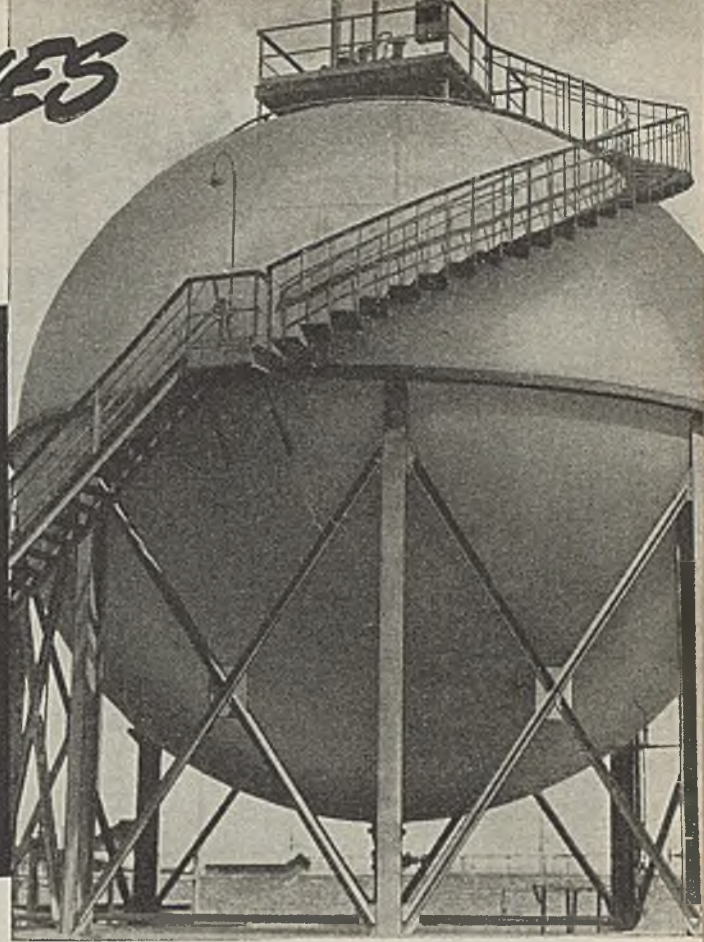
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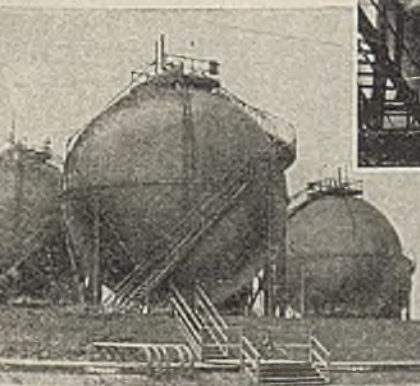
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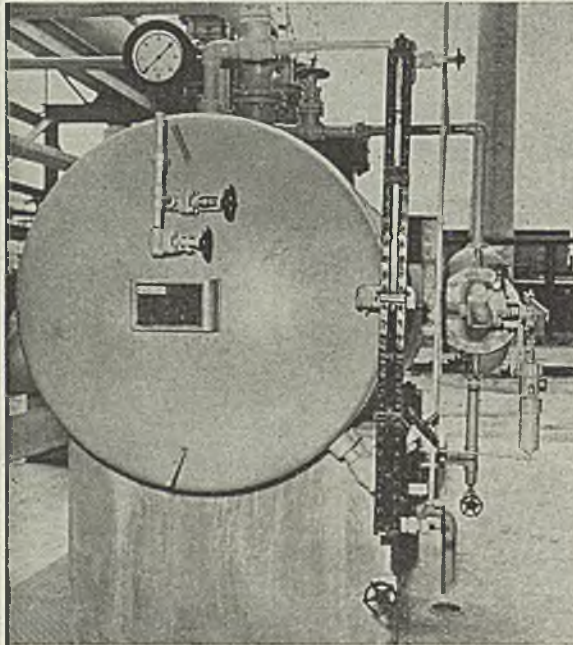


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N. Y.—Bulletin 46-1. 24-page technical bulletin on the metallic stearates available from this company. Contains information on chemical and physical properties as well as application data on these compounds.

12

Cleaning Chemicals. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.—4-page leaflet describes cleaning compounds for low carbon steel and discusses solvents, emulsion type pre-cleaners, solvent alkali combinations for pre-cleaning, alkaline soap type cleaners.

13

Coatings. Chateloid Corp., Dayton, Ohio.—First issue of this company's new bi-monthly publication entitled "Insure Your Stain Profits with Chateloid Stains."

14

Coatings. Nukem Products Corp., Buffalo, N. Y.—12-page booklet illustrating and describing the plastic coating Nukem manufactured by this company. A number of applications of this acid and alkali proof coating are illustrated.

15

Coatings. United Chromium, Inc., New York, N. Y.—16-page illustrated booklet, which discusses the sources, properties and applications of a number of resins used in synthetic lacquers and protective coatings.

16

Conveyors. Chain Belt Co., Milwaukee, Wis.—Bulletin 463. 26-page bulletin on the complete line of Rex belt conveyor idlers which includes photographs, tables, charts, diagrams and cutaway views to illustrate and describe the various items. Includes section devoted to selection of this type of equipment.

17

Conveyors. The Rapids-Standards Co., Inc., Grand Rapids, Mich.—4-page leaflet featuring the Floor-Veyor, a power driven belt conveyor for handling packaged materials in wholesale houses, warehouses, and manufacturing industries.

18

Couplings. Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.—Bulletin SL-1000-1. 4-page booklet illustrating and describing the rubber cushioned resilient flexible couplings made by this company. Details of construction are illustrated with a cutaway view and the various features are shown. Specifications and a table of dimensions are given.

19

Dust Control. American Foundry Equipment Co., Mishawaka, Ind.—Bulletin 112. 8-page illustrated leaflet featuring Dustube dust collectors. This consists of a simple, cloth bag type filter combining high efficiency and simplicity of installation, operation and inspection with low operating and maintenance costs. Contains specifications of the various models of dust collectors. Also includes diagrammatic sketches showing the principle of operation.

20

Electric Motors. Electric Machinery Mfg. Co., Minneapolis, Minn.—Publication No. 1068. 24-page illustrated booklet entitled "Selection and Application of Synchronous Motors and Synchronous Motor Controls." This is a reprint of the series of articles on this subject.

21

Electric Equipment. Federal Telephone & Radio Corp., Newark, N. J.—12-page booklet illustrating and describing the standard selenium rectifier equipment made by this company.

22

Electronic Equipment. Allen B. DuMont Laboratories, Inc., Passaic, N. J.—Two 4-page leaflets, the first of which features cathode ray tubes and the second discusses the cathode ray oscillograph made by this company.

23

Electronics Equipment. John T. O'Connor & Co., West Orange, N. J.—6-page leaflet featuring the electronic equipment, consulting service, and development service now available from this company.

24

Ejectors. Condenser Service & Engineering Co., Inc., Hoboken, N. J.—8-page catalog illustrating and describing the line of steam jet air ejectors for various applications in power plants, industrial and marine use. Contains engineering data, specifications, graphs and tables for aiding the engineer in selecting suitable equipment.

25

Equipment. Hardinge Co., Inc., York, Pa.—Bulletin No. 31-A. 16-page booklet illustrating and describing the thickening, clarifying and agitating equipment manufactured by this company. Various models are well illustrated by photographs, sectional views and diagrammatic sketches. Data on the application of thickeners and clarifiers to various types of material are shown.

26

Equipment. Hardinge Co., Inc., York, Pa.—4-

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Men who design piping, and are therefore responsible for its efficient performance, safety and permanence, really appreciate the fine engineering that goes into WeldELLS—and all other Taylor Forge Welding Fittings.

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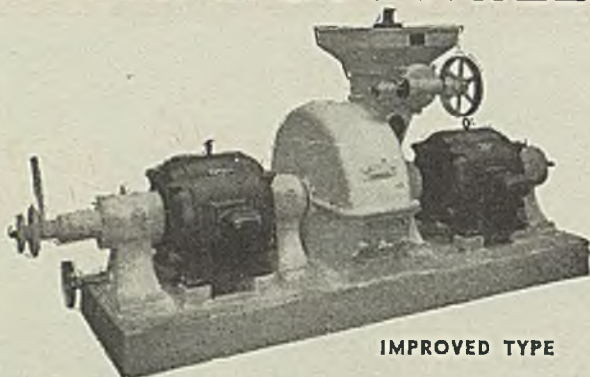
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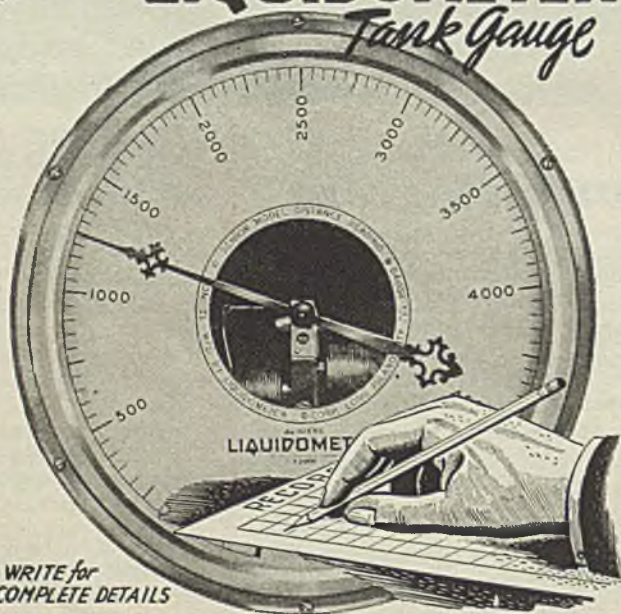
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36-29 SKILLMAN AVE., LONG ISLAND CITY, N. Y.

page leaflet illustrating and briefly describing the various types of process equipment made by this company.

27

Evaporators. Condenser Service & Engineering Co., Inc., Hoboken, N. J.—12-page catalog illustrating and describing the line of low pressure evaporators made by this company. Diagrammatic sketches show the application of various types of evaporators.

28

Expansion Joints. Cook Electric Co., Chicago, Ill.—8-page booklet illustrating and describing Magnilastic expansion joints for a wide range of operating conditions. Contains specifications, dimensions and other information regarding the application of these expansion joints.

29

Fire Protection. Automatic Sprinkler Corp. of America, Youngstown, Ohio.—Bulletin No. 56. 20-page booklet illustrating and describing the automatic sprinkler made by this company. Numerous illustrations and application sketches show the value of these systems.

30

Flexible Couplings. American Flexible Coupling Co., Erie, Pa.—Catalog No. 461. 32-page catalog showing the various flexible couplings manufactured by this company. Principle of design is shown and information is given on the installation and operation of these couplings. Contains dimensions and specifications of the various types and includes data on the selection and application of couplings.

31

Heat Transfer Equipment. Grisco-Russell Co., New York, N. Y.—Bulletin 1261 illustrates and describes various types of evaporators, heaters, coolers, condensers and heat exchangers for liquids, vapors and gases of all kinds. 2-page index table shows suitable units for handling specific fluids.

32

Instruments. The Bristol Co., Waterbury, Conn.—Bulletin P1233 describes and illustrates in detail the features of the new diesel engine pyrometer manufactured by this company. Includes drawings and specifications of diesel engine thermocouple assemblies for use with this instrument.

33

Instruments. Electric Auto-Lite Co., Instrument and Gage Division, New York, N. Y.—40-page color catalog illustrating and describing the various instruments and gages made by this company.

34

Instruments. Electronic Controls, Inc., Newark, N. J.—2-page leaflet featuring the electronic interval timer model 1029 manufactured by this company.

35

Instruments. Fischer & Porter Co., Hathoro, Pa.—Catalog section 31-E. 4-page booklet illustrating and describing a small size low-cost rotameter for purge line (bubbler) service. Capacities and dimensions are given in tabular form. Specifications are included.

36

Instruments. The Hays Corp., Michigan City, Ind.—Bulletin 46-766. 8-page bulletin featuring the Hays totalizing, indicating Veriflow meter. This combines positive volumetric measurement with rate of flow indication. Details of construction are shown in a cutaway view of the instrument and the principle of operation is described.

37

Instruments. Northern Equipment Co., Erie, Pa.—Bulletin 455. 4-page leaflet entitled "Controlling Water Level on Combustion Engineering Type VU Boilers."

38

Instruments. The Powers Regulator Co., Chicago, Ill.—Circular PD-358. 4-page folder illustrating and describing the Type H thermostatic water mixer made by this company. It is designed for use in controlling the temperature of water in photo developing baths.

39

Materials Handling. Automatic Transportation Co., Chicago, Ill.—A series of five brochures illustrating this company's electric propelled fork lift trucks ranging from 1 to 3 tons in capacity. Contains answers to many technical questions on operation and construction of this company's equipment.

40

Mixers. Sprout Waldron & Co., Muncy, Pa.—Bulletin SM-346. 4-page bulletin illustrating and describing the special mixer equipment made by this company for the process industries.

41

Molding Equipment. Watson-Stillman Co., Roselle, N. J.—Bulletin 620-B. 12-page bulletin featuring the horizontal injection molding machine made by this company. Bulletin 641-A. 8-page

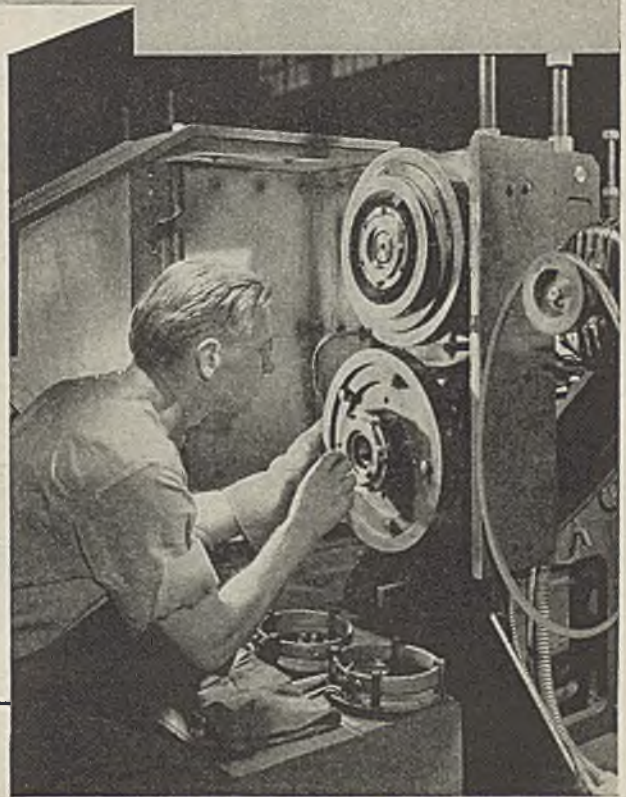
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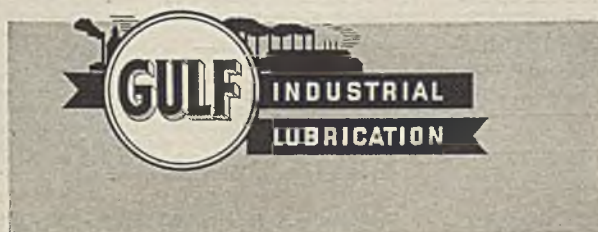
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illustrated folder showing the transfer molding machine for use in applications of 50 to 1200 tons.

42

Plastics. Bakelite Corp., New York, N. Y.—36-page booklet entitled "The A.B.C.'s of Modern Plastics." Provides a brief outline of the origin, preparation and uses of plastics and of their importance in modern civilization. Simple discussion covers thermosetting and thermoplastic materials, molding and extrusion, laminating, plywood molding and wood bonding, and other plastic processes.

43

Plastics. E. I. du Pont de Nemours & Co., Arlington, N. J.—12 page brochure highlights some of the special characteristics and combinations of properties which have made possible successful product applications from plastic materials made by this company.

44

Proportioning Equipment. Proportioners, Inc., Providence, R. I.—Bulletin 1714. 4-page leaflet featuring this company's packaged unit for constant rate chemical feeding. Contains specifications for low pressure and high pressure units.

45

Pumps. Carver Pump Co., Muscatine, Iowa.—Bulletin 200. 8-page bulletin describing and illustrating this company's new line of centrifugal pumps ranging in capacity from 40 to 900 gal. per minute. Includes details of hydraulic design and a table for selecting pumps for various services.

46

Pumps. Economy Pumps, Inc., Hamilton, Ohio.—Bulletin B-346. 4-page leaflet illustrating and describing the vertically split-case multi-stage high pressure centrifugal pumps made by this company. Details of construction, as well as approximate dimensions and weights of these pumps are given. Includes performance curves.

47

Pumps. Ingersoll-Rand Co., Phillipsburg, N. J.—Form 7062. 16-page illustrated booklet featuring the application of two-stage centrifugal pumps to various industries. Outstanding features are illustrated in cutaway views and performance data are given in tabular form.

48

Pumps. Ingersoll-Rand Co., Phillipsburg, N. J.—Form 7094. 12-page bulletin describes this company's line of single stage pumps built for general service in various process industries. Construction features and details are illustrated with cross sectional views and the dimensions and capacities are given.

49

Pumps. Warren Steam Pump Co., Inc., Warren, Mass.—Bulletin 230. 4-page folder featuring the horizontal duplex piston pump made by this company. Includes detailed description of the mechanical features, metal specifications, sizes, capacities and dimensions.

50

Refrigeration Equipment. Bowser, Inc., Terryville, Conn.—Four leaflets illustrating and describing the Bowser Cold-Hold refrigeration unit for various industrial purposes.

51

Safety Equipment. Standard Equipment Co., Chicago, Ill.—Several pamphlets describing the safety equipment made by this company. Includes data on goggles, garmets and aprons, gloves and eye shields.

52

Scrubbers. The Peabody Engineering Corp., New York, N. Y.—Bulletin No. H-202. 4-page illustrated booklet describing the gas scrubbers and coolers manufactured by this company. Contains diagrammatic sketches which show the principle of operation. Various features of the equipment are described and a number of applications suggested.

53

Silicones. Dow Corning Corp., Midland, Mich.—Resin series No. 1. 4-page leaflet entitled "How to Use DC996, a high temperature silicone insulating varnish that cures at low temperatures.

54

Solvents. Armour & Co., Chicago, Ill.—4-page technical bulletin entitled "The Armids as Mutual Solvents for Waxes and Plastics." It describes the use of commercial octadecanamide in blending certain plastics with paraffin and microcrystalline waxes and includes diagrams showing areas of compatibility.

55

Spray Equipment. Eclipse Air Brush Co., Newark, N. J.—Catalog 86. 44-page illustrated catalog describing the complete line of low pressure spray equipment manufactured by this company. Contains information on the various types of spray guns and accessories, portable painting units, air-motored agitators, compressors, etc.

56

Tachometers. Herman H. Sticht Co., Inc.,



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I Was Stumped...

when Jim asked me that!

I was buying that resin. He was responsible for making it work. I didn't know that we could have a resin made to order for our specific job, instead of a resin made to the average requirements of merely similar applications. That's when I switched to Interlake specification resins.

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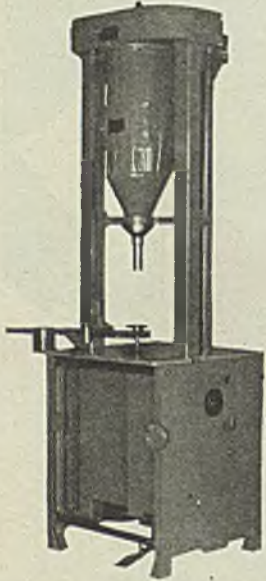
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Incorporating many improvements, this new model of our old, reliable Universal Filling Machine, is designed to do an even better job than its popular predecessor. The new machine features heavier construction where needed, increased drive efficiency and greater convenience for the operator.

This means added operation proficiency, steadier production and lower cost packaging for the user . . . for you. S & S Universal Fillers are supplied as one, two or four station machines; auger or centrifugal feed to accommodate material to be filled.

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FILLING : PACKAGING : WRAPPING MACHINES
Speeds to suit your needs—15-30-60-120 per hour

"Better machines for better packages"

New York, N. Y.—8-page leaflet featuring the tachometers made by this company. Bulletin 798.

57

Textile Finishing. American Cyanamid Co., Textile Resin Department, Bound Brook, N. J.—Bulletin 101. 12-page booklet discussing the production of durable glazes on chintz fabric. Processing details are included and the properties of finishing resins are discussed.

58

Tower Packing. General Ceramics & Steatite Corp., Keasby, N. J.—Bulletin 191F. 2-page leaflet describing the Frischer rings used as tower packing. This is a technical report on experiments made at a chemical engineering laboratory.

59

Tubing. Murray Tube Works, Elizabeth, N. J.—6-page folder which describes and illustrates the tube fabricating facilities of this company.

60

Valves. American Car & Foundry Co., New York, N. Y.—8-page illustrated pamphlet featuring the full pipe-area lubricating plug valve which may be used for acids, caustics, chemicals, oil, water and other fluids. The various models are illustrated and the principles of operation are described.

61

Valves. William M. Bailey Co., Pittsburgh, Pa. 6-page folder illustrating and describing the Bailey mechanical goggle valves for gas washers, precipitators, boiler plants, coke plants, blast furnace gas mains, chemical plants and metallurgical plants. The goggle valve is a positive shutoff valve designed to provide safety for workmen at coke ovens, blast furnaces and process equipment. Includes detail drawings and tables of dimensions. Installation and operation are described.

62

Valves. H. Belfield Co., Philadelphia, Pa.—Bulletin 501, a 12-page booklet features the new pilot piston control valve made by this company. Mechanical characteristics are discussed and the valve is illustrated by cutaway views. Diagrammatic sketches are used to illustrate the various types of valves. Contains flow characteristics and application data.

63

Ventilating Equipment. L. J. Wing Mfg. Co., New York, N. Y.—6-page pocket size folder illustrating and describing the various types of heating, ventilating and combustion equipment and auxiliary turbines made by this company.

64

Water Treating. W. H. & L. D. Betz, Philadelphia, Pa.—16-page brochure entitled "The Six Fundamentals of Betz Water Conditioning Service." It illustrates and describes how this company provides a supervisory service for boiler water conditioning.

65

Water Treating. The Permutit Co., New York, N. Y.—Booklet featuring the master valve control for gravity and large size pressure vessels or zeolite softeners. Automatic control with this valve regulates rate of flow, prevents waste of water in the operation of backwashing and rinsing and maintains the zeolite in clean active condition.

66

Welding. Eutectic Welding Alloys Corp., New York, N. Y.—Selection chart lists this company's welding rods and their suggested applications and contains useful information on the application of these rods.

67

Welding. The Graver Tank & Mfg. Co., Inc., Chicago, Ill.—New booklet entitled "Weldments." This 19-page booklet presents a discussion of weldments as a modern metal fabrication method.

68

Welding. Jessop Steel Co., Washington, Pa.—8-page booklet containing complete information on the selection and application of this company's stainless electrodes for welding stainless steel.

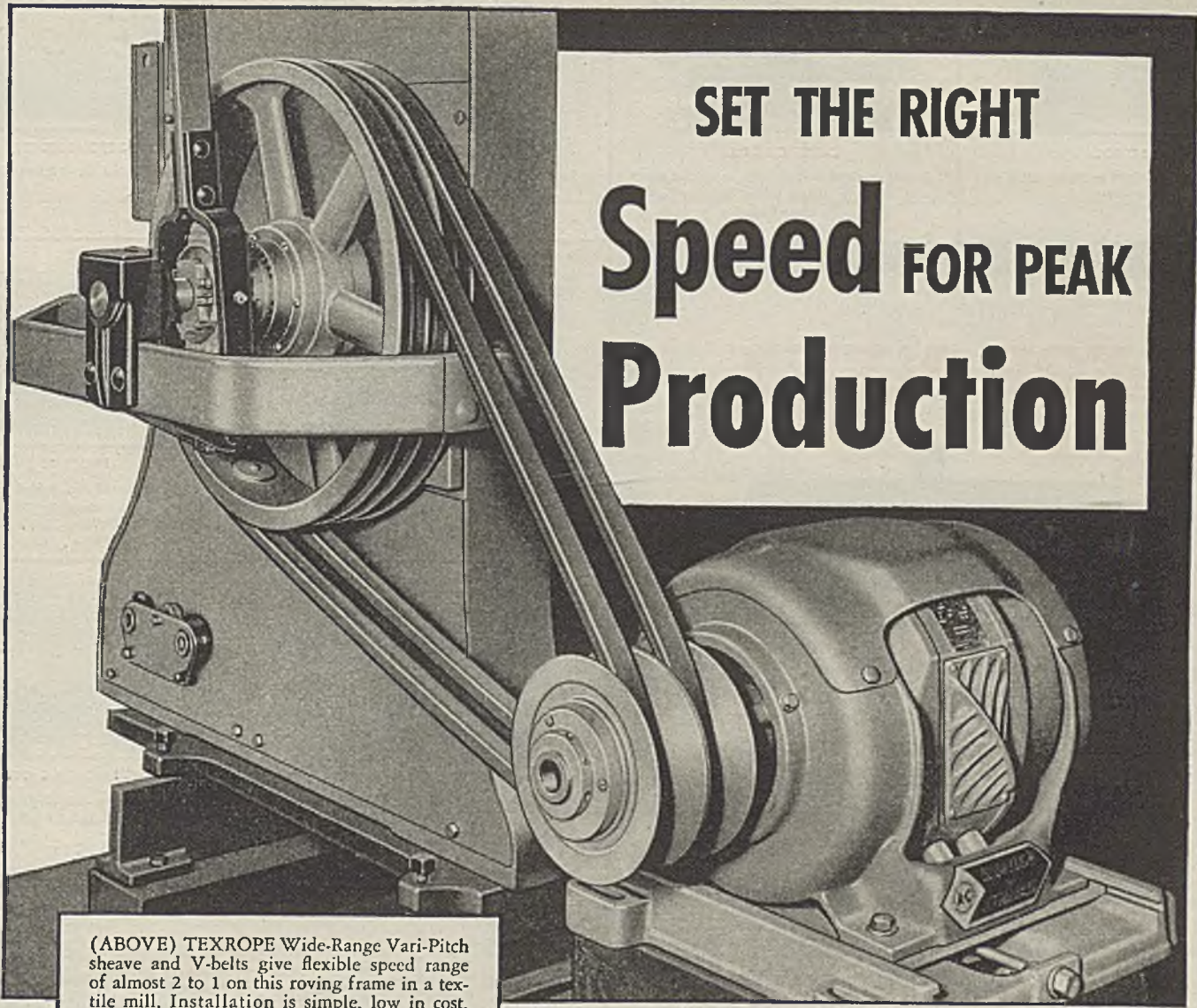
69

Welding. Metal & Thermit Corp., New York, N. Y.—92-page catalog illustrating and describing applications, characteristics, physical and chemical properties, and recommended procedures for the Murex arc welding electrodes manufactured by this company. Also 16-page bulletin describing the type HTS welding electrode designed to prevent underbead cracking in the welding of various steels.

70

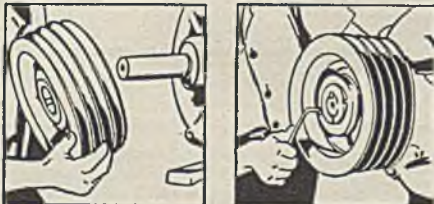
Welding Alloys. Ampeco Metals, Inc., Milwaukee, Wis.—Bulletin W-8F. A Spanish edition of the Ampeco-Trode industrial application chart which contains a list of applications of aluminum bronze electrodes. Bulletin W-9 describes in detail the different grades of bronze electrodes manufactured by this company. Bulletin 82 describes a series of stainless white alloys containing 20 to 30 percent nickel.

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Patented "Magic-Grip" sheave comes completely assembled. You simply slip it on the shaft (there's easy clearance for even over-size shafts) then tighten three cap screws. Sheave is locked on with a powerful clamp fit — yet it can be removed just as easily. No hammering to damage motor bearings — no filing or reaming. And, no wobble, weave or backlash.

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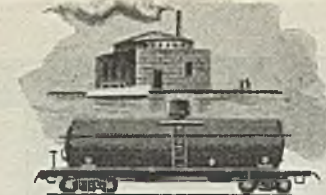
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Clean, steel car, 6,000 to 10,000 gallon capacity.



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Heavily insulated steel car, with or without heater coils, 8,000 or 10,000 gallon capacity. Usually specially lined.



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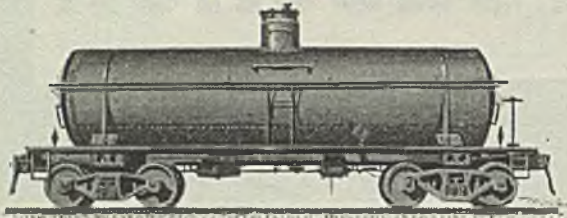
Insulated, welded car; built to withstand pressure up to 500 pounds; 15 or 30 ton capacity.



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Clean, steam coiled car of 8,000 gallon capacity.

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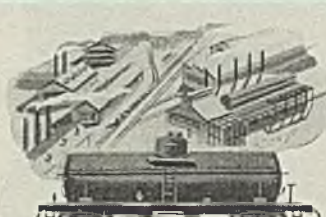
LARD

Clean steam coiled car, usually of 8,000 gallon capacity.



WINE

Insulated car with one to six compartments. Interior coated to preserve quality.



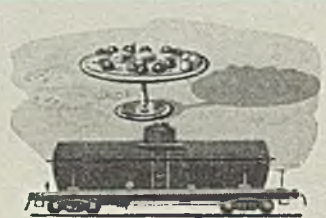
FUEL OIL

Steel car, steam coiled, 8,000 to 12,500 gallon capacity.



PROPANE

Heavily constructed car, welded and insulated. Built to withstand internal pressures to 300 pounds. Capacity 10,000 to 11,000 gallons.



CORN SYRUP UNMIXED

Clean, steam coiled with heavy truck capacity. Usually lined with aluminum paint.



LUBRICATING OIL

Steel car, with steam coils, single or multiple compartment; usually 8,000 gallon capacity.



MURIATIC ACID

Car lined with pure or synthetic rubber; 8,000 to 10,000 gallon capacity.



ACETIC ACID

Aluminum Car; 8,000 or 10,000 gallon capacity.



GASOLINE

Clean car, 6,000 to 12,500 gallons; single or multiple compartment.



ASPHALT OR TAR

Heavily steam coiled car; with 2 or more inches of insulation; steam jacketed outlet; 8,000 to 10,000 gallon capacity.



MOLASSES

Steam coiled car with heavy capacity trucks; 8,000 gallon capacity.



SULPHURIC ACID

Heavily constructed steel car with heavy truck capacity. Equipped to unload through dome.

CHEMICAL ECONOMICS

H. M. BATTERS, Market Editor

RIISING TREND REPORTED FOR BOTH PRODUCTION AND CONSUMPTION OF CHEMICALS IN JULY

WHILE only incomplete data are available for industrial activities in July, they point to an improvement in both the producing and consuming ends of the chemical industry. Steel mills, freed from strikes and shortage of coal, were able to turn out the largest tonnage of steel achieved in any month so far this year—in fact the largest since July of last year. A somewhat similar result is reported by oil refineries with runs to stills averaging better than at any time since last August. General industrial outputs also were reported to be gaining in volume with a consequent increase in demand for a varied line of chemicals.

The Federal Reserve Board index shows a rather sharp gain in all production in June with the index number for that month standing at 171 as compared with a revised figure of 159 for May. The Board revised its preliminary index for production of industrial chemicals for May, cutting it from 395 to 387 but the index for June moved up 12 points to 399 which is its record level for this year. Data for production of chemicals in June included the output of some government-owned plants which are now operating under private management. This addition to capacities made a notable change in production totals for such chemicals as nitric acid, synthetic anhydrous ammonia, and ammonium nitrate as the June figures are far ahead of those reported for any previous month of the year.

The index of *Chemical Engineering* places industrial consumption of chemicals in June at 193.40 and at a revised figure of 196.89 for May. For the six months ended June, the index reports a higher consumption of chemicals in industry than for any other six-month period on record. The gain over the first half of last year, when some of the civilian industries were influenced by war activities, is approximately 3 percent. This increase was accomplished in the face of many unfavorable developments including closing of plants, shortage of materials, shortage of packaging material, difficulties in transportation, utilization of long-operated equipment, and an unbalanced price situation.

A review of the industries which offer the largest outlets for chemicals shows that they have advanced into the second half of this year with prospects for bettering the showing made in the first half. Consumption of rubber has gone ahead at a record rate. In the first half of the year, 493,261 long tons of rubber was used in the fabrication of tires and other products. Broken down by type this included 344,962 tons GR-S; 19,982 tons Neoprene; 41,406 tons GR-I; and 2,389 tons N-type rubbers. Consumption of natural rubber amounted to 84,522

tons and is increasing as imports gain in volume. In addition to the above totals, consuming companies made use of 130,918 tons of reclaimed rubber. Based on the six-month figures it is estimated that about one million long tons of rubber will be consumed in this country in 1946 or more than was required at the peak of wartime demands.

Demand for pulp and paper is sufficient to keep plants going at capacity levels but uncertainty about the size of outputs is caused by the possible limitations on supplies of pulp. Production in this country and in Canada has been pushed as far as possible and imports of pulp have added to the general supply. Sweden, which has furnished a good part of imports, is reported to be falling behind in its output.

For the 1946-47 fertilizer season, the supply of fertilizer chemicals is expected to be about the same as for the season recently closed. With large consumption of superphosphate at home and abroad, a new record

for production is in prospect. A larger tonnage of ammonium nitrate also is probable since some of the former government plants are now producing for industry. TVA also is contributing to the supply of ammonium nitrate especially for export. From a world standpoint it is estimated that requirements for nitrogen will exceed supply by about a million tons and a deficit of about 16 percent is expected in the case of phosphate rock. These surveys have a bearing on domestic production since they point to a greater demand from abroad for our products.

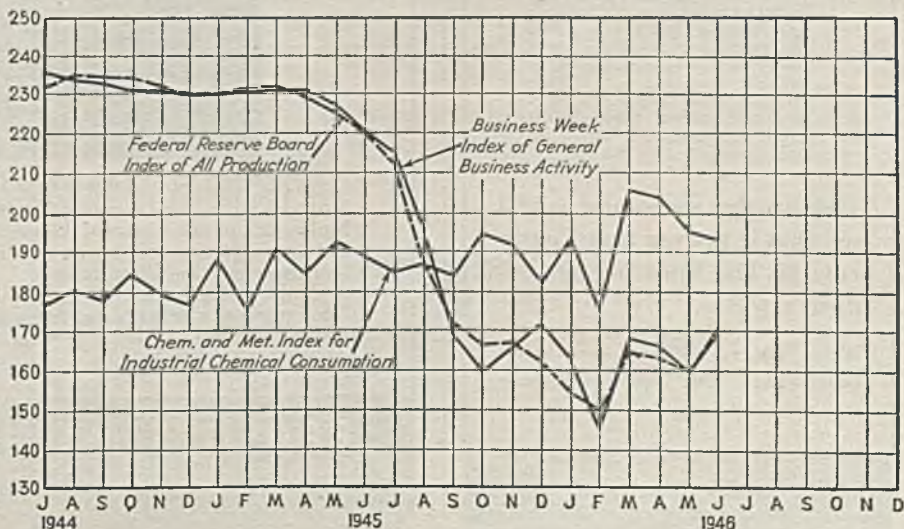
Producers of glass find a ready market for their goods. Container output in the first half of this year was approximately 8 percent above that for the comparable period of last year and the 12 months totals are expected to set an all-time high. Flat glass has moved in larger volume as building and automotive production gained headway but the rate of increase has been slowed by scarcity of materials and other unfavorable factors which means that the full possibilities of the market have not yet been reached.

Producers of vegetable oils have had difficult going since the supply of oil-bearing materials has been unsteady and inadequate. Crushers of linseed at times have been forced to close their plants because no seed was available, this applying to the eastern crushers who depend largely on imported seed. Total tonnage of all oilseeds crushed in the first half of this year is 543,839 tons which compares with 640,966 tons crushed in the first half of last year.

The short supply of oils and fats has had a direct bearing on the soap industry and deliveries of soap in the first half of the year, based on reports from 70 manufacturers representing 90 percent of production, amounted to 1,223,968,000 lb. plus 1,915,000 gal. of liquid soap. Dollar sales for soap in the half year were close to 14 percent below the comparable period of 1945.

Chemical Engineering Index Industrial Consumption of Chemicals

	1935 = 100	May Revised	June
Fertilizers	42.86	38.94	38.94
Pulp and paper	22.02	20.95	20.95
Petroleum refined	19.40	18.90	18.90
Glass	20.30	19.97	19.97
Paint and varnish	23.52	23.50	23.50
Iron and steel	7.60	10.14	10.14
Rayon	20.65	18.68	18.68
Textiles	11.94	10.82	10.82
Coal products	4.68	7.05	7.05
Leather	4.70	4.65	4.65
Industrial explosives	6.38	6.90	6.90
Rubber	6.80	6.90	6.90
Plastics	6.04	6.00	6.00
		196.89	193.40





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Scores 100% In The Basic Plant Site Selection Factor Test

- Proximity to markets**—Pensacola, less than 600 miles from the U. S. center of population. Is ideally situated in relation to domestic and foreign markets.
- Settled labor conditions**—Ample skilled and unskilled labor, cooperative and settled.
- Favorable tax rates**—Reasonable property taxes, complete exemption of first \$5,000 valuation of homesteads from city and county taxes for current operating purposes. No state income or real estate tax.
- Railroad facilities**—Two major railroads which maintain large terminals.
- Proximity to sources of supply**—Special opportunities for the chemical, paint and varnish, soap, mahogany furniture, wood novelties, textiles, plastics and boat-building industries. Supplies immediately available.
- Power and water**—Cheap electrical power, natural gas, coal and oil. Unlimited soft water supply, 99.98% pure.
- Residential characteristics**—Ideal year-around climate makes living more pleasant, less costly; assured lower plant construction and maintenance costs and more working days.
- Water transportation**—Pensacola harbor can accommodate the entire United States Navy. Excellent port facilities. Two steamship lines operate regular services—one a 52 hour "turn-around" service to Havana. Sheltered barge canal from the Mexican border to New Jersey.

Add up the score and you'll see that it proves that Pensacola IS The Spot for new industry today.

Write today, telling us your requirements. All correspondence strictly confidential.

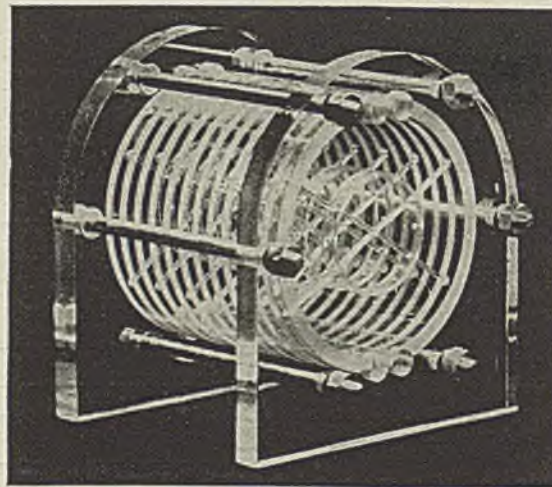


1945 Production of Coke and Byproducts at Byproduct-Coke Plants

Bureau Mines Table

Product	Plants Not Owned by City Gas Companies	Plants Owned by City Gas Companies (Public Utilities)	Total
Number of active plants	72	15	87
Coke			
Production, tons	58,430,076	3,664,212	62,094,288
Value	\$437,080,202	\$33,110,137	\$470,190,339
Average per ton	\$7.48	\$9.04	\$7.57
Byproducts			
Tar			
Production, Gal.	652,106,266	44,201,045	696,307,311
Sale, gal.	366,043,225	44,456,099	410,499,324
Value	\$19,476,954	\$2,350,936	\$21,827,890
Ammonia			
Production (NH ₃ equivalent of all forms), lb.	414,637,421	22,722,017	437,359,438
Liquor (NH ₃ content)			
Production, lb.	50,801,127	4,411,907	55,213,124
Sales, lb.	47,054,833	4,384,292	51,439,125
Value	\$1,433,291	\$102,810	\$1,536,101
Sulphate			
Production, lb.	1,455,345,178	73,240,079	1,528,585,257
Sales, lb.	1,526,866,800	75,257,000	1,602,123,800
Value	\$19,491,616	\$1,042,402	\$20,534,078
Gas			
Production, M cu. ft.	\$47,848,089	56,028,029	904,476,118
Disposal of surplus			
Used under boilers			
M cu. ft.	32,017,600	44,303	32,061,903
Value	\$3,092,247	\$6,103	\$3,098,350
Used in steel or affiliated plant			
M cu. ft.	324,241,986	52,235	324,294,221
Value	\$36,952,380	\$20,220	\$36,972,600
Distributed through city mains			
M cu. ft.	114,960,028	51,218,346	166,178,374
Value	\$26,110,110	\$17,421,975	\$43,532,085
Sold for industrial use			
M cu. ft.	29,102,560	2,016,353	31,118,913
Value	\$3,236,809	\$905,178	\$4,141,987
Crude light oil			
Production, gal.	237,439,484	8,247,709	245,687,253
Sales, gal.	13,822,705	4,296,117	18,118,822
Value	\$1,230,003	\$331,234	\$1,561,237
Light oil derivatives			
Production, gal.	198,864,848	3,804,718	202,669,566
Sales, gal.	187,587,304	3,687,829	191,275,133
Value	\$27,468,672	\$418,823	\$27,887,495
Naphthalene, crude			
Production, lb.	86,898,339	778,960	87,677,299
Sales, lb.	86,157,557	778,960	86,936,517
Value	\$1,791,522	\$15,445	\$1,806,967
All other byproducts, value	\$9,159,124	\$60,291	\$9,219,415

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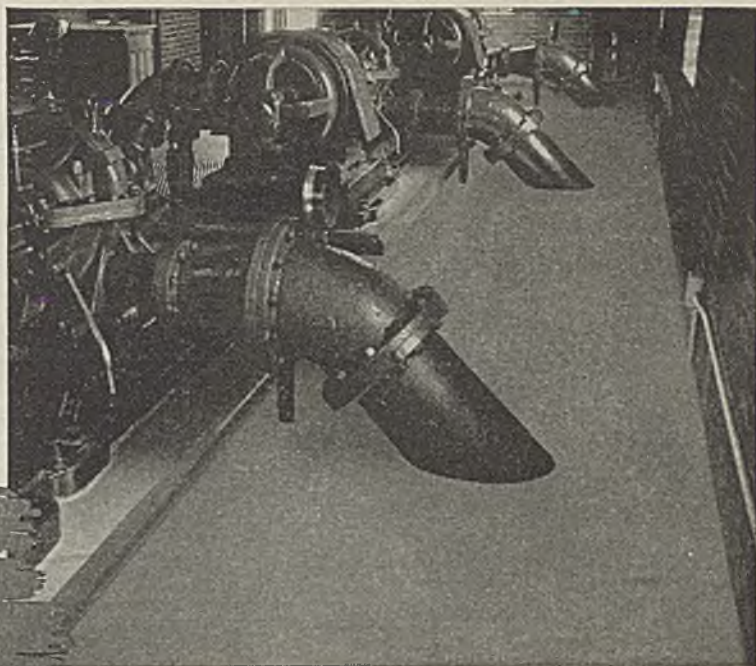
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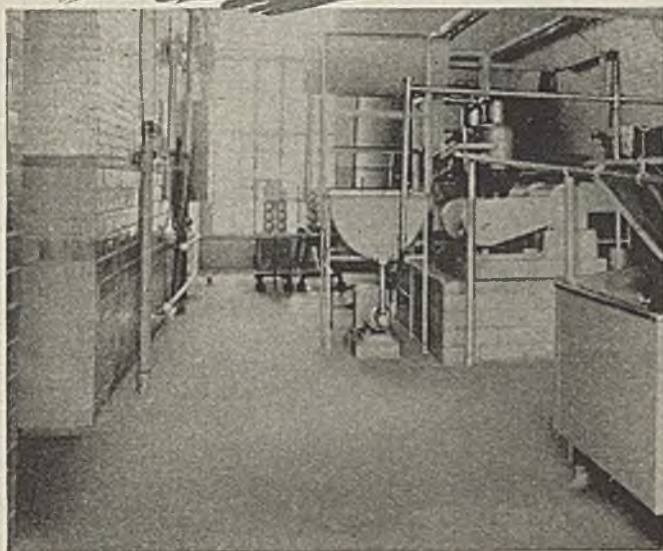
on concrete floors
and walls, on or below
grade, gives...

POSITIVE PROTECTION

Against Acids, Alkalis,
Oil and Water



Prufcoat will not blister, peel or soften when subjected to moisture from behind, or condensation on the surface, even when applied to concrete floors and walls far below grade.



Impervious to fats, oils and waxes, insoluble in alcohol and unaffected by salts, Prufcoat Protective Coatings are *acid-proof* as well as being proof against the alkali reaction of concrete.

The Prufcoat film formed after polymerization is tough, non-oxidizing and non-combustible—will withstand severe abrasion and can be washed with the strongest cleaning solutions.

APPLIED BY BRUSH... BY YOUR OWN MAINTENANCE CREW, Prufcoat air-dries by evaporation of the volatile solvents in a matter of minutes. Write today for complete descriptive folder. Address all inquiries to Prufcoat Laboratories, Inc., 50 East 42nd Street, New York City.



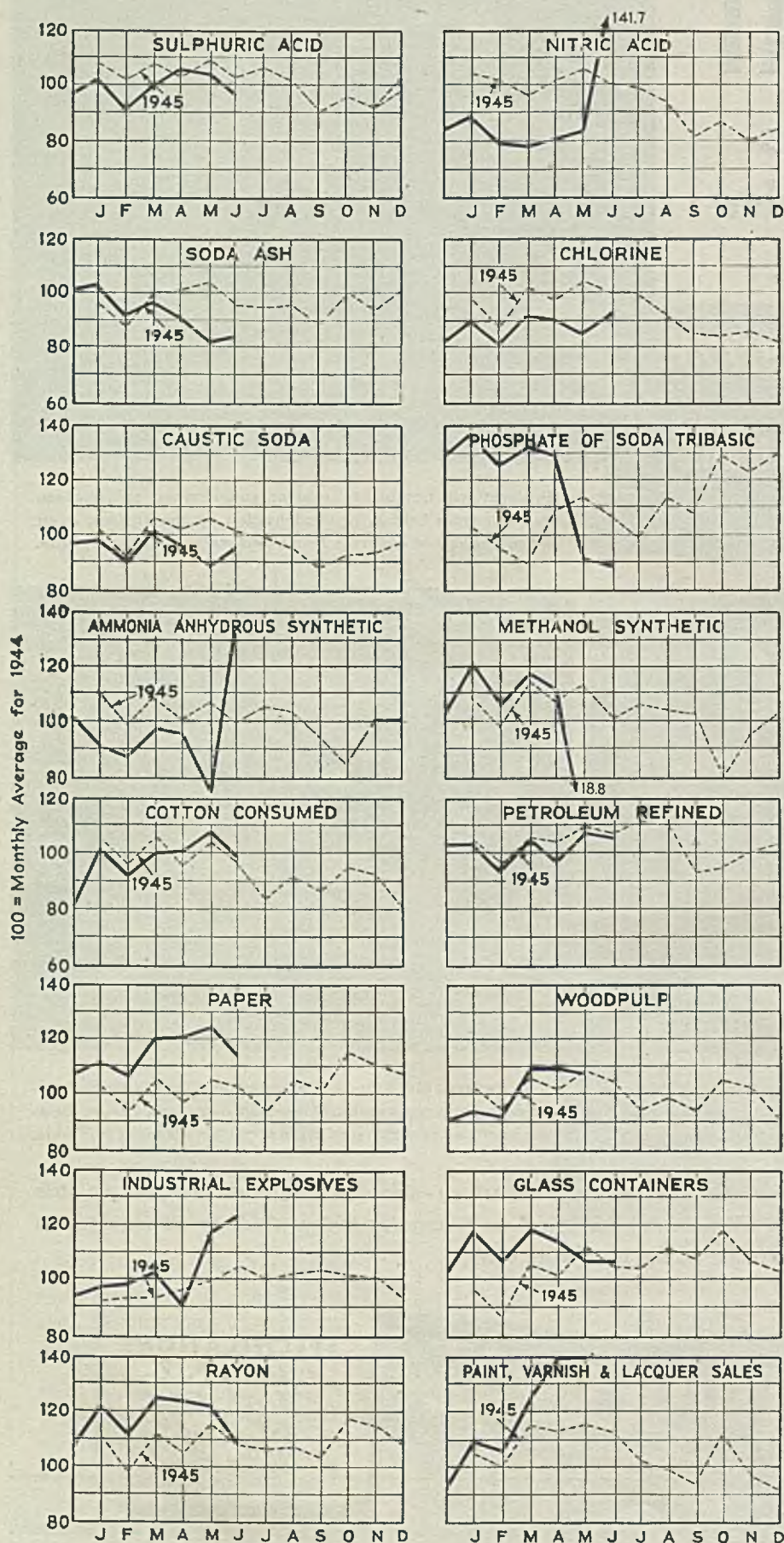
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PROTECTIVE COATING

SPECIFICATIONS

- ✓ Acid-Proof
- ✓ Alkali-Proof
- ✓ Oil-Proof
- ✓ Water-Proof

One material for application to *all* concrete, structural steel, floors, pipes, tanks and machinery.

PRODUCTION AND CONSUMPTION TRENDS

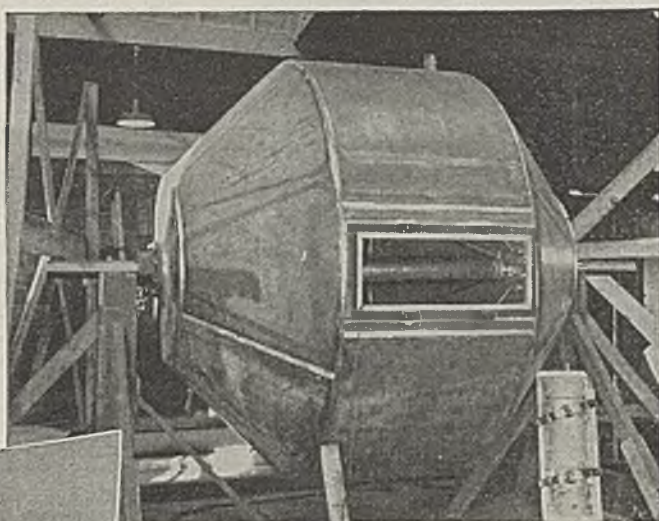
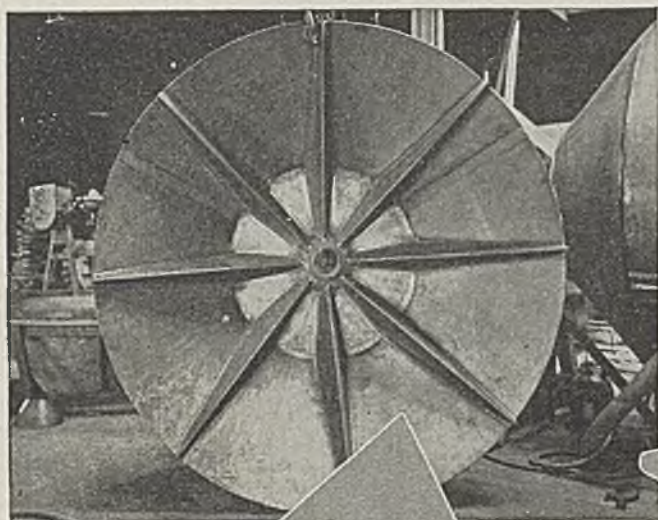


MANUFACTURERS of chemicals are working against seasonal trends inasmuch as operations have been speeded up in the last two months due to the renewal of work at some plants which had been closed by strikes and also because of the active call for supplies from consumers. The situation, however, is spotty with shortage of many raw materials still preventing full use of manufacturing facilities. In addition to the actual scarcity of materials, increasing difficulty has been found in spotting box cars for moving supplies from producing to consuming centers.

The shorter working week has contributed to the shortage of cars because it causes a greater time lag in their unloading and return. However, the problem basically rests on the fact that the number of available cars is inadequate. The Office of Defense Transportation has recognized this and government agencies are reported to be planning the construction of 50,000 box cars. Railroads have ordered 57,693 cars to be built this year and it is believed that 80,000 new cars are needed if consideration is given to replacement requirements. In order to conserve steel, the use of aluminum bodies on steel underframes is being studied and the necessity for prompt action is shown by estimates that demand for rail deliveries will be larger in the months starting with September than it has been at any time so far this year. In addition to the heavy movement of grains, production and delivery of major durable consumer goods are rising each month.

The rollback of some prices in the interim of OPA suspension, while resulting in some lowering of prices, has not altered the general price trend which is toward higher levels. The fact that chemical prices in general have been held in check while production costs have been mounting has created a situation whereby adjustments are necessary for profitable operation and for the encouragement of full-scale production. So far as chemicals are concerned, the revival of OPA apparently will serve not as an agency for continued price freezing but as an official medium for prescribing the extent of price advances. This is made manifest by recent official sanction for price rises for superphosphate, ammonium sulphate, nitrate of soda, nitrate of soda-potash, specified plastics products, and linseed oil. Manufacturers of synthetic resins, plastic materials, and substitute rubber have been authorized to apply for individual adjustments in their ceiling prices where production is threatened by increased costs. Ceilings for lead arsenate and paris green also are higher.

In addition, a beginning has been made in the removal of price controls where it is deemed they are no longer important. Several non-ferrous metals, non-metallic minerals and salts were freed from price control on July 26. The list includes arsenic trioxide, cadmium oxide and sulphide, metallic arsenic, activated clay, barite, bentonite, chalk, china clay, cryolite, diatomaceous earth, feldspar, fuller's earth, graphite, ilmanite, pyrites, whiting, and witherite.



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**WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS**

United States Production of Certain Chemicals

May 1946, May 1945 and Five-Month Totals for 1946 and 1945

Chemical and Basis	Units	May 1946	May 1945	Total, Five Months	
		1946	1945	1946	1945
Ammonia, synthetic anhydrous ¹	Tons	34,511	48,244	203,262	237,633
Ammonium nitrate (100% NH ₄ NO ₃).....	Tons	35,597	.....	197,375	.....
Ammonium sulphate, synthetic (technical)....	M lb.	17,054	.....	89,370	.....
Calcium arsenate (100% Ca ₃ (AsO ₄) ₂).....	M lb.	3,496	2,403	10,318	10,065
Calcium carbide (commercial).....	Tons	36,761	64,805	206,743	310,656
Calcium phosphate:					
Monobasic (100% CaH ₄ (PO ₄) ₂).....	M lb.	4,867	5,210	28,536	25,992
Dibasic (100% CaH ₂ (PO ₄) ₂).....	M lb.	4,143	3,389	34,072	18,318
Carbon Dioxide:					
Liquid and gas.....	M lb.	16,979	17,827	85,148	87,875
Solid (dry ice).....	M lb.	58,197	65,419	240,946	263,703
Chlorine.....	Tons	89,960	110,332	455,812	517,295
Chromic green (C.P.).....	M lb.	1,592	419	8,773	2,543
Chromic yellow and orange (C.P.).....	M lb.	3,376	3,375	21,001	16,871
Hydrochloric acid (100% HCl).....	Tons	26,331	37,152	133,662	181,214
Hydrogen.....	M cu. ft.	1,203,000	2,199,000	6,894,000	10,377,000
Lead arsenate (acid and basic).....	M lb.	7,956	7,892	39,364	42,033
Molybdate chrome orange (C.P.).....	M lb.	386	151	2,201	.....
Nitric acid (100% HNO ₃).....	Tons	32,538	41,757	160,640	200,716
Oxygen.....	M cu. ft.	834,997	1,333,996	12,092,610	6,950,492
Phosphoric acid (50% H ₃ PO ₄).....	Tons	62,452	58,981	346,194	274,431
Soda ash (commercial sodium carbonate):					
Ammonia soda process (98-100% Na ₂ CO ₃):					
Total wet and dry ²	Tons	303,174	388,044	1,756,049	1,844,470
Finished light ³	Tons	150,969	206,019	971,342	992,134
Finished dense.....	Tons	104,055	125,807	617,284	578,322
Natural ⁴	Tons	17,847	17,133	82,907	75,497
Sodium bicarbonate (refined) (100% NaHCO ₃)	Tons	14,399	16,993	89,144	71,530
Sodium bichromate and chromate.....	Tons	7,096	6,955	37,579	34,264
Sodium hydroxide (100% NaOH):					
Electrolytic process:					
Liquid ⁵	Tons	87,240	104,563	440,495	489,291
Solid.....	Tons	15,630	18,299	79,371	93,761
Lime soda process:					
Liquid ⁵	Tons	52,050	65,315	307,733	361,685
Solid.....	Tons	14,740	21,955	101,397	101,028
Sodium phosphate:					
Monobasic (100% NaH ₂ PO ₄).....	Tons	504	1,387	4,903	6,152
Dibasic (100% Na ₂ HPO ₄).....	Tons	2,876	5,132	25,800	23,167
Tribasic (100% Na ₃ PO ₄).....	Tons	6,087	7,623	42,535	34,281
Meta (100% NaPO ₃).....	Tons	1,349	2,358	11,988	10,365
Tetra (100% Na ₄ P ₂ O ₇).....	Tons	4,437	2,848	33,572	15,192
Sodium silicate (anhydrous).....	Tons	29,198	43,955	158,322	189,828
Sodium sulphate:					
Anhydrous (refined) (100% Na ₂ SO ₄)....	Tons	27,098	6,684	122,372	34,314
Glaubers salt.....	Tons	14,592	19,654	78,745	90,714
Crude salt cake.....	Tons	30,553	47,668	147,979	238,196
Sulphuric acid (100% H ₂ SO ₄):					
Chamber process.....	Tons	267,845	269,394	1,286,508	1,381,492
Net, contact process ⁶	Tons	472,693	507,590	2,215,830	2,405,681

Data for this tabulation have been taken from "Facts for Industry" series issued by Bureau of the Census and WPB Chemicals Bureau. Production figures represent primary production and do not include purchased or transferred material. Quantities produced by government-owned arsenals, ordnance works, and certain plants operated for the government by private industry are not included. Chemicals manufactured by TVA, however, are included. All tons are 2,000 lb. Where no figures are given, data are either confidential or not yet available. ¹ Includes a small amount of aqua ammonia. ² Total wet and dry production, including quantities diverted for manufacture of caustic soda and sodium bicarbonate, and quantities processed to finished light and finished dense. ³ Not including quantities converted to finished dense. ⁴ Data collected in cooperation with the Bureau of Mines. ⁵ Figures represent total production of liquid material, including quantities evaporated to solid caustic and reported as such. ⁶ Includes oleum grades. Excludes spent acid.

United States Production of Certain Synthetic Organic Chemicals

April 1946, April 1945 and Four-Month Totals for 1946 and 1945

Chemical	April 1946	April 1945	Total, Four Months	
	1946	1945	1946	1945
Acetanilic, technical and U.S.P.....	638,239	575,103	2,416,820	1,686,570
Acetic acid:				
Synthetic ¹	23,187,005	22,564,074	89,083,793	94,050,095
Recovered.....	99,837,047	.....	343,765,330	.....
Natural ²	2,342,315	3,081,745	7,776,897	11,897,907
Acetic anhydride ³	44,789,682	45,309,429	172,880,931	179,541,151
Acetone.....	26,316,490	.....	106,978,271	.....

(Continued on page 293)

CONTROL STEAM FLOW!

The Fischer and Porter Armored
VALVE BODY ROTAMETER

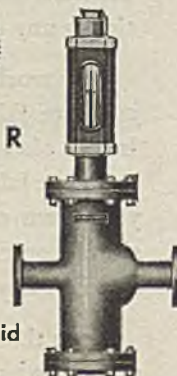
Can withstand pressures as high as..... 2000 PSI-
Steam flow rates can be accurately and economically

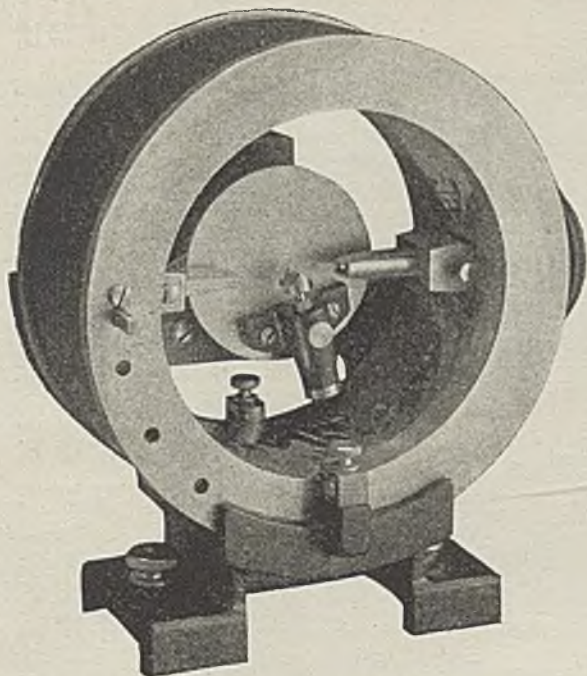
INDICATED
RECORDED
CONTROLLED
TOTALIZED

as readily as the flow rates of any other fluid

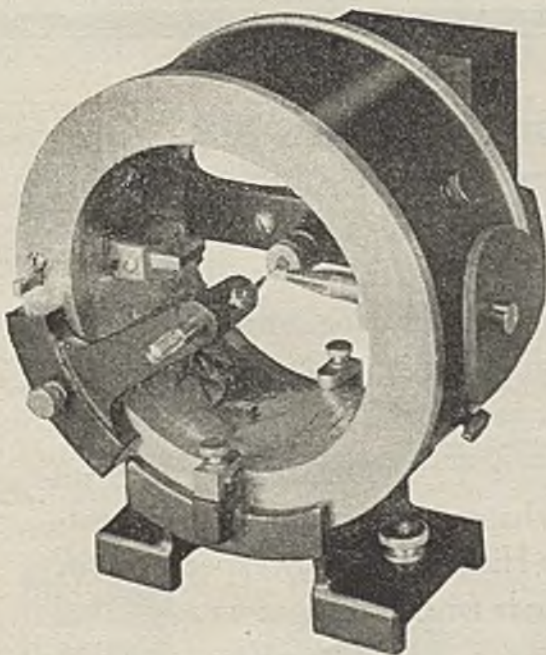
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It's PRECISE



If you are interested in x-ray diffraction analysis of crystalline substances—check the outstanding features of the G-E Model XRD Powder Camera.

It's VERSATILE—all practical variations of the Debye-Scherrer-Hull-Davey technics can be accomplished. The sample shape may be varied rather than limited to cylindrical. The sample may be oscillated or rotated in a variety of holders. The camera sides are open so that large samples may extend into the center.

It's EFFICIENT—in the XRD Powder Camera the effective diameter is related to the number of degrees in a radian so that a distance on the film will be related to the Bragg angle by a round number. The size chosen produces the most favorable dispersion of the pattern as an optimum compromise between the requirements of speed and resolution. And the effective resolving power is variable through a choice of collimators and sample size.

It's PRECISE—designed to exacting standards and precision manufactured, you can depend upon the G-E Model XRD Powder Camera to routinely produce precision results of hair-line quality. And because it is a precision instrument, the XRD Powder Camera provides exceptional operating convenience that simplifies the production of patterns.

There are sound reasons why the majority of the nation's leading industries and laboratories have selected the G-E Model XRD X-Ray Diffraction Unit and cameras. They protected their investment by investigating. If you have problems that require x-ray diffraction, why not investigate the G-E Model XRD? For complete information on the XRD Unit and its cameras, write to General Electric X-Ray Corporation, 175 Jackson Boulevard, Chicago 4, Illinois. Department 2513.

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Fig. H-530

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Available in Brass, or made to order in any machinable material. 1/4" I.P.S., capacities from 12 to 75 gph @ 10 lbs. water pressure.

Send Monarch an outline of your spray problem—if the liquid can be sprayed with direct pressure at all—Monarch can furnish the nozzle.

NOZZLES FOR:

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6A and 6C?

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2730 E. WESTMORELAND ST.
PHILADELPHIA 34, PA.

U.S. Production of Synthetic Organic Chemicals (Cont. from page 296)

Chemical	April 1946	April 1945	Total, Four Months 1946	Total, Four Months 1945
Acetylsalicylic acid.....	1,013,525	948,074	3,910,160	3,574,895
Aniline.....	6,624,185	.....	27,707,581	.....
Barbituric acid derivatives ¹ 5-Ethyl-5-phenylbarbituric acid and salts (Phenobarbital).....	35,084	16,652	124,956	88,814
Benzene:				
Motor grade:				
Tar distillers ⁴	896,596	.....	3,885,460	.....
Coke-oven operators ⁵	2,256,879	.....	9,421,712	.....
All other grades ¹ :				
Tar distillers ⁴	2,376,688	.....	7,598,756	.....
Coke-oven operators ⁵	8,739,032	.....	30,150,075	.....
Butyl alcohol, primary, normal.....	8,901,966	.....	33,091,560	.....
Carbon bisulphide.....	21,909,280	.....	94,717,371	.....
Carbon tetrachloride.....	10,888,678	.....	48,462,902	.....
Chlorobenzene, mono.....	23,011,332	.....	86,688,535	.....
Cresol oil:				
Tar distillers ⁴	10,052,000	11,152,804	38,080,956	43,712,386
Coke-oven operators ⁵	2,386,273	3,111,764	7,825,878	12,672,287
Cresols ¹ :				
Meta-para.....	748,565	815,013	1,727,271	2,563,531
Ortho-meta-para.....	491,292	.....	2,505,776	.....
Cresylic acid, refined ¹	2,268,046	2,730,465	7,788,068	10,714,794
Dibutyl phthalate.....	1,447,909	.....	.....	.....
Dichlorodiphenyltrichloroethane (DDT) ¹	4,139,852	.....	14,231,674	.....
Ethyl acetate (85%).....	7,610,358	9,793,282	28,193,176	37,210,246
Ethyl ether, technical and U.S.P. ¹	3,486,949	8,296,093	10,110,284	31,109,435
Formaldehyde (37% by wt.).....	40,256,656	.....	159,543,924	.....
Methanol:				
Natural.....	1,229,449	1,553,760	5,173,522	6,387,680
Synthetic.....	43,032,508	42,349,920	179,964,023	168,094,640
Naphthalene:				
Tar distillers (less than 70° C.) ⁴	17,660,149	17,359,596	58,828,594	66,741,255
Tar distillers (70° C. and over) ⁴	8,634,316	6,157,904	33,465,215	22,639,968
Coke-oven operators (less than 70° C.) ⁵	5,389,912	8,000,052	18,893,473	30,179,535
Coke-oven operators (70° C. and over) ⁵	2,435,998	.....	7,642,720	.....
Phenol (synthetic and natural) ¹	18,438,950	.....	65,282,587	.....
Phthalic anhydride.....	9,216,851	11,582,105	35,149,262	42,882,902
Styrene (government owned plants only) ¹	31,778,855	.....	115,577,248	.....
Toluene:				
Coke-oven operators ⁵	1,465,272	.....	5,458,168	.....
All other ^{5,10}	1,010,581	.....	4,189,081	.....

All data in pounds except benzene (gal.), creosote oil (gal.), toluene (gal.), and penicillin (million Oxford units). Statistics collected and compiled by U. S. Tariff Commission except where noted. Absence of data on production indicates either that returns were unavailable or confidential. ¹ Excludes the statistics on recovered acid. ² Acid produced by direct process from wood and from calcium acetate. ³ All acetic anhydride including that from acetic acid by vapor-phase process. ⁴ Product of distillers who use purchased coal tar only. ⁵ Statistics are given in terms of bulk chemicals only. ⁶ Statistics collected by Bureau of Mines. ⁷ Total production including data reported both by coke-oven operators and by distillers of purchased coal tar. ⁸ Reported to U. S. Bureau of the Census. ⁹ Reported in gal. by Bureau of the Census but converted to lb. for comparison with the production of synthetic methanol. ¹⁰ Includes toluene produced from petroleum by any process.

Alcohol Plants and Distillery Equipment

Hicks offers practical know-how gained through long experience for the design, fabrication and erection of plants to produce alcohols or potable spirits for domestic and foreign producers.

Whatever the conditions or fermentables, Hicks is probably experienced in methods for profitable operation.

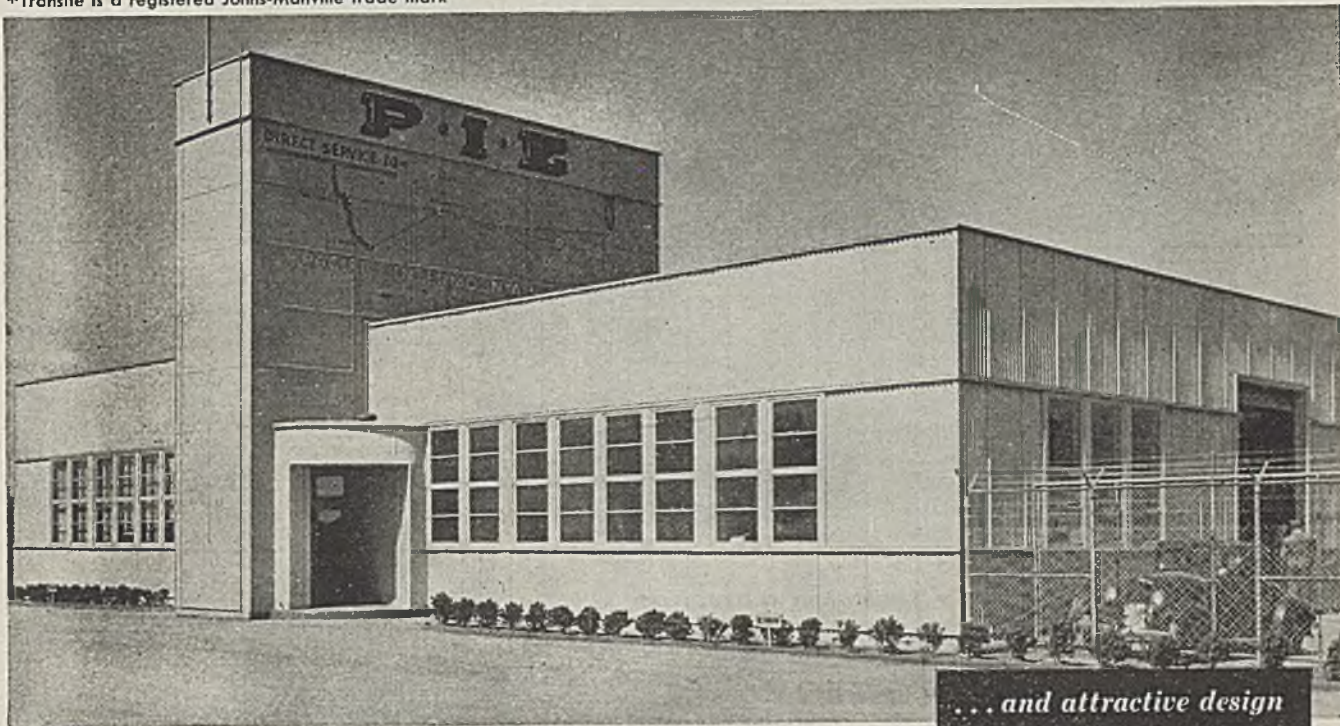
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Low in cost and adaptable to every type of modern building, Corrugated Transite offers a way to save money both on construction and maintenance.

The large fireproof sheets—with their unusual strength increased by corrugations—permit a minimum of framing. Quickly installed,

they require little or no upkeep. They're made of asbestos and cement, practically indestructible materials.

Attractive stone-gray in color, Transite can be used alone or in combination with other building materials. And when need for alterations arises, the sheets are practically 100% salvageable.

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EASY TO SAW



EASY TO DRILL

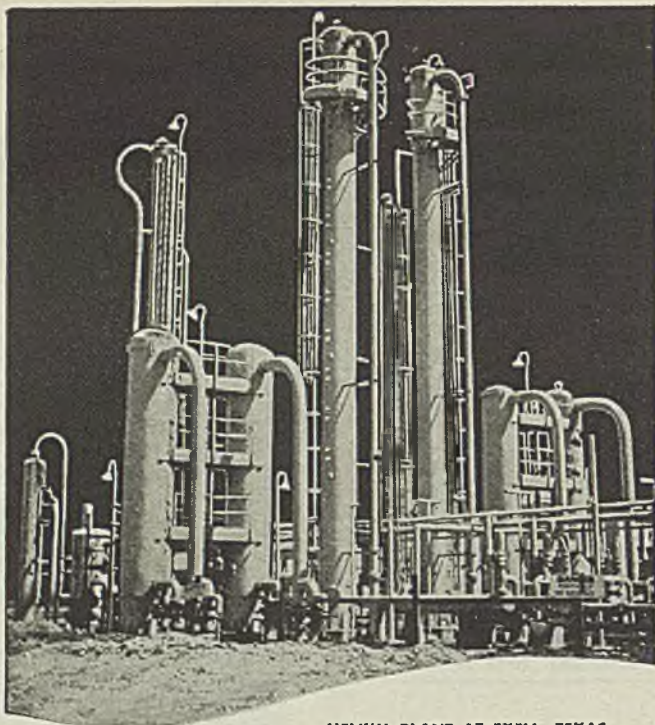


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HELIUM RECOVERY
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CHEMICAL ENGINEERING
Weighted Index of Prices for
CHEMICALS

Base = 100 for 1937

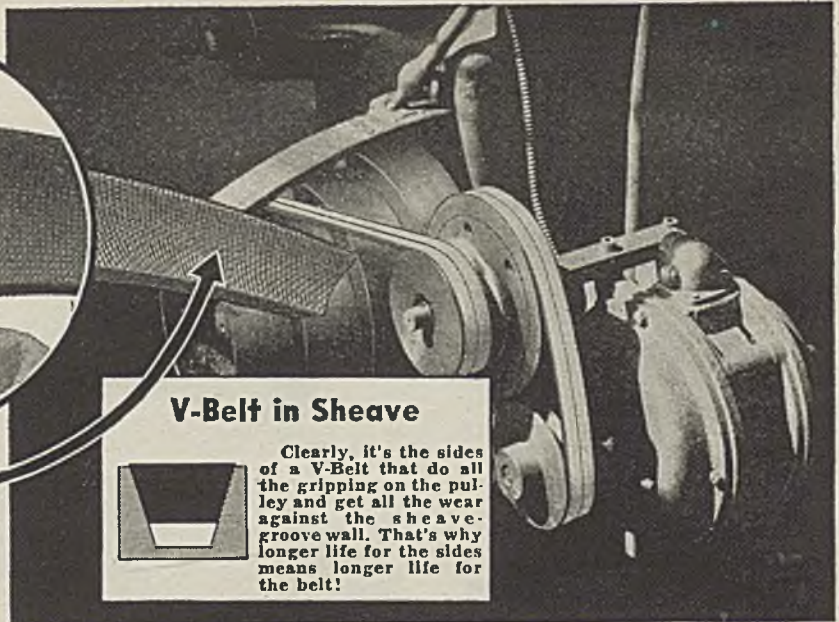
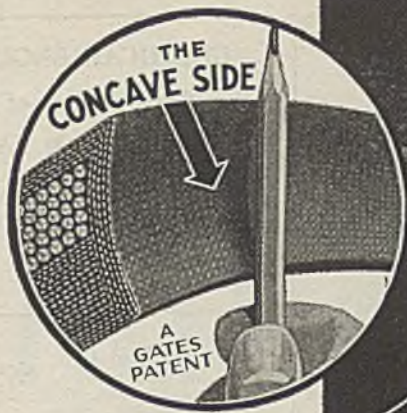
This month	111.36
Last month	110.50
August, 1945	108.75
August, 1944	109.48

CURRENT PRICES

The accompanying prices refer to round lots. Where it is trade custom to sell f.o.b. works, quotations are so designated. Prices are corrected to August 12.

INDUSTRIAL CHEMICALS

Acetone, tanks, lb.	\$0.06	-
Acid, acetic, 29% bbl., 100 lb.	3.38	\$3.63
Boric, bbl., ton	109.00	113.00
Citric, drums, lb.	.224	.23
Formic, chys, lb.	.104	.11
Hydrofluoric, 30% drums, lb.	.08	.085
Lactic, 44% tech., light, bbl., lb.	.073	.076
Muriatic, 18° tanks, 100 lb.	1.05	-
Nitric, 36° carboys, lb.	.05	.024
Oleum, tanks, wks, ton.	18.50	20.00
Oxalic, crystals, bbl., lb.	.114	.124
Phosphoric tech., tanks, lb.	.04	-
Sulphuric, 60° tanks, ton.	13.00	-
Tartaric, powd., bbl., lb.	.62	.65
Alcohol, amyl from pentane, tanks, lb.	.131	-
Alcohol, butyl, tanks, lb.	.101	.244
Alcohol ethyl, denatured, No. 1 special, tanks, gal.	.542	-
Alum, ammonia, lump, lb.	.044	-
Aluminum sulphate, com, bags, 100 lb.	1.15	1.45
Ammonia, anhydrous, cyl., lb.	.144	-
Ammonium carbonate, powd., casks, tanks, ton.	59.00	61.50
Ammonium carbonate, powd., casks, lb.	.094	.10
Sulphate, wks., ton.	.144	-
Amyl acetate, tech. from pentane, tanks, lb.	.021	.03
Aqua ammonia, 26° drums, lb.	.021	.03
Arsenic, white, powd., bbl., lb.	.05	.054
Barium carbonate, bbl., lb.	65.00	75.00
Chloride, bbl., ton	75.00	78.00
Nitrate, casks, lb.	.094	.11
Black fix, dry, bags, ton.	60.00	70.00
Bleaching powder, f.o.b., wks, drums, 100 lb.	2.50	3.00
Borax, gran., bags, 100 lb.	45.00	-
Calcium acetate, bags, 100 lb.	3.00	-
Arsenate, dr., lb.	.074	.08
Carbide, drums, ton	50.00	-
Chloride, flake, bags, del., ton	18.50	25.00
Carbon bisulphide, drums, lb.	.05	.05
Tetrachloride, drums, gal.	.73	.80
Chlorine, liquid, tanks, wks., 100 lb.	1.75	2.00
Copperas, bgs., f.o.b., wks., ton.	17.00	18.00
Copper carbonate, bbl., lb.	.194	.20
Sulphate, bbl., 100 lb.	5.65	6.15
Cream of tartar, bbl., lb.	.60	.52
Diethylene glycol, dr. lb.	.14	.154
Epsom salt, dom., tech., bbl., 100 lb.	1.80	2.00
Ethyl acetate, tanks, lb.	.084	.114
Formaldehyde, 30%, tanks, lb. wks.	.032	-
Furfural, tanks, lb.	.094	-
Glaubers salt, bags, 100 lb.	1.05	1.10
Glycerine c.p. drums, extra, lb.	.184	.19
Lead:		
White, basic carbonate, dry, casks, lb.	.10	-
Red, dry, sck., lb.	.104	-
Lead acetate, white crys., bbl., lb.	.124	.13
Arsenate, powd., bags, lb.	.134	.144
Lithopone, bags, lb.	.044	.049
Magnesium carb., tech., bags, lb.	.071	.08
Methanol, 95%, tanks, gal.	.60	-
Synthetic, tanks, gal.	.24	-
Phosphorus, yellow, cases, lb.	.23	.25
Potassium bichromate, casks, lb.	.104	.104
Chlorate, powd., lb.	.094	.12
Hydroxide (caustic potash) dr. lb.	.07	.074
Muriate, 60%, bags, unit.	.534	-
Nitrate, ref., bbl., lb.	.08	.09
Permanganate, drums, lb.	.194	.20
Prussiate, yellow, casks, lb.	.16	.17
Sal ammoniac, white, casks, lb.	.0515	.06
Salsoda, bbl., 100 lb.	1.00	1.05
Salt cake, bulk, ton.	15.00	-
Soda ash, light, 58%, bags, contract, 100 lb.	1.05	-
Dense, bags, 100 lb.	1.15	-
Soda, caustic, 76% solid, drums, 100 lb.	2.30	3.00
Acetate, del., bbl., lb.	.054	.06
Bicarbonate, bbl., 100 lb.	1.70	2.00
Bichromate, bags, lb.	.074	.08
Bisulphate, bulk, ton.	16.00	17.00
Bisulphite, bbl., lb.	.03	.04



V-Belt in Sheave



Clearly, it's the sides of a V-Belt that do all the gripping on the pulley and get all the wear against the sheave-groove wall. That's why longer life for the sides means longer life for the belt!

**That's
Where V-Belts
Get All the WEAR!**

-and that's WHY the CONCAVE SIDE is IMPORTANT!*

Examine a hundred—or a thousand—worn-out V-Belts and here is what you will find—

Almost without exception, it is the sidewall of the belt that has worn out first. There is a perfectly natural reason for this—and every man who works around machinery knows it.

It is the *sidewall* of a V-Belt that has to *grip* the pulley and *drive* it. It's the sidewall that *transmits* to the pulley all the power the pulley ever receives. No other part of the belt gets anything like the *actual* wear the sidewall gets. Is it any wonder the sidewall of the *ordinary* V-Belt is the part that wears out first? And when you prolong the life of the sidewall you naturally prolong the life of the belt!

The simple diagrams on the right show clearly why the ordinary, *straight-sided* V-Belt gets *excessive* wear along the *middle* of the *sides*. They show also why the Patented Concave Side *greatly reduces* sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight sided V-Belts can *possibly* give.

Straight Sided V-Belt	How Straight Sided V-Belt Bulges When Bending Around Its Pulley
<p>You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.</p>	
Gates V-Belt with Patented Concave Sidewall	Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley
<p>No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!</p>	

*More Important NOW Than Ever Before.

Now that Gates Specialized Research has resulted in V-Belts having much stronger tension members—tension members of Rayon Cords and Flexible Steel Cables, among others—the sidewall of the belt is often called upon to transmit to the pulley much heavier loads. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important today than ever before!

468

THE GATES RUBBER COMPANY

DENVER, U. S. A.

World's Largest Makers of V-Belts



THE MARK OF SPECIALIZED RESEARCH

GATES VULCO ROPE DRIVES

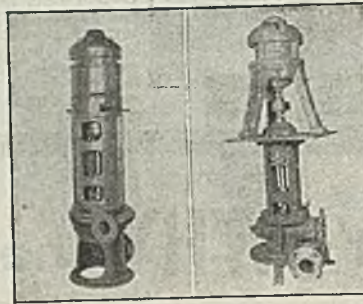
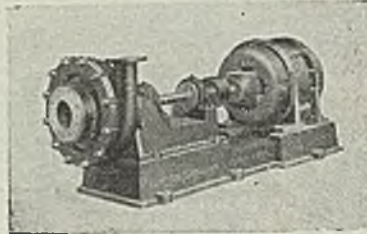
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IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries



HORIZONTAL AND VERTICAL, FOR EVERY PURPOSE

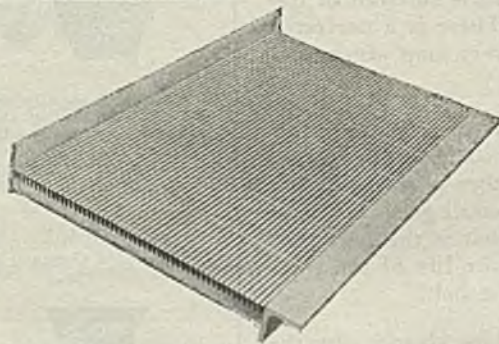
LAWRENCE experience and engineering research have brought the centrifugal principle to the maximum of efficiency, both in horizontal and vertical pump types. As a result, there is hardly a pumping problem that cannot be solved completely and economically with some of the many types of LAWRENCE CENTRIFUGALS. And the LAWRENCE conception of economy comprehends power cost, maintenance cost, long life, and continuity of service. The LAWRENCE objective is to furnish equipment that will assure THE LOWEST PUMPING COST PER UNIT OF FLUID HANDLED PER YEAR. Write for the Bulletins, at the same time outlining your requirements so that data may be furnished on the type best adapted to your purpose.



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For Better Chemical Processing!

Hendrick manufactures perforated metal screens for many chemical processing and industrial operations. An extensive stock of dies, combined with 70 years of experience in perforating plate metals to exacting specifications, is your assurance of long and satisfactory service life. Hendrick screens are punched accurately in any size or shape of opening, flat or curved to any diameter, in all commercially rolled metals. Write for further information.



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Architectural Grilles
Mitco Open Steel Flooring,
"Shur-Site" Treads and
Amorgrids.

CHEMICAL ENGINEERING Weighted Index of Prices for OILS & FATS

Base = 100 for 1937

This month	166.39
Last month	153.39
August, 1945	145.85
August, 1944	145.24

Chlorate, kegs, lb.	\$0.081	\$0.061
Cyanide, cases, dom., lb.	.14	.15
Fluoride, bbl., lb.	.07	.08
Hyposulphite, bags, 100 lb.	2.25	2.50
Metasilicate, bbl., 100 lb.	2.50	2.65
Nitrate, bulk, ton.	27.00	
Nitrite, casks, lb.	.061	.07
Phosphite, tribasic, bags, 100 lb.	2.70	
Prussiate, yel., bags, lb.	.10	.11
Silicate, 40° dr., wks., 100 lb.	.80	.85
Sulphite, crys., bbl., lb.	.021	.02
Sulphur, crude at mine, long ton	18.00	
Dioxide, cyl., lb.	.07	.08
Dioxide, tanks, lb.	.04	
Tin crystals, bbl., lb.	.39	
Zinc chloride, grain, bbl., lb.	.051	.06
Oxide, lead free, bags, lb.	.081	
Oxide, 5% leaded, bags, lb.	.081	
Sulphate, bbl., cwt.	3.85	4.00

OILS AND FATS

Castor oil, No. 3 bbl., lb.	\$0.141	\$0.151
Chinawood oil, tanks, lb.	.39	
Coconut oil, Ceylon, N. Y., lb.	.0885	
Corn oil crude, tanks (f.o.b. mill), lb.	.121	
Cottonseed oil crude (f.o.b. mill), tanks, lb.	.16	
Linseed oil raw, car lots, dr., lb.	.168	
Palm, casks, lb.	.0865	
Peanut oil, crude, tanks (mill), lb.	.121	
Rapeseed oil, refined, bbl., lb.	nom.	
Soybean, tanks, lb.	.111	
Menhaden, light, pressed, dr., lb.	.13	
Crude, tanks (f.o.b. factory), lb.	.089	
Grease, yellow, loose, lb.	.111	
Oleo stearine, lb.	.094	
Oleo oil, No. 1, lb.	.24	
Red oil, distilled, bbl., lb.	.131	
Tallow, extra, loose, lb.	.081	

COAL-TAR PRODUCTS

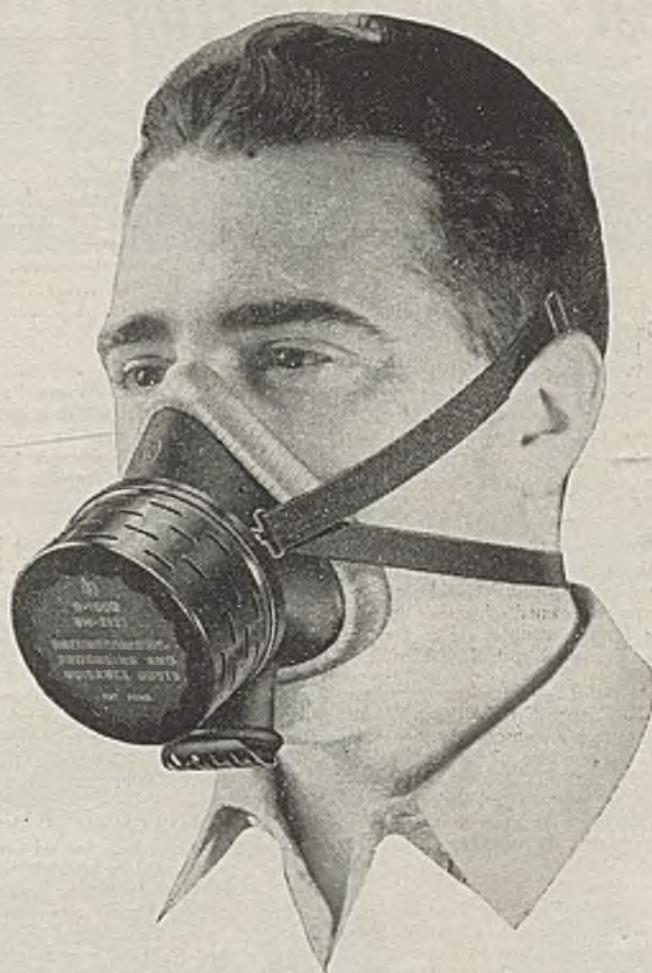
Alpha-naphthol, crude, bbl., lb.	\$0.52	\$0.55
Alpha-naphthylamine, bbl., lb.	.32	.34
Aniline oil, drums, lb.	.111	.121
Aniline salts, bbl., lb.	.22	.24
Benzaldehyde, tech., dr., lb.	.45	.50
Benzenidine base, bbl., lb.	.70	.75
Benzoic acid, USP, kegs, lb.	.54	.56
Benzol, 90%, tanks, works, gal.	.15	
Benzyl chloride, tech., dr., lb.	.22	.24
Beta-naphthol, tech., drums, lb.	.21	.22
Cresol, USP, dr., lb.	.101	
Cresylic acid, dr., wks., gal.	.81	.83
Diphenyl, bbl., lb.	.15	
Diethylaniline, dr., lb.	.40	.45
Dinitrotoluol, bbl., lb.	.18	.19
Dinitrophenyl, bbl., lb.	.22	.23
Dip oil, 15%, dr., gal.	.23	.25
Diphenylamine, dr., f.o.b. wks., lb.	.25	
H acid, bbl., lb.	.45	.50
Hydroquinone, bbl., lb.	.90	
Naphthalene, flake, bbl., lb.	.091	.10
Nitrobenzene, dr., lb.	.08	.09
Para-cresol, bbl., lb.	.41	
Para-nitroaniline, bbl., lb.	.42	.43
Phenol, USP, drums, lb.	.10	.11
Picric acid, bbl., lb.	.35	.40
Pyridine, dr., gal.	1.55	1.60
Resorcinol, tech., kegs, lb.	.65	.70
Salicylic acid, tech., bbl., lb.	.26	.33
Solvent naphtha, w.w., tanks, gal.	.26	
Toluidin, bbl., lb.	.06	
Toluol, drums, works, gal.	.27	
Xylol, com., tanks, gal.	.22	

MISCELLANEOUS

Casein, tech., bbl., lb.	\$0.41	\$0.42
Dry colors:		
Carbon gas, black (wks.), lb.	.0365	.007
Prussian blue, bbl., lb.	.36	.37
Ultramarine blue, bbl., lb.	.11	.26
Chrome, green, bbl., lb.	.24	.33
Carmine, red, tins, lb.	5.50	6.00
Para toner, lb.	.75	.80
Vermilion, English, bbl., lb.	2.50	2.60
Chrome yellow, C.P., bbl., lb.	.17	.18
Gum copal, Congo, bags, lb.	.09	.15
Manila, bags, lb.	.09	.15
Damar, Batavia, cases, lb.	.10	.22
Kauri, cases, lb.	.18	.60
Magnesite, calc., ton.	64.00	
Pumice stone, lump, bbl., lb.	.05	.07
Rosin, H., 100 lb.	7.49	
Shellac, orange, fine, bags, lb.	.70	
Bleached, honeydew, bags, lb.	.71	
T. N., bags, lb.	.68	
Turpentine, gal.	1.06	

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NEW CONSTRUCTION

PROPOSED WORK

Ark., El Dorado—Root Petroleum Co., Commercial National Bank Bldg., Shreveport, La., plans to remodel existing catalytic cracking plant into a premium gasoline manufacturing plant. Estimated cost \$300,000.

Calif., San Bernardino—Converse Rubber Co., Malden, Mass., plans to construct a rubber products factory in the Central Manufacturing District. Anderson Nichols Associates, 210 West 7th St., Los Angeles, Cons. Engrs. Estimated cost will exceed \$1,000,000.

Calif., San Francisco—Paraffine Companies, Inc., 475 Brannan St., plans to construct an asbestos cement products plant. Estimated cost \$1,000,000.

Ill., Monsanto—Monsanto Chemical Co., 1700 South Second St., St. Louis, Mo., plans to remodel and construct additions to former government owned chemical warfare service plant for the manufacture of chemical products. Estimated cost \$1,000,000.

Kan., Deerfield—Deerfield Petroleum, Inc., c/o F. Connor Creigh, Pres., Wichita, plans to construct an absorption type gasoline extraction plant here. Estimated cost \$100,000.

N. C., Charlotte—Dillard Paper Co., 515 West 6th St., plans to enlarge its paper plant on North Tryon St. at Dalton Ave. Estimated cost \$300,000.

O., Cleveland—E. I. du Pont de Nemours & Co., Inc. Grasselli Chemical Div., Independence Rd., plans to construct a 2 story, 30x85 ft. factory. Conrad, Hays, Simpson & Ruth, Hanna Bldg., Cleveland, Archts.

O., Gibsonburg—Kelley Island Line & Transport Co., Leader Bldg., Cleveland, plans to construct three factory buildings. Estimated cost \$100,000.

Okl., Edmond—Peppers Refining Co., Oklahoma City, Okla., plans to enlarge West Edmond compressor station to a capacity of 20,000,000 cu.ft. of gas per day. Estimated cost \$300,000.

Tex., Houston—Asbestos Co. of Texas, c/o Otis Massey, 201 Hutchins St., plans to construct an asbestos shingle manufacturing plant. Estimated cost \$375,000.

CONTRACTS AWARDED

Calif., Berkeley—Pacific Paint & Varnish Co., 4th and Cedar Sts., received low bid for 3 story, 60x100 ft. resin and varnish factory building from Barrett & Hilb, 918 Harrison St., San Francisco, at \$120,000.

Calif., El Cerrito—Technical Porcelain & China-ware Co., Manila and Kearney Sts., has awarded the contract for a factory building to Godfrey Petersen, 1336 Portland St., Albany. Estimated cost \$60,000.

Calif., Plaster City—U. S. Gypsum Co., 816 West 5th St., Los Angeles, has awarded contract for a group of five small and one large factory buildings for a wallboard plant to Morrison-Knudsen Co., Title Guarantee Bldg., Los Angeles. Estimated cost will exceed \$1,000,000.

	Current Projects		Cumulative 1946	
	Proposed Work	Contracts	Proposed Work	Contracts
New England.....		\$55,000	\$715,000	\$5,784,000
Middle Atlantic.....		430,000	9,096,000	28,073,000
South.....	\$300,000	23,600,000	55,567,000	47,250,000
Middle West.....	1,155,000	1,177,000	12,523,000	41,542,000
West of Mississippi.....	1,075,000	6,220,000	85,816,000	77,230,000
Far West.....	2,000,000	1,558,000	7,855,000	16,897,000
Canada.....		700,000	405,000	15,563,000
Total.....	\$4,530,000	\$33,738,000	\$171,977,000	\$232,339,000

Calif., Vernon—Wilson Paper Co., 4200 South Alameda St., will construct three masonry warehouse buildings by own forces under supervision of Webber & Co., Eng., 606 South Hill St., Los Angeles. Estimated cost \$125,000.

Fla., Pensacola—St. Regis Paper Co., 230 Park Ave., New York, N. Y., has awarded the contract for a paper mill to Merritt-Chapman & Scott Corp., 17 Battery Pl., New York, N. Y. Estimated cost \$10,000,000.

Ga., Savannah—The Southern Paper Board Corp., subsidiary of Robert Gair Corp., New York, N. Y., has awarded the contract for a pulp and paper mill here to Daniel Construction Co., Greenville, S. C. Estimated cost \$13,000,000.

Ill., North Chicago—Abbott Laboratories, North Chicago, has awarded the contract for an addition to its research building, also 3 story addition to factory building A-1, to Wm. E. O'Neil Construction Co., 2751 North Claybourn St., Chicago. Estimated cost \$700,000 and \$400,000 respectively.

Miss., Gulfport—Sterling Drug Co., Inc., 170 Varick St., New York, N. Y., has awarded the contract for a drug plant to George P. Hopkins, Gulfport. Estimated cost \$600,000.

Mo., St. Louis—Sterling Aluminum Products Co., 2925 North Market St., has awarded the contract for a 1 and 2 story addition to its shops, warehouse and office building to John Hill Construction Co., 915 Olive St., St. Louis. Estimated cost including equipment \$55,000.

N. H., Tilton—Johns-Manville Corp., 22 East 40th St., New York, N. Y., has awarded the contract for design and construction of a paper mill to H. A. Kuljian & Co., 1518 Walnut St., Philadelphia. Estimated cost \$55,000.

Ore., Merrill—Klamath Falls Potato Products, Inc., Merrill, has awarded the contract for remodeling its starch manufacturing plant to Pinnegar & Watkins, Klamath Falls. Estimated cost \$91,000.

Ore., Portland—Western Waxed Paper Co., Public Service Bldg., has awarded the contract for a 1 story, 155x240 ft. addition to its plant to Reimers & Joliette, Ry. Exchange Bldg., Portland. Estimated cost \$100,000.

Pa., McKees Rocks—Federal Enameling & Stamping Co., McKees Rocks, has awarded the contract for a 5 story, 100x185 ft. factory addition to Brookside Lumber Co., Brookside Farms, Pittsburgh. Estimated cost \$100,000.

Pa., North Wales—Keller-Whilidin Pottery Co. has awarded the contract for the construction

of a manufacturing plant to Austin Co., 19 Rector St., New York, N. Y. Estimated cost will exceed \$55,000.

Pa., Towanda—E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has awarded the contract for a manufacturing plant to Rust Engineering Co., Clark Bldg., Pittsburgh. Estimated cost \$275,000.

Tex., Hearne—Humble Oil & Refining Co., Humble Bldg., Houston, has awarded the contract for a gasoline and oil products terminal to O'Rourke Construction Co., 4011 Koehler St., Houston. Estimated cost \$70,000.

Tex., Houston—Diamond Alkali Co. of Texas, 1006 Main St., subsidiary of Diamond Alkali Co., Pittsburgh, Pa., has awarded the contract for the construction of an electro chemical plant to Brown & Root, Inc., 4300 Calhoun Rd., Houston. Estimated cost \$5,750,000.

Tex., Houston—Humble Oil & Refining Co., Humble Bldg., has awarded the contract for a gasoline and oil products terminal to O'Rourke Construction Co., 4011 Koehler St., Houston. Estimated cost \$80,000.

Tex., Randado—Sun Oil Co., Milan Bldg., San Antonio, will construct a pressure maintenance plant with own forces. Estimated cost \$70,000.

Tex., Robstown—Humble Oil & Refining Co., Humble Bldg., Houston, will construct a compressor station to utilize casinghead gas. Work will be done by owner. Estimated cost \$140,000.

Tex., Waco—Humble Oil & Refining Co., Humble Bldg., has awarded the contract for a gasoline and oil products terminal to O'Rourke Construction Co., 4011 Koehler St., Houston.

Wash., Tacoma—Cellulose Products Co., 6010 East 15th St., will construct a factory and warehouse. Work will be done by day labor. Estimated cost \$60,000.

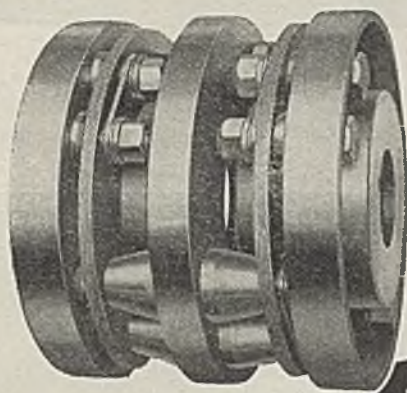
Wis., Manitowoc—Heresite & Chemical Co., 822 South 14th St., has awarded the contract for the construction of an addition to its factory to Karper Construction Co., 1205 West 16th St., at \$76,700.

Ont., Peterborough—Canadian Nashua Paper Co., Ltd., 25 Aylmer S., has awarded the contract for a new plant and office building to Anglin-Norcross Ontario, Ltd., 57 Bloor St., W., Toronto. Estimated cost \$500,000.

Ont., Peterborough—Tileo Plastic Co., Park Hill Rd. and Park St., has awarded the contract for a plant to Eastwood Construction Co., Ltd., 358 George St., W. Estimated cost \$200,000.

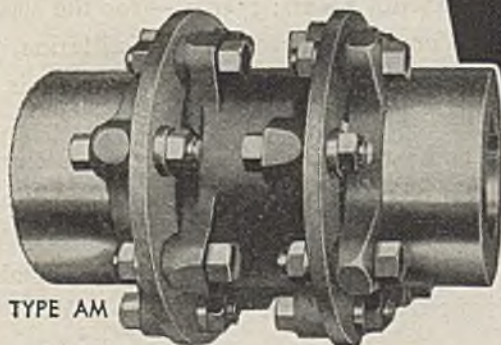
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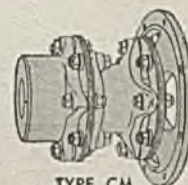
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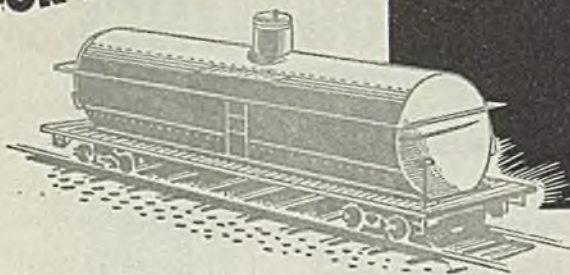


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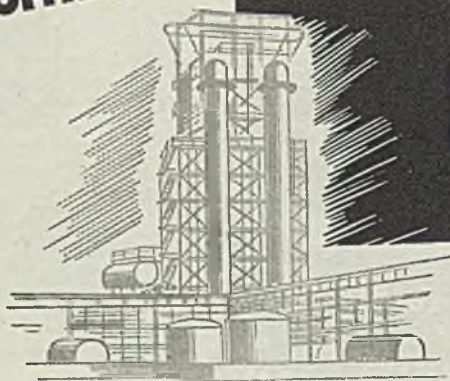
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Guide and Directory

4th NATIONAL CHEMICAL EXPOSITION



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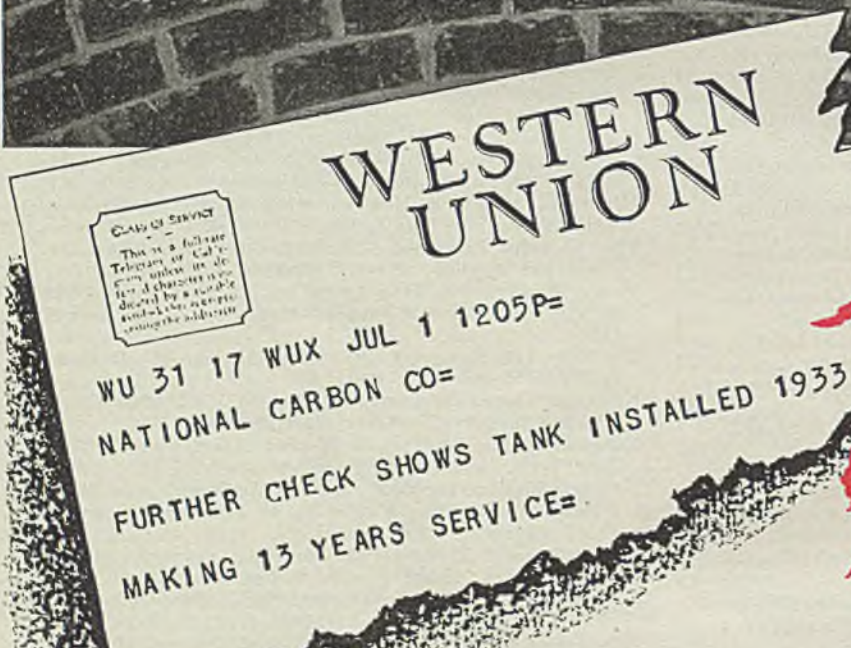
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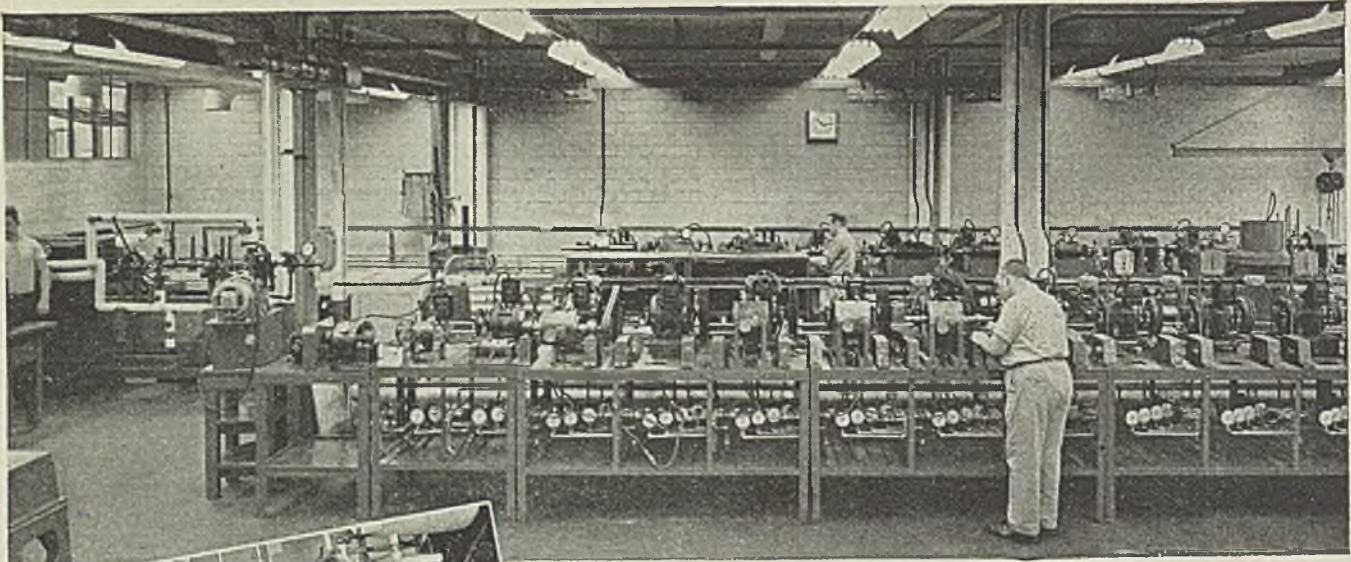
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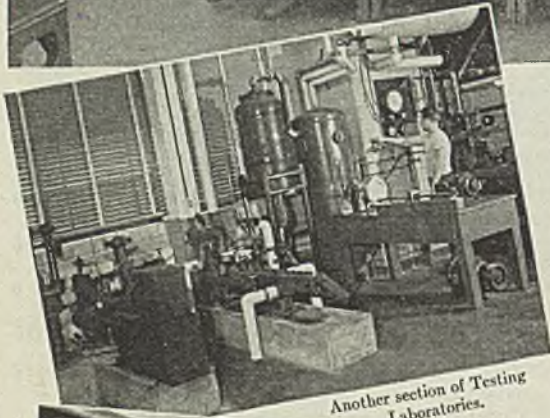
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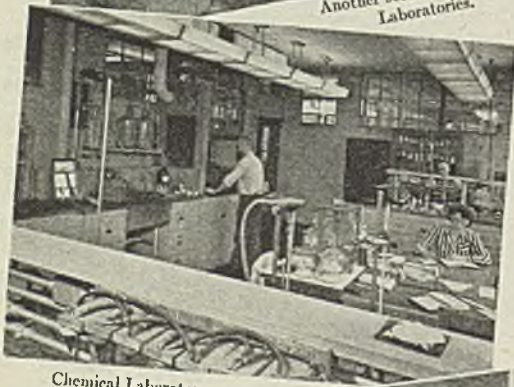
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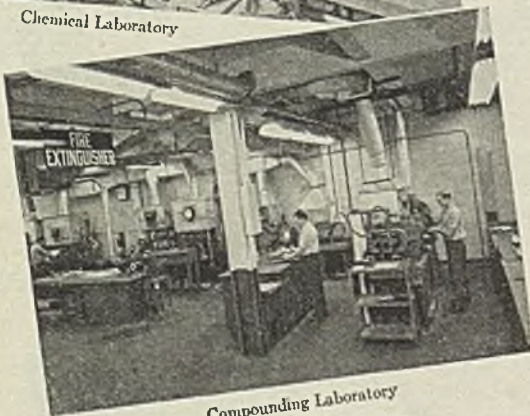
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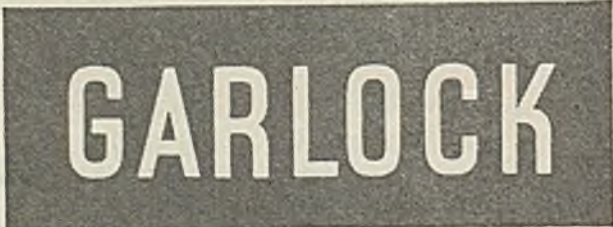


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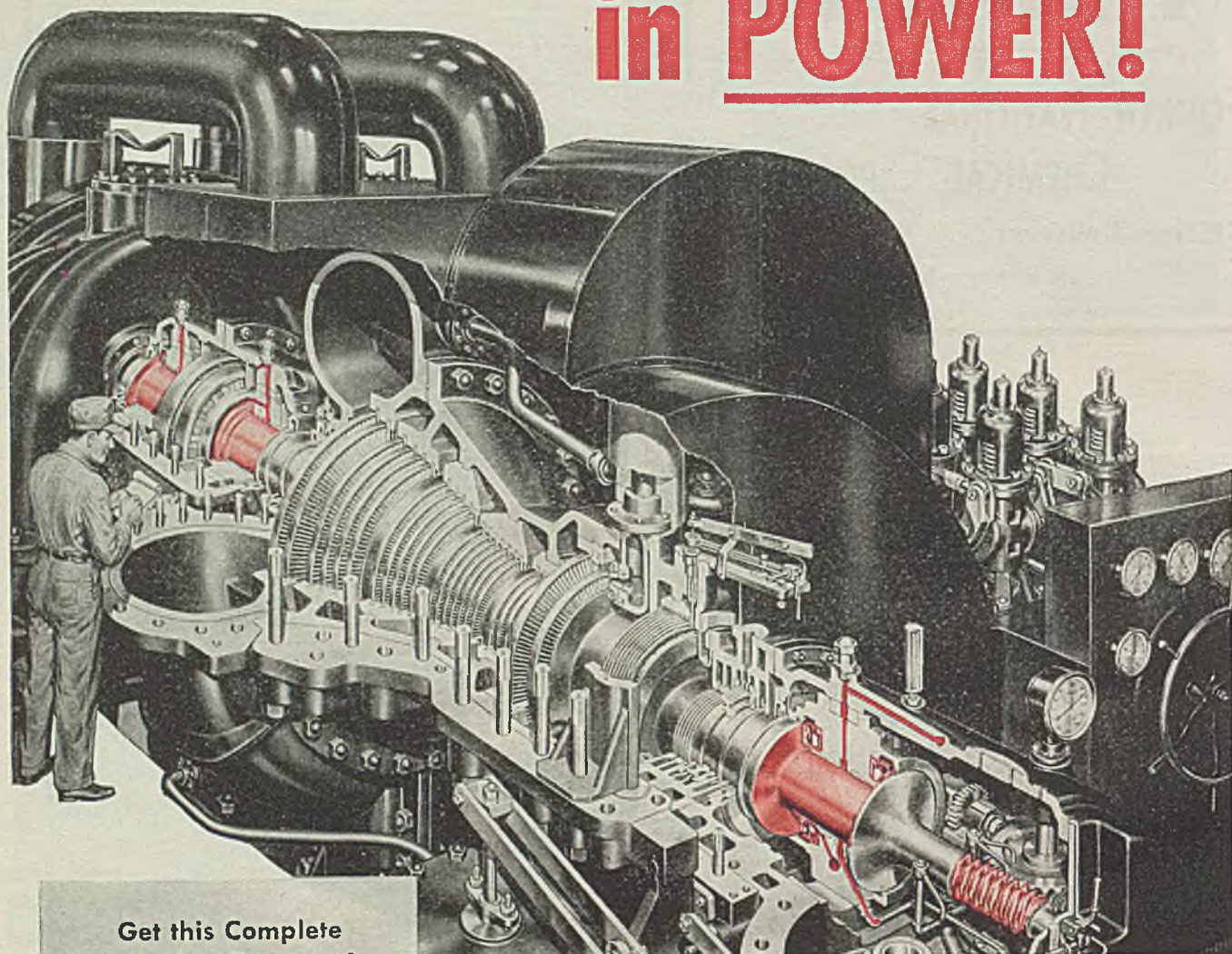


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Schaar and Company (21)
Scientific Glass Apparatus Company (70)
W. M. Welch Manufacturing Company (46)
Wilkins Anderson Company (111)
Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

ANODES

Heil Process Equipment Corporation (N23)
O. G. Kelley & Company (N37)
Lead Industries Association (10)
National Carbon Co., Inc. (85-86)
The U. S. Stoneware Co. (61-62)

ANTIOXIDANTS

Ansul Chemical Company (11)
W. A. Cleary Corporation (116)
Ross & Rowe, Inc. (48)
Universal Oil Products Company (N47)

AROMATICS

Anderson-Prichard Oil Corporation (N28)
The Dow Chemical Company (51-52-53-54)
Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

AROMATICS—Heavy

Standard Oil Company (Indiana) (127-128)

ASBESTOS

Ertel Engineering Corp. (47)

AUTOCLAVES, Industrial

Aetna Scientific Company (168)
American Instrument Company (103)
Bullovak Equipment Division of Blaw-Knox Co. (N50)
Glascote Products, Inc. (77)
Haynes Stellite Company (81-82)
Loeb Equipment Supply Co. (24-25)
(Continued on page 317)

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No responsibility assumed for errors or omissions.

CHEMICAL PORCELAIN

ELIMINATES CORROSION

from your Flowsheet



"CERAWITE" has been developed by General Ceramics to meet your need for chemical porcelain that will meet the stringent operating conditions of greater temperatures and pressures modern chemical technology demands. For chemical porcelain designed by chemical engineers for chemical engineers see our exhibit

Booth 114

National Chemical Exposition • Chicago Coliseum
September 10, 11, 12, 13, 14, 1946

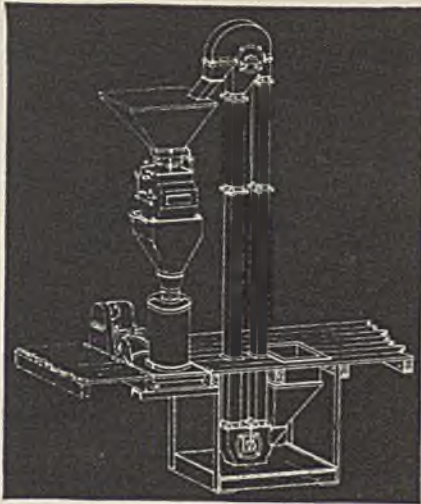


BUFFALO: 610 Jackson Bldg.
LOS ANGELES: 415 So. Central Ave.
NEW YORK: 30 Broad Street • **SEATTLE:** 1411 Fourth Ave. • **SAN FRANCISCO:** 598 Monadnock Bldg.
TACOMA: 417 Tacoma Bldg. • **HOUSTON:** 2015 Second National Bank Bldg.
MONTREAL: Canada Cement Bldg. • **TORONTO:** Richardson Agencies, Ltd., 454 King St., West
VANCOUVER, B.C.: Willard Equipment Ltd., 860 Beach Ave.

General Ceramics
AND STEATITE CORP.

CHEMICAL EQUIPMENT DIVISION
KEASBEY, NEW JERSEY

In addition to the manufacturing facilities of the Chemical Equipment Division those of the Insulator Division are also available for handling ceramic problems in all branches of industry. General Ceramics & Steatite Corporation is therefore able to offer service covering all industrial applications of ceramic products.



HOW EFFICIENT IS YOUR *Weighing Operation?*

The efficient, economical and accurate weighing of dry, granular, powdered or flaked materials in weights up to 50 pounds is a highly developed specialty of ours. Gump engineers will gladly suggest the best equipment and installation, with complete cost estimates. The diagram above shows a compact installation of an **EDTBAUER-DUPLEX* NET WEIGHER**, discharging accurate amounts of material into a container. Material is being packed down in the container by a **VIBROX Packer**. Although gravity flow of materials from hoppers on floor above is preferred, where this arrangement is not possible an elevator can be used as shown. May we send you complete information? Write today!

B. F. Gump Co.

Established 1872

422 SOUTH CLINTON STREET, CHICAGO 7, ILL.

MAKERS OF: Equipment for Grinding, Sifting, Mixing, Feeding and Weighing of Dry Products.

EXHIBITORS • Classified by Products • CONTINUED

- The Pfaudler Co. (1)
A. O. Smith Corporation (30)
- BLOWERS—See Fans**
- BOOKS, Technical**
Reinhold Publishing Corporation (9)
- BOTTLING EQUIPMENT—
See Packaging Equipment**
- BROMINE**
The Dow Chemical Company (51-52-53-54)
- CALCINERS**
- CARBON**
National Carbon Co., Inc. (85-86)
- CARBON, Activated**
Atlas Powder Co. (126)
Carbide and Carbon Chemicals Corporation (83-84)
Darco Corporation (126)
The Dow Chemical Company (51-52-53-54)
The Filter Paper Company (108-109)
Inflico, Inc. (95)
National Carbon Co., Inc. (85-86)
- CARBON—Tubing and Shapes**
Heil Process Equipment Corporation (N23)
National Carbon Co., Inc. (85-86)
- CASEIN AND DERIVATIVES**
American Cyanamid & Chemical Corporation (N49)
Hercules Powder Company, Incorporated (70)
National Starch Products (3-4)
- CASTINGS**
F. M. deBeers & Associates (115)
Haynes Stellite Company (81-82)
Hills-McCanna Company (113)
O. G. Kelley & Company (N37)
Link-Belt Company (101-102)
Michigan Steel Casting Company (140)
- CATALYSTS**
American Cyanamid & Chemical Corporation (N49)
The Davison Chemical Corporation (64-65-66)
National Aluminate Corporation (136)
Oronite Chemical Company (N9)
Socony-Vacuum Oil Company, Inc. (39)
Universal Oil Products Company (N47)
- CELLULOSE AND DERIVATIVES**
Carbide and Carbon Chemicals Corporation (83-84)
The Dow Chemical Company (51-52-53-54)
Hercules Powder Company, Incorporated (70)
- CEMENT**
Hercules Powder Company, Incorporated (70)
Maurice A. Knight (27)
The U. S. Stoneware Co. (61-62)
- CENTRIFUGALS, Industrial**
F. M. deBeers & Associates (115)
First Machinery Corp. (N6)
Loeb Equipment Supply Co. (24-25)
- CERAMIC AND PORECLAIN EQUIPMENT, Industrial**
Chicago Carb-O-Tank Co. (28)
The W. J. Fitzpatrick Company (89-90)
- General Ceramics & Steatite Corporation, Chemical Equipment Division (114)
Maurice A. Knight (27)
National Engineering Company (129-130)
Selas Corporation of America (88)
Socony-Vacuum Oil Company, Inc. (39)
The U. S. Stoneware Co. (61-62)
- CHEMICAL ENGINEERS**
Bjorksten Laboratories (67)
Blaw-Knox Company (N50)
Bullovak Equipment Division of Blaw-Knox Co. N50
D. W. Haering & Co., Inc. (N13-N14)
National Engineering Company (129-130)
Selas Corporation of America (88)
- CHEMICAL PLANT EQUIPMENT**
American Hard Rubber Company (6)
Bareo Manufacturing Company, Not Inc. (N20)
Blaw-Knox Company (N50)
Bullovak Equipment Division of Blaw-Knox Co. N50
Consolidated Products Co., Inc. (N4)
F. M. deBeers & Associates (115)
Eppenbach, Inc. (117)
Ertel Engineering Corp. (47)
The Filter Paper Company (108-109)
First Machinery Corp. (N6)
The W. J. Fitzpatrick Company (89-90)
General Ceramics & Steatite Corporation, Chemical Equipment Division (114)
Groen Mfg. Co. (N21-N22)
B. F. Gump Co. (22-23)
Hasco Valve and Machine Company (80)
Haveg Corporation (94)
Heil Process Equipment Corporation (N23)
The Hilliard Corporation (N45)
Illinois Water Treatment Company (29)
Jensen Machinery Company, Inc. (105)
The Johnson Corporation (35-36)
O. G. Kelley & Company (N37)
Maurice A. Knight (27)
The LaBour Company, Inc. (145)
Lead Industries Association (10)
Leader Iron Works, Inc. (110)
Link-Belt Company (101-102)
National Carbon Co., Inc. (85-86)
National Engineering Company (129-130)
National Technical Laboratories (N41)
Leonard Peterson & Co. Inc. (118)
The Pfaudler Co. (1)
Productive Equipment Corp. (N39)
Resisto Pipe & Valve Company (N36)
Milton Roy Company (5)
Selas Corporation of America (88)
A. O. Smith Corporation (30)
Tri-Clover Machine Co. (12)
The U. S. Stoneware Co. (61-62)
- CHEMICAL RESEARCH**
Bjorksten Laboratories (67)
Universal Oil Products Company (N47)
- CHEMICALS, Food**
Ansul Chemical Company (11)
Bjorksten Laboratories (67)
The Dow Chemical Company (51-52-53-54)
The Emulsol Corporation (N59)
(Continued on page 318)

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No responsibility assumed for errors or omissions.

EXHIBITORS • Classified by Products • CONTINUED

Glyco Products Co., Inc. (122-123)
 Ross & Rowe, Inc. (48)
 Victor Chemical Works (41-42-43)
 Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

CHEMICALS, Industrial—

Inorganic

American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 W. A. Cleary Corporation (116)
 Commercial Solvents Corporation (87)
 The Davison Chemical Corporation (64-65-66)
 The Dow Chemical Company (51-52-53-54)
 Foote Mineral Company (159-160)
 Lead Industries Association (10)
 Mallinckrodt Chemical Works (18)
 Victor Chemical Works (41-42-43)

CHEMICALS, Industrial—Organic

Alox Corporation (N24)
 American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 Atlas Powder Co. (126)
 Carbide and Carbon Chemicals Corporation (83-84)
 W. A. Cleary Corporation (116)
 Commercial Solvents Corporation (87)
 Darco Corporation (126)
 The Davison Chemical Corporation (64-65-66)
 The Dow Chemical Company (51-52-53-54)
 Foote Mineral Company (159-160)
 D. W. Haering & Co., Inc. (N13-N14)
 Hercules Powder Company, Incorporated (70)
 Mallinckrodt Chemical Works (18)
 Minnesota Mining & Manufacturing Company (91)
 Oronite Chemical Company (N9)
 Victor Chemical Works (41-42-43)

CHEMICALS, Laboratory

Central Scientific Company (71)
 Chicago Apparatus Company (135)
 Fisher Scientific Company (78)
 W. A. Hammon Drierite Company (N7)
 Mallinckrodt Chemical Works (18)
 E. H. Sargent & Co. (31)
 Schaar and Company (21)
 Scientific Glass Apparatus Company (76)
 W. M. Welch Manufacturing Company (46)
 Wilkens Anderson Company (111)

CHEMICALS, Leather

American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 Carbide and Carbon Chemicals Corporation (83-84)
 W. A. Cleary Corporation (116)
 Commercial Solvents Corporation (87)
 The Dow Chemical Company (51-52-53-54)
 The Emulsol Corporation (N59)
 Hercules Powder Company, Incorporated (70)
 The Pfaudler Co. (1)
 Socony-Vacuum Oil Company, Inc. (39)
 Victor Chemical Works (41-42-43)

CHEMICALS, Paint

Alox Corporation (N24)
 American Cyanamid & Chemical Corporation (N49)
 Atlas Powder Co. (126)

Carbide and Carbon Chemicals Corporation (83-84)
 W. A. Cleary Corporation (116)
 Commercial Solvents Corporation (87)
 The Dow Chemical Company (51-52-53-54)
 Hercules Powder Company, Incorporated (70)
 Lead Industries Association (10)
 Mallinckrodt Chemical Works (18)
 Reichhold Chemicals, Inc. (50)
 Socony-Vacuum Oil Company, Inc. (39)
 Victor Chemical Works (41-42-43)

CHEMICALS, Pharmaceutical

Alox Corporation (N24)
 American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 Atlas Powder Co. (126)
 Carbide and Carbon Chemicals Corporation (83-84)
 The Dow Chemical Company (51-52-53-54)
 The Emulsol Corporation (N59)
 Foote Mineral Company (159-160)
 Mallinckrodt Chemical Works (18)
 Victor Chemical Works (41-42-43)
 Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

CHEMICALS, Photographic

American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 Carbide and Carbon Chemicals Corporation (83-84)
 The Dow Chemical Company (51-52-53-54)
 Hercules Powder Company, Incorporated (70)
 Mallinckrodt Chemical Works (18)

CHEMICALS, Plastics

American Cyanamid & Chemical Corporation (N49)
 Atlas Powder Co. (126)
 Bjorksten Laboratories (67)
 Carbide and Carbon Chemicals Corporation (83-84)
 W. A. Cleary Corporation (116)
 Commercial Solvents Corporation (87)
 The Dow Chemical Company (51-52-53-54)
 Hercules Powder Company, Incorporated (70)
 Victor Chemical Works (41-42-43)

CHEMICALS, Rubber

American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 Bjorksten Laboratories (67)
 Carbide and Carbon Chemicals Corporation (83-84)
 W. A. Cleary Corporation (116)
 Commercial Solvents Corporation (87)
 The Dow Chemical Company (51-52-53-54)
 Hercules Powder Company, Incorporated (70)
 Lead Industries Association (10)
 Mallinckrodt Chemical Works (18)
 Standard Oil Company (Indiana) (127-128)

CHEMICALS, Textile

American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 Atlas Powder Co. (126)
 Carbide and Carbon Chemicals Corporation (83-84)

(Continued on page 320)



COST COMPARISON

	50 lb. Open Mouth Burlap Bags	30 lb. Multiwall Paper Valve Bags
Bag cost per M	\$129.55	\$86.80
Bag cost per 50 lbs.	.129	.086
Labor cost per 50 lbs.	.013	.007
Total bag and labor cost per 50 lbs.	.142	.093
Saving per bag paper over burlap		.049
Saving per ton paper over burlap		1.96

DETAILS OF LABOR COSTS

Burlap bags	Production per Hour	Cost per 50 lbs.
1 man filling, weighing, closing and handling at 80¢ per hour	3000 lbs.	.013
Multiwall Paper Valve Bags		
1 man filling and handling at 80¢ per hour	6000 lbs.	.007

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER
CHEMICALS	FOOD ✓
FEEDSTUFFS	MISCELLANEOUS

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR
CORROSIVE	HEAVY
DELIQUESCENT	HYGROSCOPIC
FLUFFY	LIGHT ✓
FREE-FLOWING ✓	VISCOUS

ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speeds, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute — with one operator.

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INSTALLED AS A SANITARY MEASURE...



What you see through the glass shows the tribute to Multiwalls printed on his bags by this prominent dog food manufacturer.

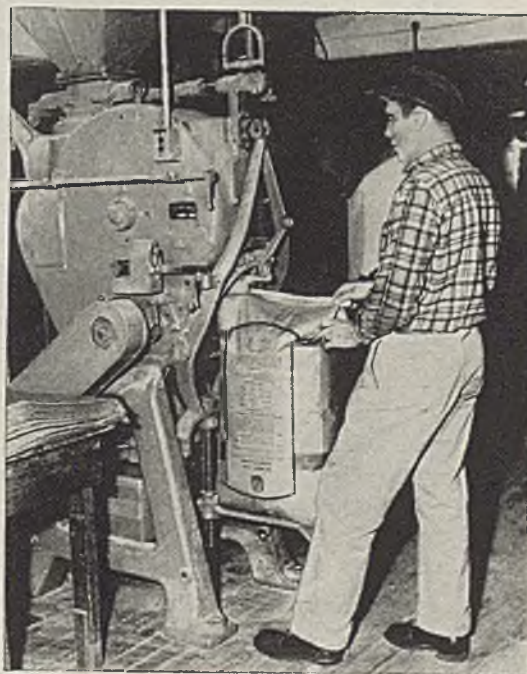
this ST. REGIS PACKAGING SYSTEM

- 1—Reduced container costs 35%
- 2—Increased production 100%
- 3—Reduced labor costs 46%

Primarily interested in protecting his product against dirt and other forms of contamination, Mr. Waller Mowll, president of the Old Trusty Dog Food Company, soon found that a St. Regis Packaging System not only gave him the desired protection, but also saved money through reduction of labor and container costs, and doubled production.

This Case History proves again that St. Regis packers, adapted to the particular type of product, and Multiwall paper bags, tailored to suit the customer's specific requirements, can speed production and save money for the small concern needing a single packer, as well as for the big cement, chemical, foodstuff, or fertilizer producer requiring batteries of high speed packers.

For the full story on how this company packed a better dog food in a better container, and how these principles may be applied to *your* business, mail the coupon.



ST. REGIS SALES CORPORATION

(Sales Subsidiary of St. Regis Paper Company)

NEW YORK 17: 230 Park Ave.

CHICAGO 1: 230 No. Michigan Ave.

BALTIMORE 2: 2601 O'Sullivan Bldg.

SAN FRANCISCO 4: 1 Montgomery St.

Mail this coupon for the complete story

Allentown, Pa. Birmingham Boston Cleveland Dallas Denver
 Detroit Franklin, Va. Los Angeles Nazareth, Pa. New Orleans
 No. Kansas City, Mo. Ocala, Fla. Oswego, N. Y. Seattle Toledo

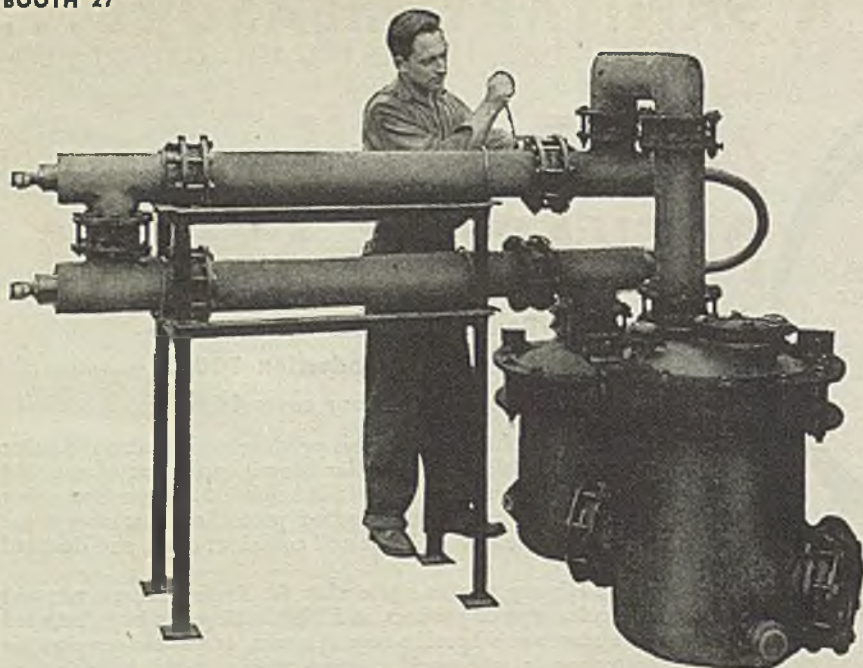
IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal, Vancouver.

Without obligation, please send me full details regarding "Case History" No. 7, outlined above.

NAME _____

COMPANY _____

ADDRESS _____



The complete functional unit above consists of a Knight-Ware boiling kettle, heat exchanger and receiver. The boiling kettle is equipped with Karbate bayonet heaters. The Knight-Ware parts are protected from physical and thermal shock damage by an armor of Permanite-impregnated glass fabric.

Our Business Is Solving CORROSION PROBLEMS

Thru the years Knight engineers have solved a great variety of corrosion problems. With this wide experience they have designed many types of acid- and alkali-handling equipment to meet the conditions of individual customers' problems. Besides our own, they use many other types of materials to develop successful functional units.

Some of the Knight products they use are: *Knight-Ware*, an acid- and alkali-proof chemical stoneware; *Permanite*, a new resin material that is used alone or reinforced with glass fabric; and *Pyroflex*, a thermoplastic resin. Depending on the needs of the job, Pyroflex construction often includes steel, Pyroflex, Knight-Ware, Permanite, rubber, lead, glass, carbon and plastics. Thus a complete functional unit is designed by combining the best materials for a specific job.

Knight Chemical Equipment for handling corrosive chemicals is being used in just about every process industry. That is why those faced with special corrosion problems first submit them to—

MAURICE A. KNIGHT
108 Kelly Ave., Akron 9, Ohio

Visit our Exhibit No. 27 at the National Chemical Exposition



EXHIBITORS

Classified by Products CONTINUED

- Commercial Solvents Corporation (87)
- The Dow Chemical Company (51-52-53-54)
- The Emulsol Corporation (N59)
- Hercules Powder Company, Incorporated (70)
- Socony-Vacuum Oil Company, Inc. (39)
- L. Sonneborn Sons, Inc. (N43)
- Victor Chemical Works (41-42-43)

CHEMICALS, Water Treatment

- American Cyanamid & Chemical Corporation (N49)
- Ansul Chemical Company (11)
- Carbide and Carbon Chemicals Corporation (83-84)
- The Dow Chemical Company (51-52-53-54)
- The Filter Paper Company (108-109)
- D. W. Haering & Co., Inc. (N13-N14)
- Illinois Water Treatment Company (29)
- Jensen Machinery Company, Inc. (105)
- National Aluminate Corporation (136)
- Victor Chemical Works (41-42-43)

CHEMISTS

- Bjorksten Laboratories (67)
- D. W. Haering & Co., Inc. (N13-N14)

CHLORHYDRINS

- Carbide and Carbon Chemicals Corporation (83-84)

CHLORINE

- American Cyanamid & Chemical Corporation (N49)

CLARIFIERS

- Ertel Engineering Corp. (47)
- The Filter Paper Company (108-109)
- Infilco, Inc. (95)
- Link-Belt Company (101-102)
- Selas Corporation of America (88)

CLASSIFIERS

- Blaw-Knox Company (N50)
- Link-Belt Company (101-102)

COATINGS

- Alox Corporation (N24)
- Atlas Powder Co. (126)
- Chamberlain Engineering Corporation (163)
- The Davison Chemical Corporation (64-65-66)
- F. M. deBeers & Associates (115)
- Foote Mineral Company (159-160)
- Hercules Powder Company, Incorporated (70)
- Maurice A. Knight (27)
- L. Sonneborn Sons, Inc. (N43)
- Standard Oil Company (Indiana) (127-128)
- The U. S. Stoneware Co. (61-62)

COLLOID MILLS, Industrial

- Eppenbach, Inc. (N17)
- First Machinery Corp. (N6)
- The W. J. Fitzpatrick Company (89-90)

COLORS

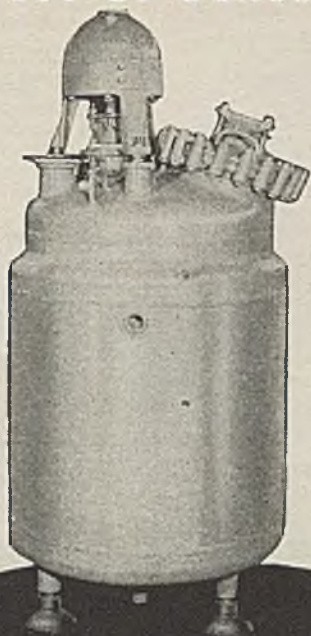
- Lead Industries Association (10)
 - Reichhold Chemicals, Inc. (50)
- (Continued on page 322)

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THE INERTNESS OF GLASS



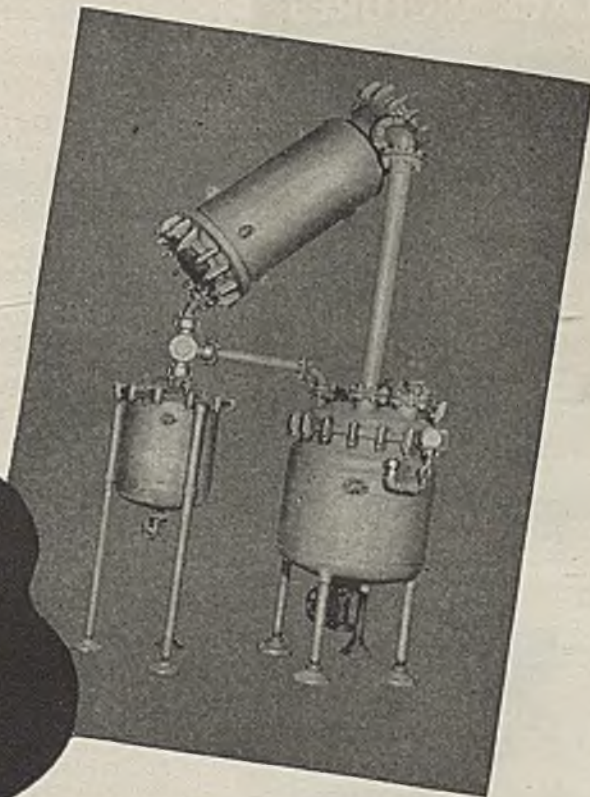
THE STRENGTH OF STEEL



GLASCOTE

Corrosion Resistant

Equipment



Single Units or Complete Glass-on-Steel Assemblies

Glascote glass-on-steel equipment meets industry's most exacting corrosion resistant requirements. The glass, developed by Glascote engineers specially for this service, is resistant to all acids, at low or elevated temperatures, except hydrofluoric and hot concentrated phosphoric. Glascote glass is a true glass. It is chemically inert and has all the properties of laboratory glassware combined with greater strength, toughness, and elasticity.

This proven glass-on-steel construction is available in a wide variety of reaction kettles, crystallizers, evaporators, chlorinators, condensers, distilling, mixing, storage and blending units. The

equipment can be furnished in single shell or jacketed, open or closed designs, in a wide range of sizes, fitted with inlets, outlets, agitators and other accessories to meet the individual condition. Use of glass-on-steel pipe, and pipe fittings available in sizes from 1½" O. D. up, permits the processing and other equipment units to be joined together into complete glass-on-steel assemblies when desired.

Glascote engineers will be glad to help you in selecting a standard, or suggest special equipment to meet your particular and individual needs. Let us quote on your glass-on-steel, stainless steel and alloy vessel requirements.

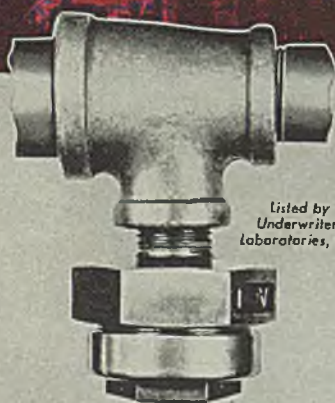
GLASCOTE PRODUCTS, Inc.

20905 ST. CLAIR AVENUE

CLEVELAND 17, OHIO

ENGINEERING AND SALES REPRESENTATIVES IN THE PRINCIPAL CITIES
CORROSION RESISTANT EQUIPMENT FOR THE PROCESSING INDUSTRIES

FIRE PAINTS BLACK PICTURES



Listed by
Underwriters
Laboratories, Inc.

WATER BATH PROTECTION SAVES CHEMICAL PLANT

In the picture... fire in one unit of a large butadiene plant was stopped from spreading to other units by a water spray protective system. In just such applications, Blaw-Knox Aquatomic Fog Nozzles are ideal. Simple, reliable, non-clogging, they deliver a cooling, quenching spray under outdoor conditions.

Write for details.



Also—
Blaw-Knox offers Standard Wet and Dry Pipe Systems, as well as Thermostatically Controlled Pre-Action and Deluge Systems.

Aquatomic
FOG NOZZLES
by
BLAW-KNOX
SPRINKLER DIVISION

831 Beaver Avenue, N. S.,
Pittsburgh 12, Penna.

CONDENSERS AND COOLERS,

Industrial

Blulovak Equipment Division of Blaw-Knox Co. (N50)
F. M. deBeers & Associates (115)
First Machinery Corp. (N6)
General Ceramics & Steatite Corporation, Chemical Equipment Division (114)
Glascote Products, Inc. (77)
Graham Manufacturing Co., Inc. (N45)
Groen Mfg Co. (N21-N22)
Haveg Corporation (94)
Heil Process Equipment Corporation (N23)
Jensen Machinery Company, Inc. (105)
The Johnson Corporation (35-36)
Maurice A. Knight (27)
Lead Industries Association (10)
Leader Iron Works, Inc. (110)
Link-Belt Company (101-102)
National Carbon Co., Inc. (85-86)
The Pfaudler Co. (1)

CONTAINERS AND PACKAGES

Bemis Bro. Bag Co. (37-38)
Bjorksten Laboratories (67)
Continental Can Company, Inc., The Container Company Division (44-45)
Emery Carpenter Container Company (97)
Hercules Powder Company, Incorporated (70)
The Master Package Corporation (104)

CONTROLLERS AND CONTROL SYSTEMS

American Instrument Company (103)
The Bristol Company (N53-N54)
Brown Instrument Company, Div. of Minneapolis-Honeywell Regulator Co. (N34-N35)
Durametallie Corp. (119)
The Foxbord Company (161-162)
Industrial Instruments, Inc. (26)
The Johnson Corporation (35-36)
Kieley & Mueller, Inc. (155)
Leeds & Northrup Company (156-157-158)
Moore Products Co. (137)
National Technical Laboratories (N41)
Milton Roy Company (5)
Taylor Instrument Companies (143-144)
Wheeleo Instruments Company (N15)

COOKERS—See Digestors

COOLERS—See Condensers

CRESOLS

Oronite Chemical Company (N9)
Standard Oil Company (Indiana) (127-128)

CRUCIBLES, Industrial

National Carbon Co., Inc. (85-86)
Selas Corporation of America (88)

CRUSHERS, GRINDS, MILLS AND PULVERIZERS, Industrial

Eppenbach, Inc. (N17)
First Machinery Corp. (N6)
The W. J. Fitzpatrick Company (89-90)
B. F. Gump Co. (22-23)
Link-Belt Company (101-102)
Loeb Equipment Supply Co. (24-25)
Raymond Pulverizer Division, Com-

blustion Engineering Company, Inc. (73-74)

Trimount Instrument Co. (N31)

DECOLORIZING AND PURIFYING MATERIALS

Ansul Chemical Company (11)
Atlas Powder Co. (126)
Darco Corporation (128)
Ertel Engineering Corp. (47)
The Filter Paper Company (108-109)

DESICCANTS

The Davison Chemical Corporation (64-65-66)
The Dow Chemical Company (51-52-53-54)
W. A. Hammond Drierite Company (N7)
Socony-Vacuum Oil Company, Inc. (39)

DETERGENTS

Alox Corporation (N24)
American Cyanamid & Chemical Corporation (N49)
Atlas Powder Co. (126)
Carbide and Carbon Chemicals Corporation (83-84)
The Emulsol Corporation (N59)
Hercules Powder Company, Incorporated (70)
Standard Oil Company (Indiana) (127-128)
Victor Chemical Works (41-42-43)
Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

DIGESTORS AND COOKERS

Blulovak Equipment Division of Blaw-Knox Co. (N50)
First Machinery Corp. (N6)
Groen Mfg. Co. (N21-N22)
Haveg Corporation (94)
Leader Iron Works, Inc. (110)
The Pfaudler Co. (1)
A. O. Smith Corporation (30)

DISINFECTANTS AND DISINFECTANT BASES

American Cyanamid & Chemical Corporation (N49)
Atlas Powder Co. (126)
Carbide and Carbon Chemicals Corporation (83-84)
The Davison Chemical Corporation (64-65-66)
The Dow Chemical Company (51-52-53-54)
The Emulsol Corporation (N59)
Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

DISTILLING EQUIPMENT,

Industrial

Aetna Scientific Company (168)
Barnstead Still and Sterilizer Co. Inc. (154)
Blulovak Equipment Division of Blaw-Knox Co. (N50)
Chicago Carb-O-Tank Co. (28)
Distillation Products, Inc. (138)
First Machinery Corp. (N6)
General Ceramics & Steatite Corporation, Chemical Equipment Division (114)
Glascote Products, Inc. (77)
Leader Iron Works, Inc. (110)
Loeb Equipment Supply Co. (24-25)
The Pfaudler Co. (1)
Precision Scientific Co. (N25)
A. O. Smith Corporation (30)
(Continued on page 324)

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No responsibility assumed for errors or omissions.

What Blaw-Knox includes in a . . . "TURN-KEY CHEMICAL PLANT PROJECT"

Starting with the client's idea and such data as has been developed in his preliminary investigations, Blaw-Knox carries the "turn-key project" through all the steps of design, fabrication, plant construction and initial operation. These services are included.

- 1 Preliminary design study to establish the process requirements.
- 2 Selection of processing methods.
- 3 Fundamental engineering: flow sheets, layouts, sizing of units, and cost estimates.
- 4 Detail engineering: design and specification of process vessels, mechanical equipment, piping, instruments, electrification, and structures.
- 5 Fabrication, procurement, and inspection of equipment and materials.
- 6 Execution plan for the project including schedules for engineering, procurement, and construction.
- 7 Plant construction including preparation site, erection of structures, installation of equipment, piping.
- 8 Initial operation, and training of operating personnel.

BLAW-KNOX offers unified responsibility covering this full range of services.



BLAW-KNOX DIVISION of Blaw-Knox Company

2090 Farmers Bank Bldg.,
Pittsburgh 22, Pennsylvania

NEW YORK • CHICAGO • PHILADELPHIA • BIRMINGHAM • WASHINGTON

BLAW-KNOX IMPLEMENTS THE PROCESS INDUSTRIES



Seven Blaw-Knox plants have been awarded the Army-Navy "E", and have regularly received renewal stars for continued high achievement in the production of war material.

BOOTH 115

We invite all who
may be interested in

PROCESS**MACHINERY and
EQUIPMENT**

to meet our *Chicago*
group—**PLUS** engineer-
specialists from home
offices of our agency
affiliations' building:—

- **EVAPORATORS**
- **FILTERS—Press-Vac.**
- **CENTRIFUGALS**
- **SPIRAL HEAT EXCH.**
- **EXPANSION JOINTS**
- **THERMO-COMPRESSORS**
- **STEAM-JET UNITS**
- **CHEM. CERAMIC WARE**
- **PLASTIC COVERINGS**
- **VAC. COOLING PLANTS**
- **WASTE HEAT RECOV. SYS.**

Handling **ASSOCIATED LINES** with
a call on the **COMBINED** and suc-
cessful **EXPERIENCE** of old estab-
lished companies clearing through
our exchange, we offer a **COM-
PLETE SERVICE** to all who need
DATA, PRICES, etc. Our office and
the practical knowledge of our or-
ganization are for your use. We
solicit your inquiries.

F. M. de BEERS & ASSOC.

Chemical Engineers

20 NORTH WACKER DRIVE

CHICAGO 6—Tel. Ran. 2326

EXHIBITORS
Classified by Products
CONTINUED

DRYING EQUIPMENT

Blaw-Knox Company (N50)
Bullovak Equipment Division of Blaw-
Knox Co. N50
The Davison Chemical Corporation
(64-65-66)
First Machinery Corp. (N6)
W. A. Hammond Drierite Company
(N7)
Link-Belt Company (101-102)
Loeb Equipment Supply Co. (24-25)
The Miskella Infra-Red Company
(N30)
The Pfaudler Co. (1)

DUST COLLECTING SYSTEMS

Claude B. Schneible Co. (N5)

DYES

The Dow Chemical Company (51-
52-53-54)

EJECTORS

F. M. deBeers & Associates (115)
General Ceramics & Steatite Corpora-
tion, Chemical Equipment Division
(114)
Graham Manufacturing Co., Inc.
(N45)
National Carbon Co., Inc. (85-86)
Selas Corporation of America (88)

**ELECTRICAL EQUIPMENT AND
SUPPLIES, Industrial**

A. O. Smith Corporation (30)

**ELECTROPLATING EQUIPMENT
AND SUPPLIES**

American Hard Rubber Company (8)
American Instrument Company (103)
Atlas Powder Co. (126)
Haveg Corporation (94)
Heil Process Equipment Corporation
(N23)
O. G. Kelley & Company (N37)
Maurice A. Knight (27)
Lead Industries Association (10)
The U. S. Stoneware Co. (61-62)

EMULSIFIERS

Alox Corporation (N24)
Atlas Powder Co. (126)
Bjorksten Laboratories (67)
Carbide and Carbon Chemicals Corpo-
ration (83-84)
W. A. Cleary Corporation (116)
Commercial Solvents Corporation
(87)
The Emulsol Corporation (N59)
Eppenbach, Inc. (N17)
The W. J. Fitzpatrick Company (89-
90)
Glyco Products Co., Inc. (122-123)
Hercules Powder Company, Incorpo-
rated (70)
Loeb Equipment Supply Co. (24-25)
Oronite Chemical Company (N9)
The Pfaudler Co. (1)
L. Sonneborn Sons, Inc. (N43)
Victor Chemical Works (41-42-43)

ENGINEERS

Blaw-Knox Company (N50)
D. W. Haering & Co., Inc. (N13-
N14)
National Engineering Company (129-
130)
The Pfaudler Co. (1)
Standard Oil Company (Indiana)
(127-128)

(Continued on page 326)

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BOOTH 115

Serving the MID-WEST thru
representation of large design-
ers and builders of modern,
efficient

**PROCESS MACHINERY
and EQUIPMENT**

Executives and experienced engi-
neer-experts in these unit opera-
tions will be on hand *for your*
service. Meet them. Discuss
your problems. Save time and
much letter writing in a full ex-
change of ideas. We represent:—

- **AMERICAN HEAT
RECLAIMING CORP.**
- **GROLL-REYNOLDS CO.**
- **GROLL-REYNOLDS
ENG. CO.**
- **FLETCHER WORKS, INC.**
- **GENERAL CERAMICS
& STEATITE CORP.**
- **GOSLIN-BIRMINGHAM
MANUFACTURING CO.**
- **INDUSTRIAL LINING
ENGINEERS, INC.**

We'll have some equipment to
show—**BUT MAINLY** we will
have a lot of data on tap—and a
group of men who know the
answers. We want you to meet
the people you do business with.

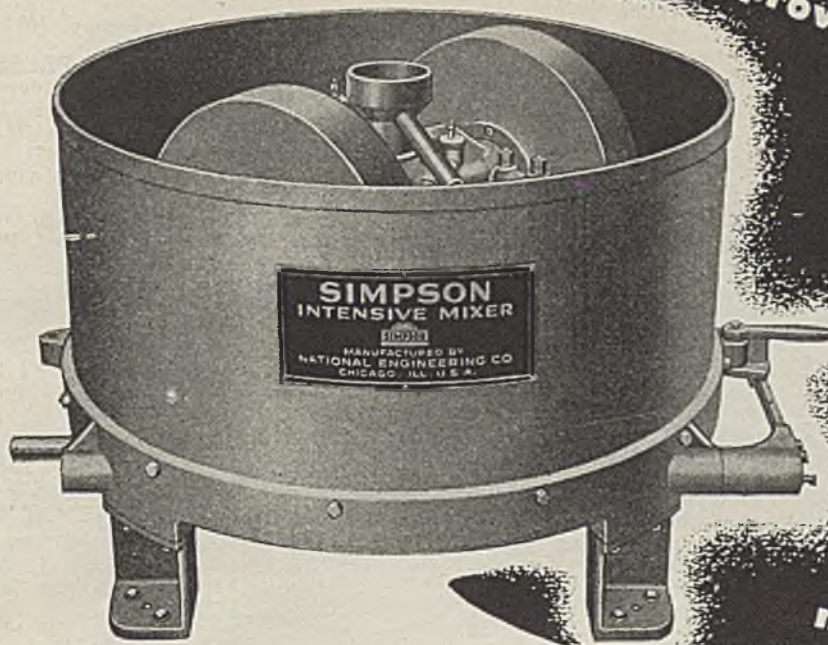
F. M. de BEERS & ASSOC.

Chemical Engineers

20 NORTH WACKER DRIVE

CHICAGO 6—Tel. Ran. 2326

SEE THEM—BOOTH 129-130 CHEMICAL SHOW



improved product quality

increased production

less mixing time

lower mixing cost

SIMPSON

Intensive

MIXERS

* The Mulling Principle of Mixing

In the Simpson Mixer heavy revolving mullers knead and smear the material which is folded over and turned into their path by a set of plows. Action is similar to a mortar and pestle. Pan is stationary. Mixer is self-cleaning.

If you mix dry, semi-dry or pasty materials and are interested in a thorough blend in the least mixing time at the lowest cost . . . Simpson mixing-by-mulling is for your plant.

Proved in hundreds of installations—on hundreds of varied products, Simpson Mixers have helped processing plants improve the quality of their product, increase their production and reduce cost.

Simpson Mixers are built in 10 sizes from 1/5 to 50 cu. ft. capacity. They may be equipped with controlled electric heating units, steam jackets, water jackets and for vacuum mixing—in stainless steel or corrosion resistant materials. They are self-cleaning and although of batch type they are ideal for continuous systems.

Find out about "better mixing"—ask for details on a test in National's Laboratory—and invite a National Engineer to discuss your mixing problems. No obligation.

Write for the Simpson Catalog.

SIMPSON



INTENSIVE MIXERS

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries:—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

**HAVE YOU HEARD
HOW THIS MILL
CAN HELP YOU?**



**FINER GRINDING,
MORE UNIFORM
DISPERSIONS RESULT
IN BETTER PRODUCTS**

The Eppenbach High Speed Wet Grinding and Colloid Mill is a dual purpose machine:

- 1 It reduces particles to sub-micro-dimensions by grinding, and
- 2 Effects perfect dispersion of such particles into fluid or plastic materials.

An examination of the turbine design shows why it is possible for a single machine to perform these two distinct operations. Liquid is broken up into minute globules by high velocity impact at top of turbine. Suspended material is mechanically sheared by the rotor and stator teeth, and hydraulically sheared by the final smooth surfaces of rotor and stator.



Eppenbach Mills are available in laboratory and production sizes. Capacities range from 1/2 to 3600 gallons per hour or higher.

Write for complete details. Ask for a copy of Catalog No. 401.

EPPENBACH, INC.

LONG ISLAND CITY 1, N. Y.



EXHIBITORS • Classified by Products • CONTINUED

ESTERS

- Alox Corporation (N24)
- American Cyanamid & Chemical Corporation (N49)
- Carbide and Carbon Chemicals Corporation (83-84)
- Commercial Solvents Corporation (87)
- The Emulsol Corporation (N59)
- Glyco Products Co., Inc. (122-123)
- Reichhold Chemicals, Inc. (50)

ETHERS

- Carbide and Carbon Chemicals Corporation (83-84)
- Commercial Solvents Corporation (87)

EVAPORATORS

- Aetna Scientific Company (168)
- American Hard Rubber Company (6)
- Blaw-Knox Company (N50)
- Buflovak Equipment Division of Blaw-Knox Co. N50
- F. M. deBeers & Associates (115)
- First Machinery Corp. (N6)
- Glascote Products, Inc. (77)
- Graham Manufacturing Co., Inc. (N45)
- Groen Mfg. Co. (N21-N22)
- Leader Iron Works, Inc. (110)
- The Pfaudler Co. (1)
- Precision Scientific Co. (N25)

EXHAUSTERS—See Fans

EXPLOSIVES

- American Cyanamid & Chemical Corporation (N49)
- Atlas Powder Co. (126)
- Hercules Powder Company, Incorporated (70)

EXTRACTION EQUIPMENT

- Buflovak Equipment Division of Blaw-Knox Co. N50
- F. M. deBeers & Associates (115)
- Glascote Products, Inc. (77)
- Leader Iron Works, Inc. (110)
- Loeb Equipment Supply Co. (24-25)
- The Pfaudler Co. (1)
- Precision Scientific Co. (N25)

FANS, BLOWERS AND EXHAUSTERS

- American Hard Rubber Company (6)
- Chicago Pump Company (63)
- General Ceramics & Steatite Corporation, Chemical Equipment Division (114)
- Haveg Corporation (94)
- Kewaunee Manufacturing Company (N26)
- Laboratory Furniture Co., Inc. (20)
- Mine Safety Appliances Company (N1)
- A. O. Smith Corporation (30)
- The U. S. Stoneware Co. (61-62)

FERTILIZERS

- The Davison Chemical Corporation (64-65-66)

FILLING EQUIPMENT—See Packaging Equipment

FILTER MEDIA

- American Cyanamid & Chemical Corporation (N49)
- H. Reeve Angel & Co., Inc. (112)
- Ertel Engineering Corp. (47)
- The Filter Paper Company (108-109)
- The Hilliard Corporation (N45)
- Infleco Inc. (95)
- National Carbon Co., Inc. (85-86)
- Selas Corporation of America (88)

Sparkler Manufacturing Company (19)

D. R. Sperry & Company (60)

FILTERS AND FILTER PRESSES

- Acc Glass Incorporated (169)
- Chicago Carb-O-Tank Co. (28)
- F. M. deBeers & Associates (115)
- Ertel Engineering Corp. (47)
- The Filter Paper Company (108-109)
- First Machinery Corp. (N6)
- General Ceramics & Steatite Corporation, Chemical Equipment Division (114)
- Haveg Corporation (94)
- The Hilliard Corporation (N45)
- Infleco Inc. (95)
- Maurice A. Knight (27)
- Loeb Equipment Supply Co. (24-25)
- Sparkler Manufacturing Company (19)
- D. R. Sperry & Company (60)
- Titeflex, Inc. (99-100)
- The U. S. Stoneware Co. (61-62)

FIRE AND FLAMEPROOFING MATERIALS

- Glyco Products Co., Inc. (122-123)
- Hercules Powder Company, Incorporated (70)
- Victor Chemical Works (41-42-43)

FITTINGS, Valve and Pipe

- American Hard Rubber Company (6)
- Armstrong Steam Trap Company (34)
- The Carpenter Steel Company, Welded Alloy Tube Division (124)
- Chicago Carb-O-Tank Co. (28)
- Distillation Products, Inc. (138)
- The Filter Paper Company (108-109)
- Fisher Governor Company (7)
- General Ceramics & Steatite Corporation, Chemical Equipment Division (114)
- Glascote Products, Inc. (77)
- Haveg Valve and Machine Company (80)
- Haveg Corporation (94)
- Haynes Stellite Company (81-82)
- Hills-McCanna Company (113)
- The Johnson Corporation (35-36)
- Kieley & Mueller, Inc. (155)
- Maurice A. Knight (27)
- Lead Industries Association (10)
- The Matheson Co., Inc. (166)
- Michigan Steel Casting Company (146)
- Moore Products Co. (137)
- National Carbon Co., Inc. (85-86)
- The Pfaudler Co. (1)
- Resisto Pipe & Valve Company (N36)
- Silver Steel Casting Co. (107)
- Taylor Instrument Companies (143-144)
- The U. S. Stoneware Co. (61-62)
- Tri-Clover Machine Co. (12)
- Yarnall Waring Company (N16)

FLOTATION AGENTS

- Carbide and Carbon Chemicals Corporation (83-84)
- The Emulsol Corporation (N59)
- Hercules Powder Company, Incorporated (70)
- Oronite Chemical Company (N9)
- Socony-Vacuum Oil Company, Inc. (39)

FLURIDES

- American Cyanamid & Chemical Corporation (N49)
- The Davison Chemical Corporation (64-65-66)

(Continued on page 328)

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FOR IMMEDIATE DELIVERY!



See it at the National
Chemical Exposition, Chicago

... the console-type RCA ELECTRON MICROSCOPE

A low-cost tool for speeding process control and research

NOW, for the first time since before the war, this valuable instrument is readily available to anyone.

It provides factory and production specialists and research workers with a compact, easily operated super-magnifier for studying the size, shape, and structure of particles too small to be seen by other means. Its simplified construction, ease of operation make it particularly suitable for repetitive checking operations and routine analysis.

There are two magnification positions: 500 X and 5000 X. A built-in camera makes it a simple matter to make good micrographs which can be usefully enlarged to 100,000 diameters!

Best of all, it is a device for small budgets—approximately one half the

price of the world-famous "Universal" model, made possible by the elimination of a few versatility features not generally required by industry. Yet it has approximately the same high resolving power as the larger model and ample magnification for 90 per cent of all direct-viewing requirements. Since no water-cooling is required, it can be easily moved wherever needed.

This remarkable instrument is now uncovering new knowledge, speeding research, and improving product quality and performance in a wide variety of industries. We'll be glad to help you appraise the possibilities of this immediately available instrument or of the larger model in connection with your work. Write Dept. 23-H.

RCA ELECTRONIC EQUIPMENT FOR INDUSTRY



"Universal" electron microscope: adjustable magnification to 20,000 X



Vacuum Unit for metal shadowing, coating, and evaporation



Gage for measuring vacuums down to 10^{-4}



Test and measuring equipment



Electronic power generators for dielectric and induction heating



Electronic metal detector to protect machines and product quality



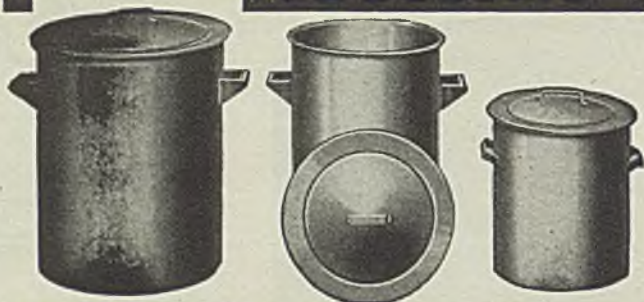
Very high-speed electronic time-interval counters



**SCIENTIFIC INSTRUMENTS
RADIO CORPORATION of AMERICA
ENGINEERING PRODUCTS DEPARTMENT, CAMDEN, N.J.**

In Canada: RCA VICTOR Company Limited, Montreal

Help for your
**CHEMICAL STORAGE
and PROCESSING
PROBLEMS •**



**STAINLESS STEEL
STOCK POTS**

• Solve many of your storage and processing problems with these rust-proof, acid-resisting, easy-to-clean Stock Pots.

Made throughout of 16 gauge, 18-8 Stainless Steel, welded construction, with all inside welds ground smooth and polished.

SPECIAL EQUIPMENT

These pots can be purchased with or without covers and if desired can be fitted with casters to make them portable.

Write for complete specifications and prices.

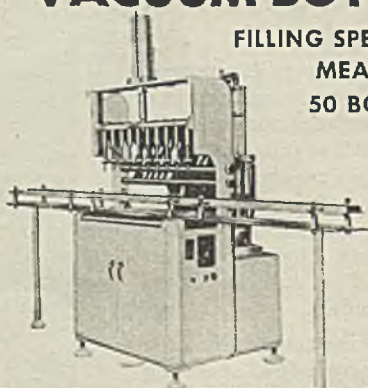
We also manufacture a complete line of Storage Tanks and Equipment.

**METAL GLASS PRODUCTS CO. DEPT. C
BELDING, MICH.**

**MAIL THIS
COUPON
FOR YOUR COPY
of Bulletin 18**

**THE NEW ERTEL
"Pneumo-Vac"
VACUUM BOTTLE FILLER**

**FILLING SPEED
MEASURED IN QUARTS—
50 BOTTLES PER MINUTE**



The "Pneumo-Vac" is operated by a balanced foot valve which allows the operator full use of both hands and reduces physical effort to a minimum. Dripping is positively prevented while unit is in operation. Liquid filling heights, for 3" to 13" bottles, can be quickly regulated. Illustrated "Pneumo-Vac" bulletin gives full information. Write for your copy.

**ERTEL ENGINEERING
CORPORATION**

KINGSTON NEW YORK
NEW YORK CITY SALES OFFICE AND SHOWROOM
40 WEST 48th STREET, NEW YORK 19, N. Y.

ERTEL ENGINEERING CORPORATION, KINGSTON, N. Y.
Please send bulletin 18 by return mail.

NAME _____
COMPANY _____
STREET _____
CITY _____ STATE _____

BOOTH 47
328

**EXHIBITORS
Classified by Products
CONTINUED**

FORMATES

Alox Corporation (N24)
Victor Chemical Works (41-42-43)

FUNGICIDES

Alox Corporation (N24)
American Cyanamid & Chemical Corporation (N49)
Carbide and Carbon Chemicals Corporation (83-84)
W. A. Cleary Corporation (116)
The Dow Chemical Company (51-52-53-54)
The Emulsol Corporation (N59)
Mullinekrodt Chemical Works (18)
Oronite Chemical Company (N9)
Socony-Vacuum Oil Company, Inc. (39)
Standard Oil Company (Indiana) (127-128)

FURNACES, Industrial

Leeds & Northrup Company (156-157-158)
Selas Corporation of America (88)

GASES

Ansul Chemical Company (11)
Carbide and Carbon Chemicals Corporation (83-84)
The Matheson Co., Inc. (166)
The Ohio Chemical & Mfg. Co. (N3)

GERMICIDES

Ansul Chemical Company (11)
Carbide and Carbon Chemicals Corporation (83-84)
W. A. Cleary Corporation (116)
The Dow Chemical Company (51-52-53-54)
The Emulsol Corporation (N59)
National Aluminate Corporation (136)
Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

GLASS, Fiber

GLASS, Optical

GLASS PIPE

GLASSWARE, Laboratory

Ace Glass Incorporated (109)
Central Scientific Company (71)
Chicago Apparatus Company (135)
Laboratory & Pharmaceutical Sales Dept., Corning Glass Works (72)
The Filter Paper Company (108-109)
Fisher Scientific Company (78)
Kimble Glass Company (133-134)
E. H. Sargent & Co. (31)
Schaar and Company (21)
Scientific Glass Apparatus Company (76)
W. M. Welch Manufacturing Company (46)
Wilkins Anderson Company (111)

GLUCOSATES

D. W. Haering & Co., Inc. (N13-N14)

GLYCERINE AND DERIVATIVES

Glyco Products Co., Inc. (122-123)

GLYCOLS—See Alcohols.

Polyhydric

(Continued on page 332)

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Do You Need a High-Strength Alloy to Resist Corrosion?

One of these grades of HASTELLOY Alloy may be what you require

	HASTELLOY A	HASTELLOY B	HASTELLOY C	HASTELLOY D
Composition:	nickel-molybdenum-iron	nickel-molybdenum-iron	nickel-molybdenum-chromium-iron	nickel and silicon
Excellent Resistance to:	hydrochloric and sulphuric acid	boiling hydrochloric acid and wet hydrochloric acid gas	free chlorine, acid solutions of ferric and cupric salts, and sulphuric acid	sulphuric acid of all concentrations up to the boiling point
Good Resistance to:	phosphoric, acetic, formic, and other organic acids	sulphuric acid	hydrochloric and nitric acid	phosphoric acid
Available Forms:	castings, forgings, hot-rolled bars, strip, plate, sheet, rods, wire, welded tubing	castings, forgings, hot-rolled bars, strip, plate, sheet, rods, wire, welded tubing, cast or drawn welding rods	castings, plate, sheet, welded tubing, cast welding rods	castings, cast welding rods


Visit Our Exhibit
at Area 81
National Chemical Exposition
Chicago Coliseum
Sept. 10-14, 1946

Test coupons of these alloys are available without charge upon request... in sheet and cast form. In requesting samples, any information you can give us about the corrosive media, the type of equipment, or other conditions of service will help us choose the proper alloys to send to you.

HASTELLOY
TRADE-MARK

HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation

General Office and Works  Kokomo, Indiana

Chicago—Cleveland—Detroit—Houston—Los Angeles—New York—San Francisco—Tulsa

HIGH-STRENGTH NICKEL-BASE ALLOYS FOR CORROSION RESISTANCE

"Hastelloy" is a registered trade-mark of Haynes Stellite Company.

LIFE... ON THE

FILT-R-STIL* ION EXCHANGE DEMINERALIZING UNITS, NOW AVAILABLE, PROVIDE NEW, EASY LOW-COST WAY TO GET "CHEMICALLY PURE" WATER FOR DIVERSIFIED NEEDS

If water is one of your raw materials, you'll want to investigate Cyanamid's new FILT-R-STIL Units for delivering chemically pure water... water that is standardized and quality-controlled, like any other chemical... water that is really H_2O , C.P.! FILT-R-STIL Units contain IONAC* ion exchange resins, new synthetic chemicals that remove ionized solids without imparting color, odor or taste to the solution treated. The process involved is comparable to a simple, cold filtration.

Besides the Units shown here, other standard Units with capacities of 150, 300, 600 and 1200 gallons per hour are available. Special Units have been designed for applications requiring capacities in excess of 1,000,000 gallons per day.

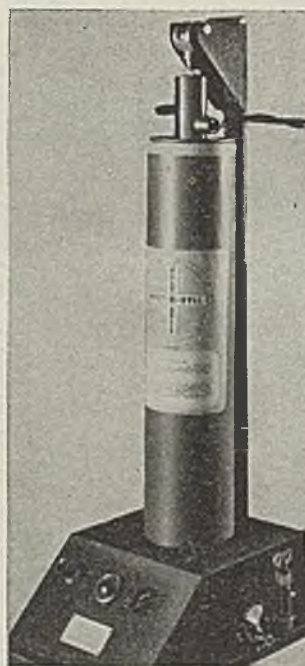
Units shown and larger models are immediately available. Write us for complete data on FILT-R-STIL Demineralizing Units and IONAC ion exchange resins.

FILT-R-STIL Water Demineralizing Units produce:

- Water chemically equal to, or better than, distilled water... and at lower cost.
- Water of uniform quality... even with a varying raw water supply.
- Water stripped of its ionized solids content... completely or partially—as specified.

Here are some of the advantages inherent in the equipment itself:

- No heat, no cooling water, no periodic dismantling required... and no scale formation.
- Compact, self-contained, completely assembled... require only connection to raw water source, drain, and electrical outlet.
- Easy to install, maintain, and operate... with long life, efficient service, and reliable results.
- Automatic, precise, quality controls... indicating the quality of the effluent (not volume treated or time consumed).



(Left) FILT-R-STIL CARTRIDGE UNIT, with a maximum flow rate of 10 gal. per hour, contains a disposable cartridge of IONAC resins. When the demineralizing capacity of the resins is exhausted, the cartridge may be discarded and a new one inserted. Overall dimensions: 8" wide, 10" deep, and 22" high.

(Left) FILT-R-STIL "LAB" UNIT, with a maximum flow rate of 30 gal. per hour, utilizes four columns containing IONAC resins. The "Lab" Unit is the smallest of the regenerative-type Units. When the resins in the columns have reached their demineralizing capacity, they are easily regenerated with dilute acid and alkali solutions and ready for reuse. Cycles of use and regeneration can be repeated indefinitely.

CHEMICAL NEWSFRONT

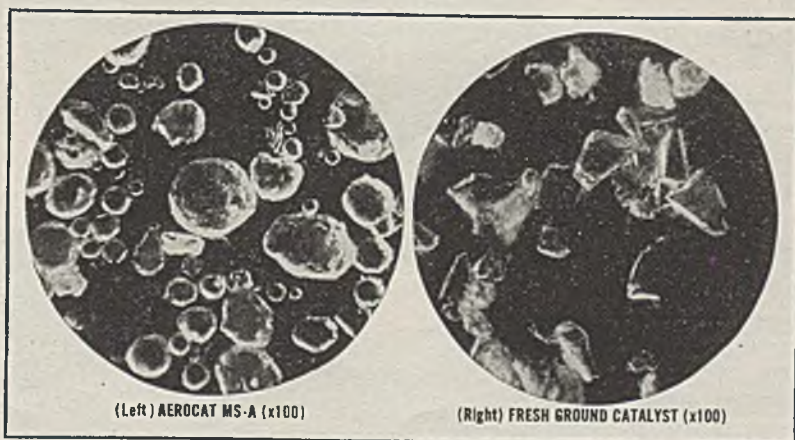
(Right) **HERE IS COLOR**, for the first time, in a shock-resistant, thermosetting plastic. This brilliant, permanent color is helping sell many household appliances because housewives like brighter, more cheerful-looking kitchens and laundries. During the war, Cyanamid's Plastics Division developed this special impact-resistant MELMAC* molding material in brown and black for hospital trays, food service, and various industrial uses. In addition to strength, it had the advantages of being lightweight, chemically inert, odorless, and tasteless. At the end of the war, Cyanamid added color for consumer appeal. Today many modern utilitarian products are being molded of this new MELMAC plastic.

It is available in red, blue, green, ivory, white, brown, and black, for such applications as this washing machine agitator molded by Eclipse Moulded Products Company for Speed Queen Washing Machine, tableware, food trays, vacuum cleaner housings, refrigerator and stove parts, syrup dispensers, germicide containers, bottle warmers, and many new products.



(Below) **LATEST ADVANCE** in synthetic fluid cracking catalysts for petroleum refining is Cyanamid's microspheroidal catalyst—AEROCAT**MS-A. Compare the spheroidal shape and controlled particle size distribution of AEROCAT MS-A (left) with the irregular sharp particles found in the ground catalyst (right). The following superior physical features of AEROCAT MS-A also result in operating and economic advantages:

- Minimum Amount of Fines
- Resistance to Attrition
- Increased Catalytic Efficiency
- Improved Flow Characteristics



(Left) AEROCAT MS-A (x100)

(Right) FRESH GROUND CATALYST (x100)

An Invitation!

American Cyanamid will occupy Booth No. N49 at the National Chemical Exposition in the Chicago Coliseum, September 10th through September 14th. **FILT-R-STIL De-mineralizing Units** will be featured. You are cordially invited to attend, and we hope visit with us. A request on your Company letterhead for an admission ticket to the Exposition will be promptly filled.

**Trade-mark of American Cyanamid & Chemical Corporation denoting cracking catalyst of its manufacture.

*Reg. U. S. Pat. Off.

American Cyanamid & Chemical Corporation

(A Unit of American Cyanamid Company)

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.



More and more plants use ILLCO-WAY DE-IONIZED WATER

(the modern low-cost
equivalent of distilled water)

10,000 GALLONS FOR
LESS THAN A DOLLAR*



ANOTHER ILLCO-WAY INSTALLATION:
Pure water is produced by this compact duplex ILLCO-WAY Unit in midwest industrial plant. No fuel, no cooling water required, no periodic dismantling for cleaning.

*If you need pure water to improve your products, but have been deterred by the cost of distillation, investigate the modern ILLCO-WAY De-ionizing process today!

You can obtain pure water—in volume up to 500,000 gallons an hour—at 1% to 10% of the cost of distillation!

Hundreds of pharmaceutical, chemical, cosmetic and industrial plants are obtaining pure process water from compact, efficient ILLCO-WAY equipment such as illustrated above (180 gph). Write for literature.

ILLINOIS WATER TREATMENT CO.
844-8 Cedar St., Rockford, Illinois
7310-BB Empire State Bldg., New York City

WATER TREATMENT ENGINEERING



See this equipment at the Chemical
Exposition, Chicago—Booth No. 29

EXHIBITORS • Classified by Products • CONTINUED

GRINDERS—See Crushers

HALIDES

HALO-AROMATICS

HALOGENS

HEATERS AND HEAT

EXCHANGERS

Bullovak Equipment Division of Blaw-Knox Co. (N50)

American Instrument Company (103)

F. M. deBeers & Associates (115)

General Ceramics & Steatite Corporation, Chemical Equipment Division (114)

Graham Manufacturing Co., Inc. (N45)

Haveg Corporation (94)

Heil Process Equipment Corporation (N23)

Jensen Machinery Company, Inc. (105)

The Johnson Corporation (35-36)

Leader Iron Works, Inc. (110)

National Carbon Co., Inc. (85-86)

The Pfaudler Co. (1)

Selas Corporation of America (88)

A. O. Smith Corporation (30)

HOISTS

Link-Belt Company (101-102)

HOMOGENIZERS, Industrial

Eppenbach, Inc. (N17)

The W. J. Fitzpatrick Company (89-90)

Loeb Equipment Supply Co. (24-25)

Marco Company, Inc. (N58)

HUMIDIFYING APPARATUS

Armstrong Steam Trap Company (34)

HYDROCARBON GASES

Carbide and Carbon Chemicals Corporation (83-84)

The Matheson Co., Inc. (106)

Skelly Oil Company (N2)

Universal Oil Products Company (N47)

HYDROCARBONS

Carbide and Carbon Chemicals Corporation (83-84)

Skelly Oil Company (N2)

Standard Oil Company (Indiana) (127-128)

Universal Oil Products Company (N47)

Velsicol Corporation (N56)

HYDROGEN ION APPARATUS—

See pH Equipment

HYDROXYLAMINES

Carbide and Carbon Chemicals Corporation (83-84)

INDUSTRIAL RESEARCH

Bjorksten Laboratories (67)

Universal Oil Products Company (N47)

INHIBITORS

Alox Corporation (N24)

Carbide and Carbon Chemicals Corporation (83-84)

Commercial Solvents Corporation (87)

D. W. Haering & Co., Inc. (N13-N14)

Universal Oil Products Company (N47)

INSECTICIDES AND BASES

American Cyanamid & Chemical Corporation (N49)

Anderson-Prichard Oil Corporation (N28)

Carbide and Carbon Chemicals Corporation (83-84)

Commercial Solvents Corporation (87)

The Emulsol Corporation (N59)

Hercules Powder Company, Incorporated (70)

Lead Industries Association (10)

Socony-Vacuum Oil Company, Inc. (39)

L. Sonneborn Sons, Inc. (N43)

Standard Oil Company (Indiana) (127-128)

Velsicol Corporation (N56)

Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

INSTRUMENTS, Electrical—

Industrial

American Instrument Company (103)

The Bristol Company (N53-N54)

Brown Instrument Company, Div. of Minneapolis-Honeywell Regulator Co. (N34-N35)

Hart-Moisture-Meters (N46)

Illinois Testing Laboratories, Inc. (N27)

Industrial Instruments, Inc. (26)

Leeds & Northrup Company (156-157-158)

National Technical Laboratories (N41)

Trimount Instrument Co. (N31)

Wheeler Instruments Company (N15)

INSTRUMENTS, Electrical—

Industrial

American Instrument Company (103)

Barnstead Still and Sterilizer Co., Inc. (154)

Brown Instrument Company, Div. of Minneapolis-Honeywell Regulator Co. (N34-N35)

Central Scientific Company (71)

Chicago Apparatus Company (135)

Fisher Scientific Company (78)

Hart-Moisture-Meters (N46)

Industrial Instruments, Inc. (26)

Leeds & Northrup Company (156-157-158)

National Technical Laboratories (N41)

E. H. Sargent & Co. (31)

Schaar and Company (21)

Scientific Glass Apparatus Company (70)

Teel Laboratories (N46)

W. M. Welch Manufacturing Company (46)

Wheeler Instruments Company (N15)

Wilkens Anderson Company (111)

Yarnall-Waring Company (N16)

(Continued on page 334)

INSTRUMENTS, Optical

American Instrument Company (103)

Buehler Ltd. (N44)

Central Scientific Company (71)

Chicago Apparatus Company (135)

Fisher Scientific Company (78)

W. H. Kessel & Co. (N29)

National Technical Laboratories (N41)

E. H. Sargent & Co. (31)

Schaar and Company (21)

(Continued on page 334)

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EXHIBITORS
Classified by Products
CONTINUED

Scientific Glass Apparatus Company (76)
W. M. Welch Manufacturing Company (46)
Wilkens Anderson Company (111)

**INSTRUMENTS, Scientific—
Laboratory**

American Instrument Company (103)
Buehler Ltd. (N44)
Central Scientific Company (71)
Chicago Apparatus Company (135)
Distillation Products, Inc. (138)
Fisher Scientific Company (78)
Hart-Moisture-Meters (N46)
Industrial Instruments, Inc. (26)
W. H. Kessel & Co. (N29)
Leeds & Northrup Company (156-157-158)
Macheth Corporation (N12)
National Technical Laboratories (N41)
Precision Scientific Co. (N25)
Radio Corporation of America (55-56-57-58)
E. H. Sargent & Co. (31)
Schaar and Company (21)
Scientific Glass Apparatus Company (76)
Taylor Instrument Companies (143-144)
Tech Laboratories (N46)
W. M. Welch Manufacturing Company (46)
Wheeleo Instruments Company (N15)
Wilkens Anderson Company (111)

**INSTRUMENTS, Testing—
Industrial**

American Instrument Company (103)
Buehler Ltd. (N44)
Fisher Governor Company (7)
The Foxboro Company (161-162)
Hart-Moisture-Meters (N46)
Industrial Instruments, Inc. (26)
W. H. Kessel & Co. (N29)
Leeds & Northrup Company (156-157-158)
Macheth Corporation (N12)
Mine Safety Appliances Company (N1)
National Technical Laboratories (N41)
Precision Scientific Co. (N25)
Radio Corporation of America (55-56-57-58)
Taylor Instrument Companies (143-144)
Tech Laboratories (N46)
Trimount Instrument Co. (N31)
Wheeleo Instruments Company (N15)

**INSULATING MATERIALS AND
SUPPLIES**

Socony-Vacuum Oil Company, Inc. (39)

ION EXCHANGE EQUIPMENT

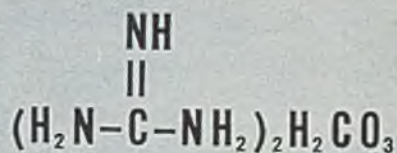
American Cyanamid & Chemical Corporation (N49)
Barnstead Still and Sterilizer Co., Inc. (154)
Central Scientific Company (71)
Chicago Apparatus Company (135)
Fisher Scientific Company (78)
Illinois Water Treatment Company (29)
Infileo Inc. (95)
E. H. Sargent & Co. (31)
(Continued on page 336)

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Guanidine compounds	$\begin{array}{c} \text{NH} \\ \\ \text{H}_2\text{N}-\text{C}-\text{NH}_2 \end{array}$
Guanylurea sulfate	$(\text{H}_2\text{N}-\text{C}(:\text{NH})-\text{NH}-\text{C}(:\text{O})-\text{NH}_2)_2\text{H}_2\text{SO}_4$
Glycolonitrile	$\text{HO}-\text{CH}_2-\text{CN}$
Lactonitrile	$\text{CH}_3-\text{CHOH}-\text{CN}$
Dicyandiamide	$\text{H}_2\text{N}-\text{C}(:\text{NH})\text{NHCN}$
Ethylene cyanohydrin	$\text{HO}-\text{CH}_2-\text{CH}_2-\text{CN}$
Phenyl biguanide hydrochloride	$\begin{array}{c} \text{NH} \quad \text{NH} \\ \quad \\ \text{C} - \text{NH} - \text{C} - \text{NH}_2 - \text{HCl} \end{array}$

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Installation
for
Sewerage
Disposal

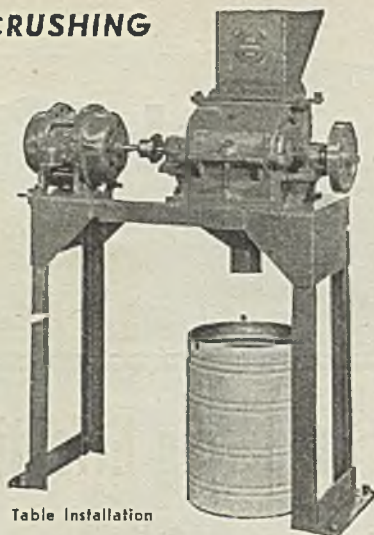


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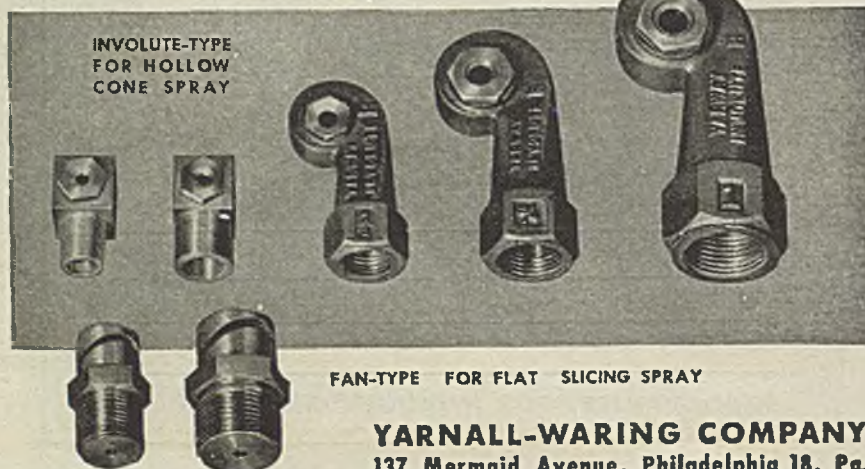
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BOOTH N16
336

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Classified by Products
CONTINUED

- Schaar and Company (21)
Scientific Glass Apparatus Company (76)
W. M. Welch Manufacturing Company (46)
Wilkins Anderson Company (111)
- ION EXCHANGE RESINS**
American Cyanamid & Chemical Corporation (N49)
The Dow Chemical Company (51-52-53-54)
Illinois Water Treatment Company (29)
National Aluminate Corporation (136)
- KETONES**
Alox Corporation (N24)
American Cyanamid & Chemical Corporation (N40)
Carbide and Carbon Chemicals Corporation (83-84)
- KETTLES**
Blaw-Knox Company (N50)
Bullovak Equipment Division of Blaw-Knox Co. (N50)
The Filter Paper Company (108-109)
First Machinery Corp. (N6)
General Ceramics & Steatite Corporation Chemical Equipment Division (114)
Glascote Products, Inc. (77)
Groen Mfg. Co. (N21-22)
Haveg Corporation (94)
Maurice A. Knight (27)
Leader Iron Works, Inc. (110)
Loeb Equipment Supply Co. (24-25)
The Pfaudler Co. (1)
- KILNS**
Blaw-Knox Company (N50)
Loeb Equipment Supply Co. (24-25)
- LABORATORIES, Tesint**
- LABORATORY APPARATUS AND SUPPLIES**
Ace Glass Incorporated (169)
Aetna Scientific Company (168)
American Instrument Company (103)
H. Reeve Angel & Co., Inc. (112)
Barnstead Still and Sterilizer Co., Inc. (154)
Buehler Ltd. (N44)
Central Scientific Company (71)
Chicago Apparatus Company (135)
Chicago Carb-O-Tank Co. (28)
Laboratory & Pharmaceutical Sales Dept., Corning Glass Works (72)
Distillation Products, Inc. (138)
Eppenbach, Inc. (N17)
Ertel Engineering Corp. (47)
Fisher Scientific Company (78)
W. H. Kessel & Co (N29)
Kimble Glass Company (133-134)
The Miskella Infra-Red Company (N30)
National Technical Laboratories (N41)
The Ohio Chemical & Mfg. Co. (N3)
Precision Scientific Co. (N25)
E. H. Sargent & Co. (31)
Schaar and Company (21)
Scientific Glass Apparatus Company (76)
Sparkler Manufacturing Company (19)
Titelflex, Inc. (99-100)
(Continued on page 338)

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See this man
with a plan...
that will improve your
lubrication and cut
maintenance



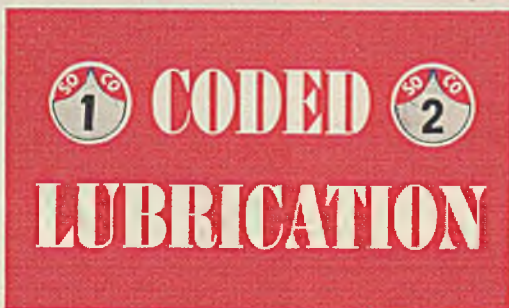
This man is a Standard Oil lubrication engineer. There's one near your plant if you are located in the states shown on the map.

His plan is Standard "Coded Lubrication Service"—a simple system that will help your oilers put the *right* lubricants in the *right* places.

This lubrication engineer will cooperate

with your lubricating men, recommend better lubricants where they are needed, and help solve knotty lubricating problems. He will explain Standard "Coded Lubrication," and show how it can be applied in your plant or fitted into your present lubricating plan.

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STANOIL

FOR 18 YEARS Standard has provided an oil containing additives to reduce oil oxidation and formation of acidity and deposits in turbines.

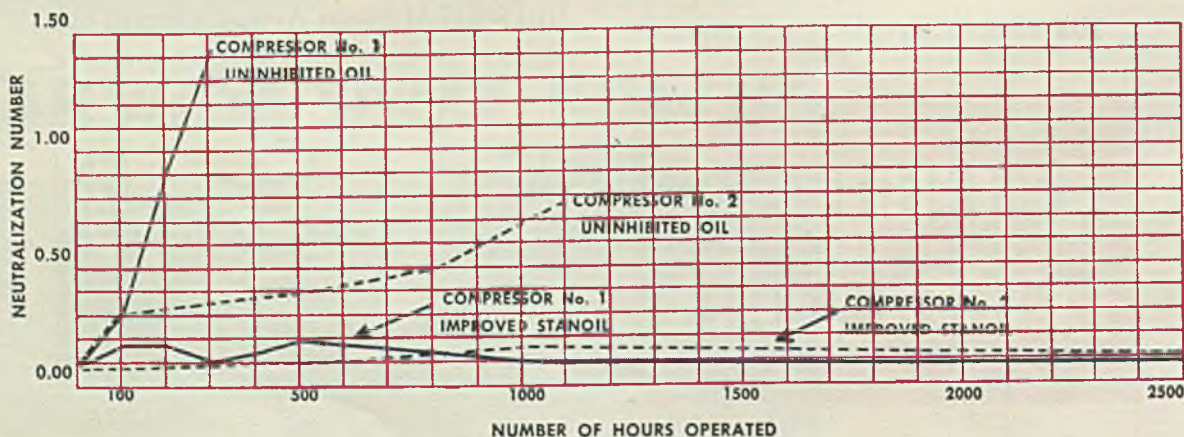
Now Standard has developed and incorporated in Stanoil an additive which improves oxidation resistance for a wide range of industrial applications. Improved Stanoil has been tested under the most severe operating conditions on many types of service: compressors, reduction gears, circulating and hydraulic systems.

Records of one of these severe tests in two compressors are charted below. They show the greatly reduced rate of acidity formation in Improved Stanoil as compared with oils previously used.

Try Improved Stanoil. Compare oil replacement records with the oil you now use in gear cases, circulating and hydraulic systems. Note how Stanoil reduces deposits in compressors.

A Standard Oil Lubrication Engineer will help you make a test. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Engineer nearest you.

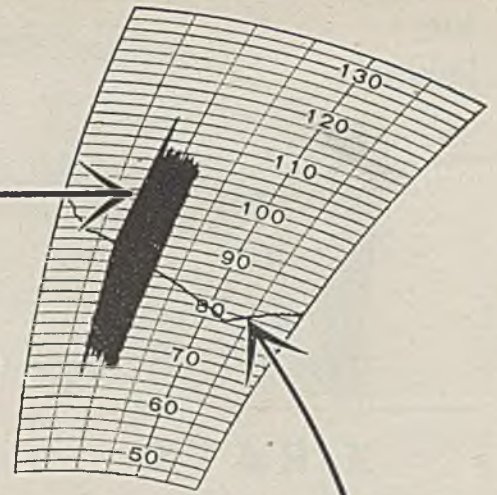
Adverse operating conditions and 24-hour a day operation imposed severe demands on the lubricating oil in two mine compressors. Conventional oil rapidly increased in acidity, as shown by the chart. Improved Stanoil maintained a safe low acidity throughout the 2500 hour test on Compressor No. 1 and for an additional 700 hours on Compressor No. 2 until it was shut down. Make-up was comparable with both oils.



STANDARD OIL COMPANY (INDIANA)

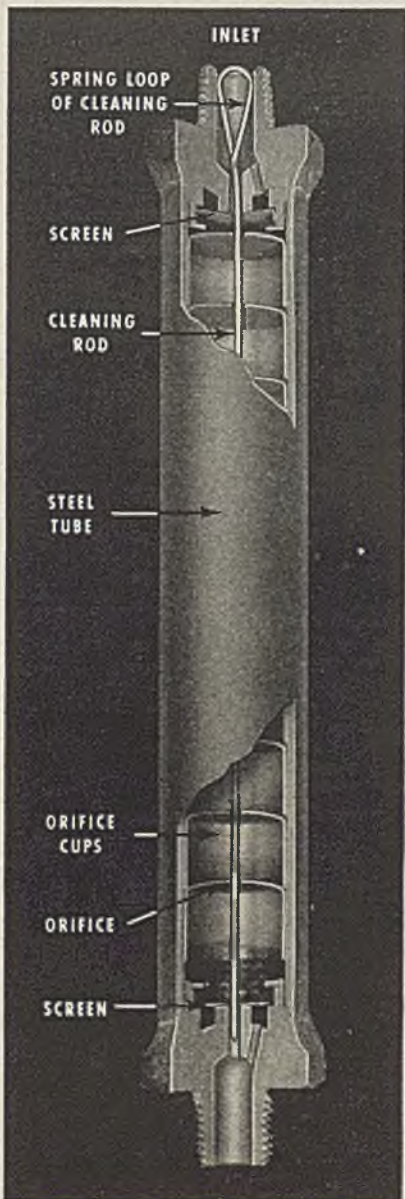
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Install it in the line just ahead of the instrument on gas or liquid service. Permits the measuring instrument to make a clean-cut, easy to interpret pressure record. In fact, enables you to apply instruments where it would otherwise be impractical. It's another example of the ingenuity of our engineers in helping you solve difficult processing problems.

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 and liquid level.*

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Physicist, Research Laboratories Division,
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- types of x-ray tubes
- artificial radioactivity or induced radioactivity
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- selection of the best radiographic equipment for the type of work to be done
- crystal lattice and the law of rational indices
- the mechanism of x-ray diffraction
- various methods of crystal analysis
- chemical analysis by x-ray diffraction
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- back-reflection technique used for strain and stress measurement
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The U. S. Stoneware Co. (61-62)
W. M. Welch Manufacturing Company (46)
Wilkins Anderson Company (111)

LABORATORY FURNITURE

Bjorksten Laboratories (67)
Fisher Scientific Company (78)
Kewaunee Manufacturing Company (N26)
Laboratory Furniture Co., Inc. (20)
Leonard Peterson & Co., Inc. (118)
Schaar and Company (21)

LACQUERS AND BASES

Atlas Powder Co. (126)
Chamberlain Engineering Corporation (163)
Hercules Powder Company, Incorporated (70)
The U. S. Stoneware Co. (61-62)

LININGS, Corrosion Resistant

American Hard Rubber Company (6)
Chicago Carb-O-Tank Co. (28)
F. M. deBeers & Associates (115)
Glascote Products, Inc. (77)
O. G. Kelley & Company (N37)
Maurice A. Knight (27)
Lead Industries Association (10)
National Carbon Co., Inc. (85-86)
The Pfandler Co. (1)
Process Equipment Corporation (N23)
The U. S. Stoneware Co. (61-62)

LUBRICANT ADDITIVES

Alox Corporation (N24)
American Cyanamid & Chemical Corporation (N49)
Carbide and Carbon Chemicals Corporation (83-84)
W. A. Cleary Corporation (116)
Commercial Solvents Corporation (87)
Foote Mineral Company (159-160)
Standard Oil Company (Indiana) (127-128)

LUBRICANTS

Alox Corporation (N24)
Bjorksten Laboratories (67)
Carbide and Carbon Chemicals Corporation (83-84)
Foote Mineral Company (159-160)
Skelly Oil Company (N2)
Socony-Vacuum Oil Company, Inc. (39)
Standard Oil Company (Indiana) (127-128)

MAGNESIUM AND ALLOYS

The Dow Chemical Company (51-52-53-54)
Hills-McCanna Company (113)

MANITOL AND DERIVATIVES

Atlas Powder Co. (126)

MANOMETERS, INDUSTRIAL

Brown Instrument Company, Div. of Minneapolis-Honeywell Regulator Co. (N34-N35)
Taylor Instrument Companies (143-144)
Trimount Instrument Co. (N31)

MATERIALS HANDLING EQUIPMENT

Automatic Transportation Company (106)
Ertel Engineering Corp. (47)
The Filter Paper Company (108-109)

B. F. Gump Co (22-23)
Link-Belt Company (101-102)
Marsh Stencil Machine Company (120)
The Moto True Company (N8)
National Engineering Company (129-130)

METALLURGICAL RESEARCH

Crucible Steel Company of America (17)

METALS AND ALLOYS

The Carpenter Steel Company
Crucible Steel Company of America (17)
The Dow Chemical Company (51-52-53-54)
Foote Mineral Company (159-160)
Haynes Stellite Company (81-82)
O. G. Kelley & Company (N37)
Lead Industries Association (10)
Michigan Steel Casting Company (146)
The U. S. Stoneware Co. (61-62)

METERS, Indicating and Recording—Industrial

American Instrument Company (103)
The Bristol Company (N53-N54)
Brown Instrument Company, Div. of Minneapolis-Honeywell Regulator Co. (N34-N35)
Distillation Products, Inc. (138)
The Filter Paper Company (108-109)
The Foxboro Co. 161-162
Hart-Moisture-Meters (N46)
Illinois Testing Laboratories, Inc. (N27)
Industrial Instruments, Inc. (26)
Leeds & Northrup Company (156-157-158)
Mine Safety Appliances Company (N1)
Moore Products Co. (137)
National Technical Laboratories (N41)
Milton Roy Company (5)
Taylor Instrument Companies (143-144)
Trimount Instrument Co. (N31)
Wheeler Instruments Company (N15)
Yarnall-Waring Company N16

MILLS—See Crushers

MIXERS, Industrial

Chicago Pump Company (63)
Eppenbach, Inc. (N17)
Ertel Engineering Corp. (47)
The Filter Paper Company (108-109)
First Machinery Corp (N6)
The W. J. Fitzpatrick Company (89-90)
B. F. Gump Co. (22-23)
Loeb Equipment Supply Co. (24-25)
Metal-Glass Products Co. (15-16)
National Engineering Company (129-130)
The Pfandler Co. (1)
The U. S. Stoneware Co., (61-62)

MOLYBDENUM AND ALLOYS

NITRATES AND NITRITES

Atlas Powder Co. (126)

NITROHYDROXY COMPOUNDS

Carbide and Carbon Chemicals Corporation (83-84)

NITRATES

(Continued on page 340)

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The INDOPOLS are synthetic high molecular weight mono-olefins. They are light in color—stable—compatible with waxes, natural and synthetic rubbers, solid polybutenes, etc.—miscible with hydrocarbon and chlorinated hydrocarbon solvents—miscible with many ethers and esters—insoluble in the lower alcohols and ketones. Uses include electrical insulating compositions, adhesive products, coating and laminating compositions for paper and other films.

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Mean molecular weight	330	780	940
Viscosity S.U. seconds			
at 100°F.	114	—	—
at 210°F.	40.6	942	3330
Specific gravity 60°/60°F.	.831	.881	.894
Refractive index (20/d)	1.4655	1.4918	1.4959
Color, N.P.A.	2	2	3
Pour point (ASTM)°F.	-65	+20	+35
Weight, lbs./U.S. gallon	6.92	7.34	7.44

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STANDARD OIL COMPANY (INDIANA)

CHEMICAL PRODUCTS DEPARTMENT • 910 SO. MICHIGAN AVENUE, CHICAGO 80, ILLINOIS

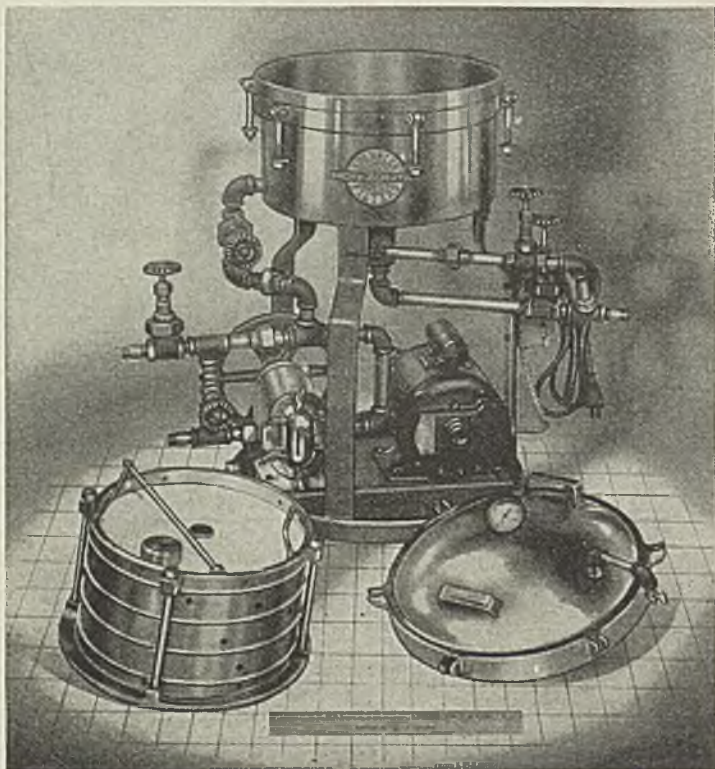


Take a Step up
in

**QUALITY
PRODUCTION**

**HOW? By FILTERING LIQUIDS THE
SPARKLER "Horizontal Plate" WAY**

**DEMONSTRATED AT BOOTH 19
NATIONAL CHEMICAL EXPOSITION
CHICAGO COLISEUM, SEPT 10-14TH**



and—EXPECT YOUR PRODUCTS TO HAVE

maximum clarity, brilliance and purity— at low cost.

SPARKLER FILTERS, with built-in Patented Scavenger Plate, provide—

FAST FLOW RATES. Uniform cake; ample freeboard for run-off of filtrate.

LONG CYCLES—Cake stability even during intermittent operation.

COMPLETE BATCH FILTRATION. Cakes may be blown dry; no unfiltered residue.

EASY CLEANING. No cloths to wash. Low Operating Cost.

*Write for information giving
product and capacity desired.*

**SPARKLER
MANUFACTURING CO.**

236 LAKE STREET MUNDELEIN, ILLINOIS



EXHIBITORS

Classified by Products
CONTINUED

NITROPARAFFINS

Commercial Solvents Corporation
(87)

OIL ADDITIVES

Alox Corporation (N24)
American Cyanamid & Chemical Corporation (N49)
W. A. Cleary Corporation (116)
Standard Oil Company (Indiana)
(127-128)

OILS

Alox Corporation (N24)
American Cyanamid & Chemical Corporation (N49)
Bjorksten Laboratories (87)
Skelly Oil Company (N2)
Socony-Vacuum Oil Company, Inc. (39)
L. Sonneborn Sons, Inc. (N43)
Standard Oil Company (Indiana)
(127-128)
Velsicol Corporation (N56)

OLEFIN OXIDES

Carbide and Carbon Chemicals Corporation (83-84)

OXALIC ACID AND OXALATES

American Cyanamid & Chemical Corporation (N49)
Victor Chemical Works (41-42-43)

PACKAGING EQUIPMENT AND SUPPLIES

Atlas Powder Co. (126)
B-B-Shipping Room Supply Co. (121)
Bemis Bro. Bag Co. (37-38)
Bjorksten Laboratories (87)
Chicago Carb-O-Tank Co. (28)
The Davison Chemical Corporation (64-65-66)
Durametallic Corp. (119)
Ertel Engineering Corp. (47)
The Filter Paper Company (108-109)
First Machinery Corp. (N6)
The W. J. Fitzpatrick Company (89-90)
B. F. Gump Co. (22-23)
Hercules Powder Company, Incorporated (70)
Loeb Equipment Supply Co. (24-25)
Marsh Stencil Machine Company (120)
The Master Package Corporation (104)
New Jersey Machine Corp. (N48)
The Pfaudler Co. (1)
St. Regis Sales Corporation, Sales Subsidiary of St. Regis Paper Company (92-93)

PAINTS

Atlas Powder Co. (126)
Chamberlain Engineering Corporation (163)
Hercules Powder Company, Incorporated (70)
Maurice A. Knight (27)
Lead Industries Association (10)
Socony-Vacuum Oil Company, Inc. (39)
L. Sonneborn Sons, Inc. (N43)
The U. S. Stoneware Co. (61-62)

(Continued on page 342)

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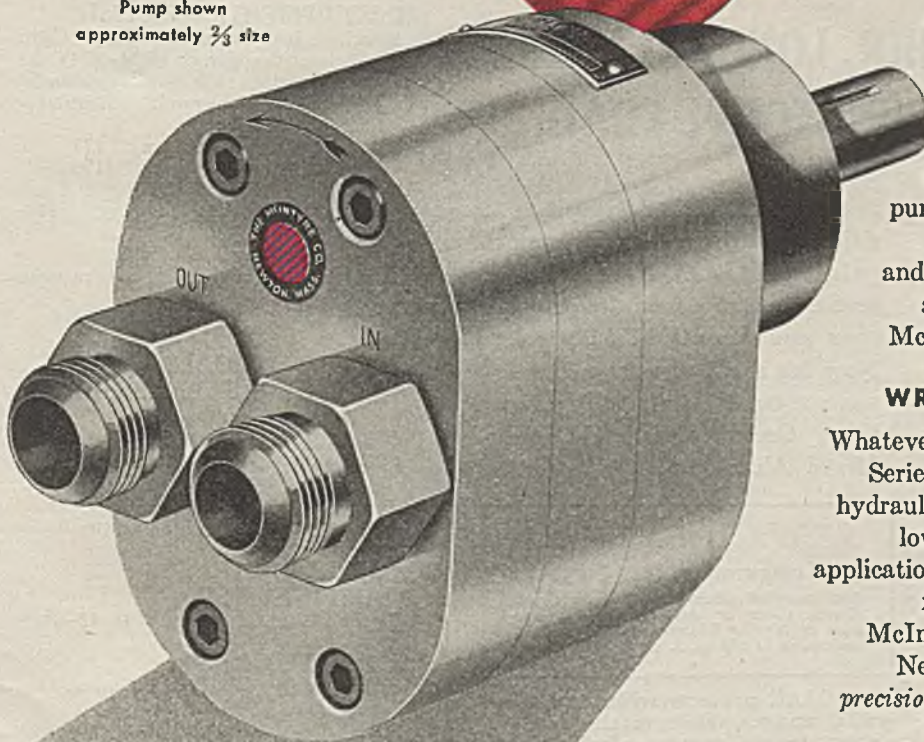
HOW TO GET *Efficient* HYDRAULIC POWER FROM A 6-POUND SPUR GEAR PUMP

... even at 1000 psi

FOR APPLICATIONS LIKE THESE:

Materials handling equipment ... farm machinery ... machine tools ... oil-well sampling ... remote valve control ... power transmission ... and low-capacity, high-pressure circulating and delivery functions.

Pump shown
approximately $\frac{3}{8}$ size



SPECIFY McINTYRE SERIES 700 HIGH-PRESSURE POWER PUMPS

Delivering from .4 gpm at 200 rpm to 9.6 gpm at 1750 rpm against pressures up to 1000 psi, McIntyre Series 700 Precision Pumps offer you the benefits of a minimum tested volumetric efficiency of 90% and an average mechanical efficiency of 80% ... ratings just recently made possible in pumps of this type.

McINTYRE PRECISION DOES IT

McIntyre mass-production machining methods are *capable of making surfaces flat to one light band and holding vital dimensions to toolroom tolerances of tenths and split tenths.* That's why the close fit of the aluminum body castings and nitrided nitralloy gears of these pumps keep slippage and wear at a minimum. And that's why more and more firms are specifying pumps and fluid motors carrying the red McIntyre Light-Band Trade-Mark.

WRITE FOR COMPLETE DATA

Whatever your possible use for McIntyre Series 700 High-Pressure Pumps—for hydraulic power, pressure lubrication, or low-capacity circulation or transfer applications—you'll want to study all the facts. Write for them today. The McIntyre Co., 600 Riverdale Avenue, Newton 58, Mass. ... also makers of precision spur gears to your specifications.

THE McINTYRE CO.

PUMPS AND FLUID MOTORS

THE ULTIMATE IN PRECISION

IDENTIFIED BY THE LIGHT BAND



NOW...A TOUGHER, LONGER-LASTING LOW-COST PROTECTIVE COATING

NEOLAC armor coats metal, wood and concrete against acids, alkalis, water, alcohol AND AGE. For, when NEOLAC dries, it leaves a tough film of pure plastic impervious to fumes and weather. NEOLAC is *non-oxidizing* . . . resists crazing and checking; puts up an air-tight defense against corrosion.

- LOW ORIGINAL COST
- GALLON COVERS 450 SQ. FEET
- NO PRIMER NEEDED . . .
2 COATS AMPLE
- LEAVES NO SKIN IN
CAN . . . NO WASTE
- EXTREMELY LOW PERMEABILITY
- RESISTS HEAT UP TO 265° F

NEOLAC brushes on easily . . . dries quickly, even over most painted surfaces. And the most severe tests forecast *longer life than any known oil-base paint*. Now it's ready to cut your maintenance costs. Available in Black, Gray, Green, Clear and Ready-Mixed Aluminum.

SPECIAL Introductory Offer for Comparative Test Purposes

One quart of either Neolac Black, Gray, Green, Clear or Aluminum, plus one pint of Neolac Thinner, \$2.80 prepaid anywhere in the U. S. A.

NEOLAC protects structural steel, walls, bridges, tanks, machinery, elevators, fences, cement blocks, brick, stone . . . most everything.

CHAMBERLAIN ENGINEERING CORPORATION

5000 BRIMFIELD RD., AKRON 9, OHIO

EXHIBITORS Classified by Products CONTINUED

PAPER AND PAPER PRODUCTS

American Cyanamid & Chemical Corporation (N49)
Bemis Bro. Bag Co. (37-38)
The Filter Paper Company (108-109)
Hercules Powder Company, Incorporated (70)
The Master Package Corporation (104)
St. Regis Sales Corporation, Sales Subsidiary of St. Regis Paper Company (92-93)

PAPER AND PULP MACHINERY

F. M. deBeers & Associates (115)
Hart-Moisture-Meters (N46)
The La Bour Company, Inc. (145)
Productive Equipment Corp. (N39)
Simplicity Engineering Company (75)
A. O. Smith Corporation (30)

PETROLEUM PRODUCTS

Alox Corporation (N24)
Anderson-Prichard Oil Corporation (N28)
Carbide and Carbon Chemicals Corporation (83-84)
Skelly Oil Company (N2)
Socony-Vacuum Oil Company, Inc. (39)
L. Sonneborn Sons, Inc. (N43)
Standard Oil Company (Indiana) (127-128)
Universal Oil Products Company (N47)

pH EQUIPMENT, Industrial

American Instrument Company (103)
The Bristol Company (N64-N64)
Brown Instrument Company, Div. of Minneapolis-Honeywell Regulator Co. (N34-N35)
Central Scientific Company (71)
The Filter Paper Company (108-109)
W. H. Kessel & Co. (N29)
Leeds & Northrup Company (156-157-158)
Macheth Corporation (N12)
National Technical Laboratories (N41)
Milton Roy Company (5)

PHARMACEUTICALS—

See Chemicals, Pharmaceutical

PHENOLS

American Cyanamid & Chemical Corporation (N49)
Oronite Chemical Company (N9)
Reichhold Chemicals, Inc. (50)

PHOSPHORUS AND DERIVATIVES

Victor Chemical Works (41-42-43)

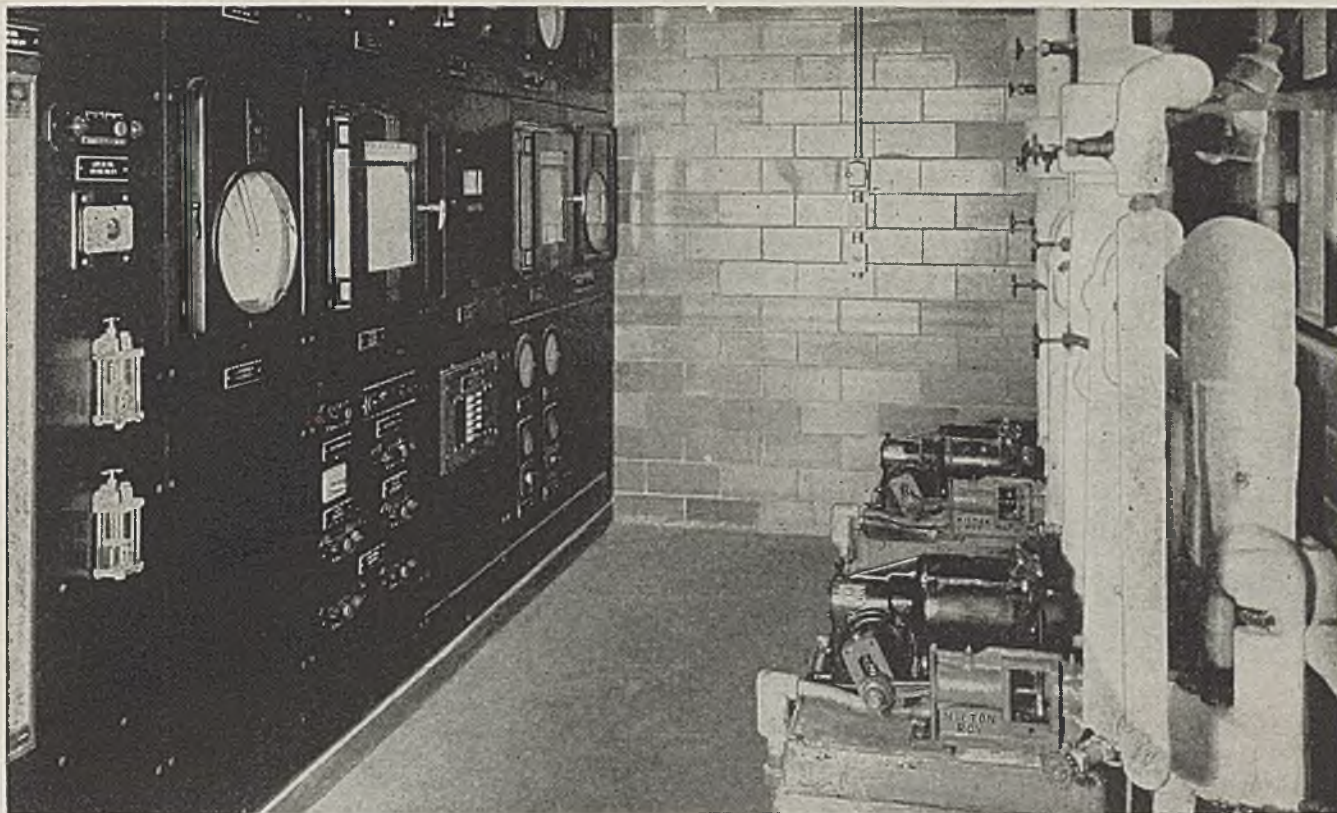
PHTHALATES

American Cyanamid & Chemical Corporation (N49)
Carbide and Carbon Chemicals Corporation (83-84)
Oronite Chemical Company
Reichhold Chemicals, Inc. (50)

PIGMENTS

American Cyanamid & Chemical Corporation (N49)
Lead Industries Association (10)
Reichhold Chemicals, Inc. (50)
(Continued on page 344)

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Automatic ratio control of molten naphthalene to air flow in the continuous processing of phthalic anhydride . . . a successful continuous process made possible by automatically controlled Milton Roy Pumps.

Consider!

Automatic Chemical Feed Systems

You can eliminate the inaccuracies and disadvantages of "slug feeds" based on a "history of flow" which are inherent in many proportioning systems.

Milton Roy Chemical Pumps are now available with positive, fully automatic speed regulation which will not vary more than 1% plus or minus with a voltage variation of 5% plus or minus. This speed regulation is effected by means of an electronic system. It is made possible by reason of Milton Roy step-valve design, the capacity of the pump always being directly proportional to the speed of operation.

We are prepared to supply complete feed systems, with meters, control panels, pumps and electronic con-

trollers . . . for proportioning treating chemicals to water flow, for pH control, for chemical processing applications such as shown above, etc.

The system is readily applicable wherever temperature, pressure, conductivity, liquid level or any other variable can be metered to set a potentiometer for pump speed control.

Inquiries are invited.

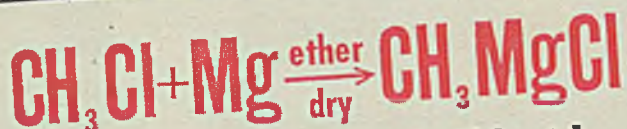
Discuss Automatic Chemical Feed Systems with us at the Chicago Chemical Show, September 10-14, at Booth No. 5.

MILTON **Roy** COMPANY



1322 E. Mermaid Ave., Chestnut Hill • Philadelphia 18, Pa.

A Low Cost GRIGNARD REAGENT



with **ANSUL Methyl Chloride**

YIELDS—Excellent, better than 90%.

REACTION—Proceeds smoothly, rapidly, and is easily controlled. Can be carried on at atmospheric pressure and slightly above room temperature.

APPARATUS—Simple and inexpensive.

ANSUL CH₃Cl—Now a low cost chemical due to greatly expanded production facilities.

MAGNESIUM—Readily available and now relatively inexpensive.

CONCLUSIONS—Excellent yield, smooth reaction, inexpensive methyl chloride and magnesium... make a Low Cost Grignard Reagent.

PHYSICAL PROPERTIES

Chemical formula.....	CH ₃ Cl
Molecular weight.....	50.491
Color (gas or liquid).....	Colorless
Odor.....	Ethereal, non-irritating
Melting point.....	-144° F. (-97.6° C.)
Boiling point.....	-10.65° F. (-23.7° C.)
Critical temperature.....	289.6° F. (143.1° C.)
Critical pressure.....	.962.2 lbs. per sq. in. abs.
Solubility.....	Methyl chloride in water—3 to 4 volumes methyl chloride vapor in 1 volume of water at ordinary temperatures and atmospheric pressure—methyl chloride in alcohol—readily soluble
Specific gravity of liquid.....	.909

Send for Bulletin No. 900

"Preparing Methyl Grignard Reagent with Methyl Chloride"... and for "Liquid Methyl Chloride"—a treatise on the properties and general handling of Ansul Methyl Chloride.

*REG. U. S. PAT. OFF.



ANSUL CHEMICAL COMPANY
INDUSTRIAL CHEMICALS DIVISION, MARINETTE, WIS.
Eastern Office: 60 E. 42nd St., New York City

EXHIBITORS

Classified by Products
CONTINUED

PILOT PLANT EQUIPMENT

- Blaw-Knox Company (N50)
- Bulovak Equipment Division of Blaw-Knox Co. (N50)
- F. M. deBeers & Associates (115)
- Eppenbach, Inc. (N17)
- Ertel Engineering Corp. (47)
- The W. J. Fitzpatrick Company (89-90)
- General Ceramics & Steatite Corporation Chemical Equipment Division (114)
- Glascote Products, Inc. (77)
- Haveg Corporation (94)
- Maurice A. Knight (27)
- Leader Iron Works, Inc. (110)
- Moore Products Co. (137)
- National Engineering Company (129-130)
- The Pfandler Co. (1)
- Resisto Pipe & Valve Company (N36)
- Milton Roy Company (5)
- Selas Corporation of America (88)
- Sparkler Manufacturing Company (19)

PIPE—See Fittings

PLANT LOCATIONS

- Alabama Power Company (N42)
- Department of Water and Power (N55)
- Pacific Northwest (N10-N11)

PLASTICIZERS

- Alox Corporation (N24)
- American Cyanamid & Chemical Corporation (N49)
- Atlas Powder Co. (126)
- Blaw-Knox Company (N50)
- Carbide and Carbon Chemicals Corporation (83-84)
- The Dow Chemical Company (51-52-53-54)
- The Emulsol Corporation (N59)
- Hercules Powder Company, Incorporated (70)
- Reichhold Chemicals, Inc. (50)
- Socony-Vacuum Oil Company, Inc. (39)
- Standard Oil Company (Indiana) (127-128)
- Victor Chemical Works (41-42-43)

PLASTICS

- American Hard Rubber Company (8)
- Bjorksten Laboratories (67)
- F. M. deBeers & Associates (115)
- The Dow Chemical Company (51-52-53-54)
- Haveg Corporation (94)
- Hercules Powder Company, Incorporated (70)
- St. Regis Sales Corporation, Sales Subsidiary of St. Regis Paper Company (92-93)
- The U. S. Stoneware Co. (61-62)

PLASTICS, Chemicals and Resins

- Atlas Powder Co. (126)
 - Carbide and Carbon Chemicals Corporation (83-84)
 - The Dow Chemical Company (51-52-53-54)
 - Hercules Powder Company, Incorporated (70)
 - Reichhold Chemicals, Inc. (50)
 - The U. S. Stoneware Co. (61-62)
- (Continued on page 346)

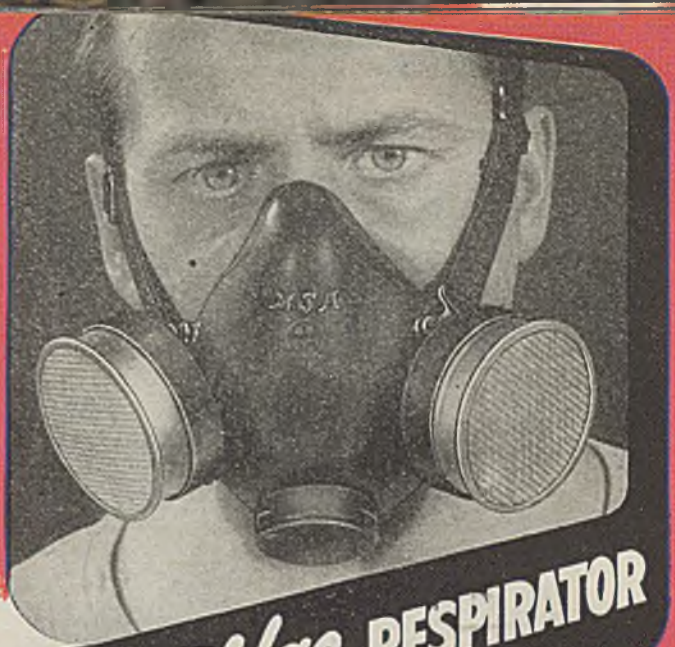
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Approved

Under New U. S. Bureau of Mines Schedule

Now Available

by **MSA**



The **NEW** MSA Chemical Cartridge RESPIRATOR

with

NEW FLOATING-CUSHION FACEPIECE

NEW GUARDED EXHALATION VALVE

NEW LONG-LIFE FILTER CARTRIDGES

NEW EASY FIT ON ANY FACE

NEW COMFORT ON THE JOB

Safety engineers, long concerned with respiratory hazards to workers from light but harmful concentrations of organic vapors, will welcome this new M.S.A. Chemical Cartridge Respirator—officially approved by the U. S. Bureau of Mines! Now, approved protection is available against benzene, acetone, carbon tetrachloride, alcohol, ether, formaldehyde, toluene, gasoline, petroleum distillates and other hazards—joined with advanced new comfort, easy fit, balance, and simplicity of cleaning and maintenance. *Write for the descriptive details.*

FOR PROTECTION IN:

- DEGREASING OPERATIONS
- GENERAL USE OF SOLVENTS
- PAINT REMOVERS and
- THINNERS, ETC.

Floating-cushion flexible facepiece has soft rolled edge forming a wide area of contact around the face and assuring quick gas-tight fit. Unique nose strap provides automatic adjustment of facepiece across the nose.



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DISTRICT REPRESENTATIVES IN PRINCIPAL CITIES

IN CANADA: MINE SAFETY APPLIANCES COMPANY OF CANADA, LIMITED

TORONTO . . . MONTREAL . . . CALGARY . . . VANCOUVER . . . NEW GLASGOW, N. S.



ARE YOU PULLING THE WOOL OVER YOUR EYES

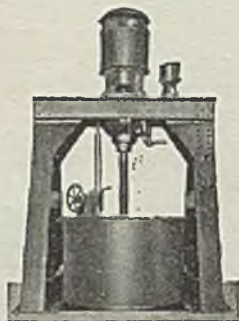


about the efficiency
of your equipment?

Could you be getting better results in less time, at a lower cost? Would up-to-date equipment facilitate your research, cut down production costs and improve your product?

Consider your present equipment, then consider the features of the new Fletcher centrifugals. They are sturdily constructed of the finest materials, fabricated to best suit individual requirements. They have larger baskets, therefore greater capacity; faster loading and unloading; increased speed in acceleration and braking, and Centroid Speed Control (an exclusive Fletcher development) for a slow unloading speed of 50 RPM. Stable, vibrationless operation; safety factors for operative confidence. Available in complete or unit installations.

Fletcher Engineering Consultation Available.



FLETCHER CENTRIFUGALS

Engineering consultation available . . . Send for Catalog.

FLETCHER WORKS, 235 GLENWOOD AVE., PHILADELPHIA 40, PA.



1. TAKE A LOOK AT YOUR PRESENT LABORATORY . . .

If it's cluttered with inefficient furniture . . .

2. TAKE A LOOK AT YOUR PRODUCTION FIGURES . . .

They may show you where you are wasting money in your laboratory: Then . . .

3. TAKE A LOOK AT KEWAUNEE MATCHING STREAMLINED UNITS . . .

Designed and built by Kewaunee for top efficiency and convenience.

Units are mass-produced, entirely by Kewaunee, in standard dimensions and finishes for perfect matching. Simply select individual Kewaunee units and combine them. Result—a "custom-built" laboratory at a ready-made price. Kewaunee metal furniture is Bonderized after fabrication for protection of finish. Working surfaces are of KemROCK for defiant resistance to acids, alkalis, solvents, physical and thermal shock. So why not "take 3 looks" today? Then write . . .

INDUSTRIAL DIVISION

Kewaunee Mfg. Co.

C. G. Campbell, President

5018 South Center Street, Adrian, Mich.

Representatives in Principal Cities

BOOTH N26

346

EXHIBITORS

Classified by Products
CONTINUED

PLASTICS PROCESSING EQUIPMENT

Blaw-Knox Company (N50)
The W. J. Fitzpatrick Company (89-90)
Groen Mfg. Co. (N21-N22)
Loeb Equipment Supply Co. (24-25)
The Miskella Infra-Red Company (N30)
The Pfandler Co. (1)

PLASTICS, Tubing and Shapes

American Hard Rubber Company (6)
The Dow Chemical Company (51-52-53-54)
Haveg Corporation (94)
The U. S. Stoneware Co. (61-62)

POLISHING AGENTS

Victor Chemical Works (41-42-43)

POLYBUTENES

Oronite Chemical Company (N9)
Standard Oil Company (Indiana) (127-128)
Universal Oil Products Company (N47)

PORCELAIN, Industrial—See Ceramic and Porcelain Equipment

PREHEATERS—See Heaters

PRESSES, Industrial

Defiance Machine Works, Inc. (2)
The Filter Paper Company (108-109)
Loeb Equipment Supply Co. (24-25)
The Pfandler Co. (1)

PROPORTIONING EQUIPMENT

B. F. Gump Co. (22-23)
D. W. Haering & Co., Inc. (N13-N14)
Hills-McCanna Company (113)
Infilco, Inc. (95)
Marco Company, Inc. (N58)
The McIntyre Co. (13-14)
Milton Roy Company (5)

PUBLICATIONS

Chemical Industries (68-69)
Chemical & Metallurgical Engineering (96)
Food Industries (96)
McGraw-Hill Publishing Co. (96)
Putman Publishing Company (59)
Reinhold Publishing Corporation (9)
Socony-Vacuum Oil Company, Inc. (39)
Standard Oil Company (Indiana) (127-128)

PULVERIZERS—See Crushers


PUMPS, Industrial

American Hard Rubber Company (6)
Central Scientific Company (71)
Chicago Carb-O-Tank Co. (28)
Chicago Pump Company (63)
Distillation Products, Inc. (138)
Ertel Engineering Corp. (47)
The Filter Paper Company (108-109)
First Machinery Corp. (N6)
General Ceramics & Steatite Corporation Chemical Equipment Division (114)
Graham Manufacturing Co., Inc. (N45)
D. W. Haering & Co., Inc. (N13-N14)

(Continued on page 348)

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**IT'S GOT TO BE GOOD
TO CARRY THIS MARK**

Sivyer steel castings have to earn the right to wear this mark  —the Sivyer diamond. They have to prove they're the kind of castings that will deliver long service . . . trouble-free, money-saving service. For only after passing Sivyer's rigid examination and tests do they go to you.

In addition to perfect castings . . . castings of greater integrity of metal . . . Sivyer castings also are finished to a greater degree. In size, shape and contour, they are blueprint accurate. This means less processing . . . less handling on your part.

These two benefits are yours when you specify Sivyer Castings that get on the job *faster* and stay there *longer*.

VISIT US AT THE NATIONAL
CHEMICAL EXPOSITION
BOOTH 107

SIVYER STEEL
CASTING COMPANY
MILWAUKEE  CHICAGO 



SIVYER STEEL CASTINGS

**SOMETHING NEW
HAS
BEEN ADDED**

Kieley & Mueller
presents

KONTROL MOTOR

Diaphragm Motor Valves
Pressure Regulators
Pump Governors

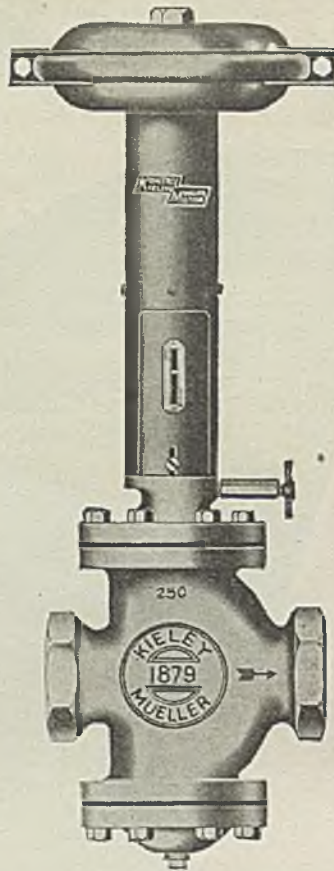
featuring

- **All Steel Diaphragm Motor Unit . . .**
lighter, tougher, stronger, more durable
- **Boltless "Duoseal" Diaphragm Casing . . .**
tight sealing, quick acting clamp ring; molded highly flexible neoprene diaphragm
- **Steel Tubular Yoke . . .**
enclosing long heat-treated, cadmium plated spring; packing gland and spring adjustment accessible through door
- **Valve Position Indicator . . .**
standard equipment; no extra charge
- **High Capacity Valve Bodies . . .**
unrestricted flow areas, smooth flow; available in bronze, semi-steel, cast steel, and special alloys
- **Superfinished Disc Guides . . .**
top and bottom guided Bevel, Percentage V Port, and Parabolic discs; minimum friction, increased life
- **Modern Design . . .**
to meet modern process requirements for better control

Write now for bulletin on the revolutionary KONTROL MOTOR valves.

**KONTROL
KIELEY & MUELLER
MOTOR**

KIELEY & MUELLER, INC., NORTH BERGEN, NEW JERSEY



EXHIBITORS Classified by Products CONTINUED

Haveg Corporation (94)
Hills-McCanna Company (113)
The Johnson Corporation (35-36)
The La Bour Company, Inc. (145)
Lead Industries Association (10)
Loeb Equipment Supply Co. (24-25)
Marco Company, Inc. (N58)
The McIntyre Co. (13-14)
National Carbon Co., Inc. (85-86)
Resisto Pipe & Valve Company (N36)
Robbins & Myers, Inc. (142)
Milton Roy Company (5)
A. O. Smith Corporation (30)
Tri-Clover Machine Co. (12)
W. M. Welch Manufacturing Company (46)

PYROMETERS, Industrial

The Bristol Company (N53-N54)
Brown Instrument Company, Div. of
Minneapolis - Honeywell Regulator
Co. (N34-N35)
Buehler Ltd. (N44)
The Foxboro Company (161-162)
Illinois Testing Laboratories, Inc.
(N27)
Leeds & Northrup Company (156-
157-158)
Wheelco Instruments Company (N15)

REAGENT CHEMICALS

Chicago Apparatus Company (135)
Fisher Scientific Company (78)
Mallinckrodt Chemical Works (18)
E. H. Sargent & Co. (31)
Schaar and Company (21)
Scientific Glass Apparatus Company
(76)
W. M. Welch Manufacturing Company (46)
Wilkins Anderson Company (111)

RECORDING INSTRUMENTS— See Meters

REFRACTORIES

National Carbon Co., Inc. (85-86)
Selas Corporation of America (88)

REFRIGERATING EQUIPMENT

Armstrong Steam Trap Company
(34)
F. M. deBeers & Associates (115)
Graham Manufacturing Co., Inc.
(N45)

REGULATORS, Pressure

The Bristol Company (N53-N54)
Brown Instrument Company, Div. of
Minneapolis - Honeywell Regulator
Co. (N34-N35)
Fisher Governor Company (7)
The Foxboro Company (161-162)
Kieley & Mueller, Inc. (155)
Leeds & Northrup Company (156-
157-158)
The Matheson Co., Inc. (166)
Moore Products Co. (137)
The Ohio Chemical & Mfg. Co. (N3)
Taylor Instrument Companies (143-
144)

REGULATORS, Temperature

American Instrument Company (103)
The Bristol Company (N53-N54)
Brown Instrument Company, Div. of
Minneapolis - Honeywell Regulator
Co. (N34-N35)
The Foxboro Company (161-162)
Moore Products Co. (137)

(Continued on page 350)

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Here at Buflovak you will find modern equipment to study and test your new process, at savings to you!

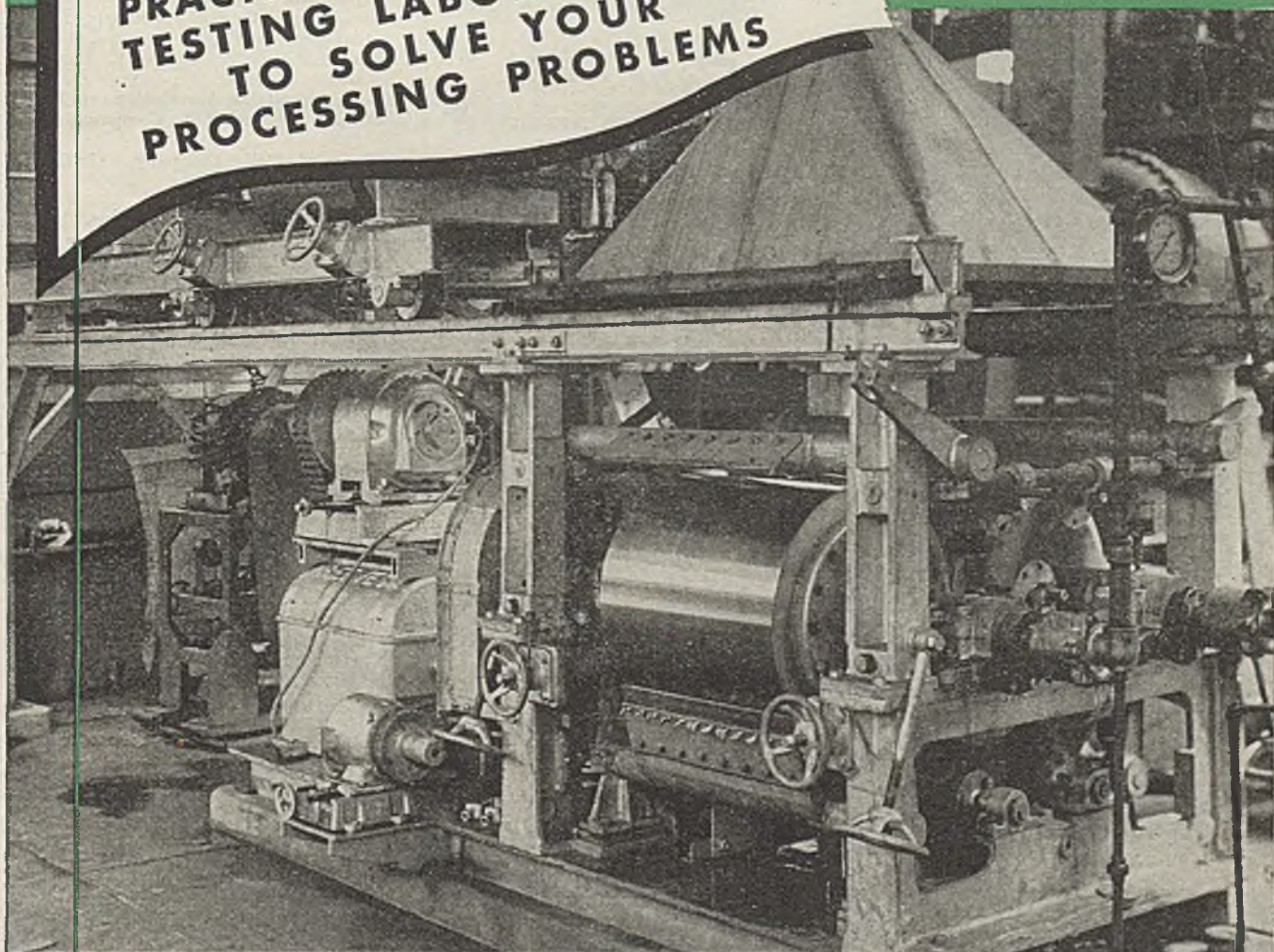
Here practical research is employed in the solution of processing problems involving chemical and drying, food processing, evaporation, extraction, impregnation, solvent recovery, and crystallization. Modern testing units will quickly show you the commercial possibilities of a contemplated process, with data on production costs, capacity, and the characteristics of the finished product.

These tests safeguard your investment in Buflovak Equipment by showing unmistakably, at the start, what will be obtained from a given process. *It is your assurance of the most efficient type of equipment!*

Buflovak makes Chemical Plant and Food Processing Equipment, Dryers, Evaporators, Solvent Recovery and Distillation Equipment. Write to us. There's no obligation to you in having us make tests, and you will quickly know the value of a new process. Buflovak offers many savings.

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PRACTICAL RESEARCH AND
TESTING LABORATORIES
TO SOLVE YOUR
PROCESSING PROBLEMS

See our exhibit at the
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Sept. 10, Sept. 14, 1946
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Booth 50-51



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BUFFALO 11, N. Y.

*Built up to a standard
not down to a price*



- **STAINLESS STEEL**
(WE SPECIALIZE IN TYPE 316)
- **HASTELLOY**
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- **INCONEL**

Type 316

WE SPECIALIZE IN TYPE 316
VALVES AND FITTINGS

HASCO "Superior"

STAINLESS STEEL VALVES and FITTINGS

For many years Hasco "Superior" Alloy Valves and Fittings have been the choice of discriminating buyers in the Paper—Chemical—Oil and Rubber industries and in the Process industries in solving Corrosive, Gas or Liquor problems.

SCREWED FITTINGS FOR IMMEDIATE DELIVERY

Write for Bulletins and Prices

HASCO VALVE and MACHINE CO.

1815 WEST ST. PAUL AVENUE • MILWAUKEE 3, WIS.

EXHIBITORS

Classified by Products
CONTINUED

Taylor Instrument Companies (143-144)
Wheelco Instruments Company (N15)

RESEARCH LABORATORIES

Bjorksten Laboratories (67)
Selas Corporation of America (88)
Universal Oil Products Company (N47)

RESINS

American Cyanamid & Chemical Corporation (N49)
Carbide and Carbon Chemicals Corporation (83-84)
Hercules Powder Company, Incorporated (70)
National Starch Products (3-4)
Reichhold Chemicals, Inc. (50)
Velsicol Corporation (N56)

ROTAMETERS

RUBBER ACCELERATORS

American Cyanamid & Chemical Corporation (N49)
Lead Industries Association (10)

RUBBER CHEMICALS

American Cyanamid & Chemical Corporation (N49)
Carbide and Carbon Chemicals Corporation (83-84)
Hercules Powder Company, Incorporated (70)
Lead Industries Association (10)
Socony-Vacuum Oil Company, Inc. (39)
Standard Oil Company (Indiana) (127-128)

RUBBER PRODUCTS, Industrial

American Hard Rubber Company (6)
Bjorksten Laboratories (67)
Ertel Engineering Corp. (47)
The Garlock Packing Co. (N52)

RUBBER RECLAIMING CHEMICALS

Socony-Vacuum Oil Company, Inc. (39)

RUBBER SOFTENERS

Carbide and Carbon Chemicals Corporation (83-84)
Commercial Solvents Corporation (87)
Socony-Vacuum Oil Company, Inc. (39)

RUST PREVENTIVES AND REMOVERS

Alox Corporation (N24)
Carbide and Carbon Chemicals Corporation (83-84)
W. A. Cleary Corporation (116)
Commercial Solvents Corporation (87)
The Davison Chemical Corporation (64-65-66)
D. W. Haering & Co., Inc. (N13-N14)
Socony-Vacuum Oil Company, Inc. (39)
L. Sonneborn Sons, Inc. (N43)
Standard Oil Company (Indiana) (127-128)
Victor Chemical Works (41-42-43)

SAFETY EQUIPMENT

Ansul Chemical Company (11)
Industrial Instruments, Inc. (26)

(Continued on page 354)

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NEW! HAVEG "60"

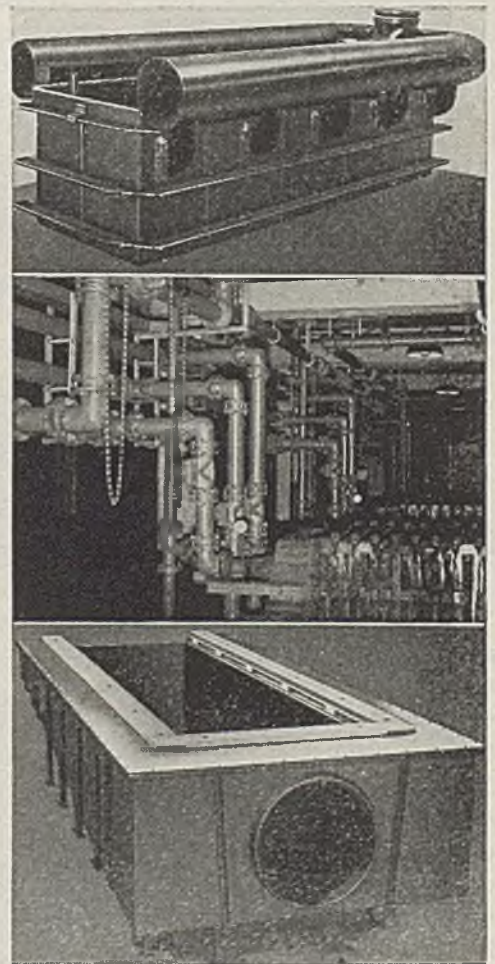
TANKS . . . PIPING . . . FUME DUCT
defy corrosion by . . .

*acids . . . solvents . . .
 alkalis . . .*

USED IN CLEANING . . . DEGREASING . . . PICKLING and PLATING OPERATIONS

Haveg "60" is completely resistant to most of the new compounds being offered for the latest metal cleaning processes . . . Haveg "60" has been especially approved for use with the bright nickel solutions. Haveg "60" is the newest grade in a family now numbering four, which provides a complete range of standard size molded plastic chemical equipment for use with acids, solvents and alkalis. Seamless, one-piece tanks as large as 10 feet in diameter by 12 feet high are readily and economically molded by Haveg.

WRITE TODAY for Haveg Bulletin F-4. It gives complete data on the chemical resistance of all four grades of Haveg . . . details constructional features . . . tabulates all standard size tanks, piping, fume duct, towers, pumps, valves and special equipment. A special insert gives complete data on the NEW HAVEG "60."



HGF-46

HAVEG CORPORATION

NEWARK, 8 DELAWARE
 FACTORY - MARSHALTON, DELAWARE



CLEVELAND 14



350 Leader Building



CHICAGO 11



1201 Palmolive Building



DETROIT 11



2832 E. Grand Blvd



LOS ANGELES 13



601 W. Fifth St

From Latch to Link... A with *Permaligned*



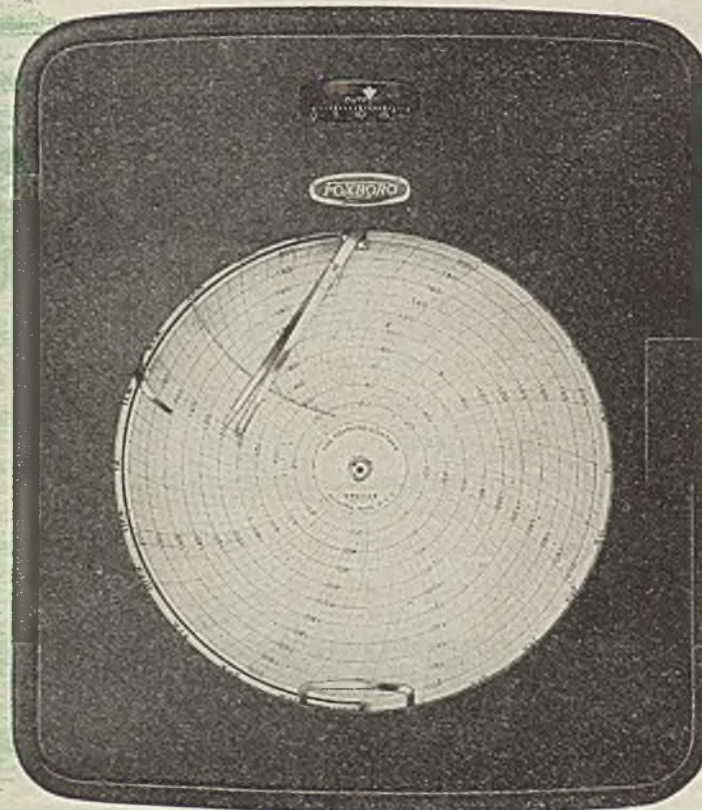
The new M-40 Controller embodies every known advance in pneumatic control. It is an all-type instrument, ingeniously adaptable to on-off, proportional, proportional with reset (Stabilog), and proportional with reset and derivative (Hyper Reset) control. It is available in single, dual, or duplex action.

Even such construction details as the latch, the door hinge, the hasp, the hub (to mention but a few) have been improved—illustrating the extent to which Foxboro has gone in the development of this new instrument.

By far the most important and valuable improvement of the Model M-40

Controller is its new *Permaligned Construction*. This basic feature assures permanent and positive alignment of parts...the combined result of its unique unit assembly, unmatched ruggedness of construction and new designing which permits closer tolerances than ever before possible.

Here, at last, is a controller not only easier and quicker to adjust and to service when necessary, but one that "stays put" once it is set. Get all the facts about this remarkable Foxboro achievement. Write for Bulletin 381. The Foxboro Company, 16 Neponset Ave., Foxboro, Mass., U. S. A. Branches in principal cities.



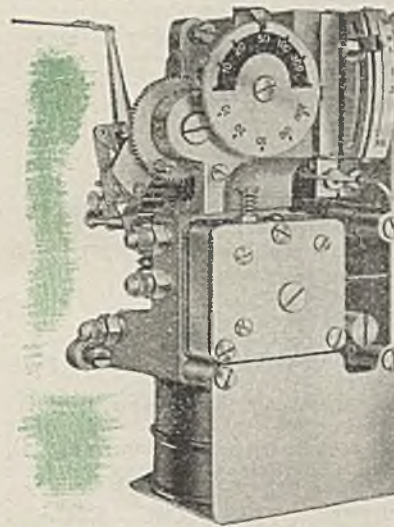
EVERY ADVANTAGE OF RESEARCH AND EXPERIENCE HAS GUIDED ITS DESIGN

The design of the Foxboro M-40 Controller reflects over thirty-five years of pioneering research and experience in the development and production of industrial instruments.

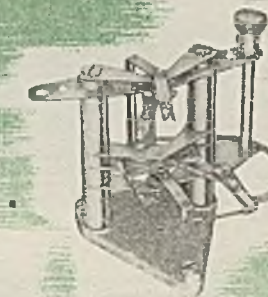
It has been influenced particularly by the past five years of meeting war requirements, far more exacting than those of normal times. A number of improvements can be traced directly to this unprecedented period when new and more exacting process requirements, faster production schedules and an urgent need for trouble-free operation taxed ingenuity.

Complete New Controller *Construction*

NEW UNIT ASSEMBLY...SIMPLER—STRONGER



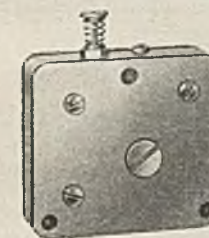
NEW COMPLETE CONTROL UNIT illustrates compact, rugged, accessible design and construction. It can be removed and replaced easily without losing alignment. Only one field adjustment necessary. Unit parts removed and assembled with equal ease and with positive alignment assured. Reset bellows interchangeable with spring for proportional unit.



NEW RESET UNIT. An entirely new unit—not a needle valve, not dependent upon capillary tubing. Provides continuous adjustment of reset rates...all steps eliminated. Reset rangeability 500 to 1. Reset and Hyper-Reset coordinated simultaneously by a single adjustment.



NEW PEN ARM MOVEMENT. Stronger construction throughout. Easier, simpler pen zero adjustment...does not throw out control pointer and pen alignment. Radically new link design. Non-backlash zero adjustment and setting device. New center location eliminates dead space—permits changeover from single to duplex or dual action, also from recording to concentric scale indicating. Held rigidly by three retained screws.



NEW CONTROL RELAY. Completely new and vastly improved. Requires no exacting adjustments. Stainless steel construction. A sturdy beryllium copper diaphragm and stainless steel ball constitute the main elements of this important unit. Can be taken apart and put together easily and quickly without loss of original adjustment. Simple pin alignment for re-assembly is positive.

FOXBORO
Reg. U. S. Pat. Off.

M-40

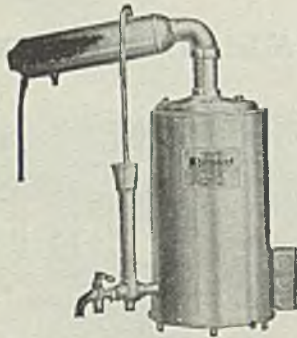
CONTROLLER

the only controller with *Permaligned* construction

WHAT'S NEW in PURE WATER

SEE the BARNSTEAD chem show exhibit

Booth 154,
Chicago Coliseum
September 10 to 14



Water Stills. Steam, gas, and electric models. Capacities from 1/2 to 500 gals. per hour. Produces chemically pure water, free from all types of impurities. Extra-duty Types for hard water use.

Laboratory Demineralizers. Produce a high-test mineral-free water, at flow rates of from 5 to 15 gals. per hour. No re-generation. Uses replaceable cartridge. Simply turn on water to use.



Regenerative Type Demineralizers. Two and four bed models. Flow rates of from 3 to 1000 gallons per hour. Low-cost deionized water is suitable for many industrial and commercial uses.



Purity Meters. For quick, easy daily check-tests of distilled or demineralized water. Easy to use and read. Measures total solids as p.p.m. of Na Cl.



leaders in water research

TRADE MARK REG. U.S. PAT. OFF.
Barnstead
STILL & STERILIZER CO. Inc.

4 LANESVILLE TERRACE, FOREST HILLS, BOSTON 31, MASS.

EXHIBITORS

Classified by Products
CONTINUED

Mine Safety Appliances Company (N1)
Wheelco Instruments Company (N15)

SALT CAKE

American Cyanamid & Chemical Corporation (N49)
Reichhold Chemicals, Inc. (50)

SCALES, Industrial

B. F. Gump Co. (22-23)
W. M. Welch Manufacturing Company (46)

SCIENTIFIC INSTRUMENTS AND SUPPLIES

American Instrument Company (103)
Buchler Ltd. (N44)
Central Scientific Company (71)
Chicago Apparatus Company (135)
Fisher Scientific Company (78)
Hart-Moisture-Meters (N46)
Industrial Instruments, Inc. (26)
W. H. Kessel & Co. (N29)
Leeds & Northrup Company (156-157-158)
National Technical Laboratories (N41)
Precision Scientific Co. (N25)
Radio Corporation of America (55-56-57-58)
E. H. Sargent & Co. (31)
Schaar and Company (21)
Scientific Glass Apparatus Company (76)
W. M. Welch Manufacturing Company (46)
Wheelco Instruments Company (N14)
Wilkins Anderson Company (111)

SCREENS, VIBRATORS, ETC.,

Industrial

B. F. Gump Co. (22-23)
Link-Belt Company (101-102)
Productive Equipment Corp. (N39)
Simplicity Engineering Company (75)

SEBACATES

Commercial Solvents Corporation (87)

SEPARATORS

The Johnson Corporation (35-36)
Selas Corporation of America (88)

SILICA GEL

The Davison Chemical Corporation (64-65-66)
Mallinckrodt Chemical Works (18)
Socony-Vacuum Oil Company, Inc. (39)

SILICATES, Inorganic

National Aluminate Corporation (136)

SILICATES, Organic

Carbide and Carbon Chemicals Corporation (83-84)

SILICONES

SOAPS AND BASES

Alox Corporation (N24)
Foote Mineral Company (159-160)
Hercules Powder Company, Incorporated (70)

SOCIETIES, Technical

(Continued on page 355)

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EXHIBITORS

Classified by Products

CONTINUED

**SOLVENT RECOVERY
CHEMICAL**

Ansul Chemical Company (11)
Carbide and Carbon Chemicals Corporation (83-84)
The Pfaudler Co. (1)

**SOLVENT RECOVERY
EQUIPMENT**

Blaw-Knox Company (N50)
Bullovak Equipment Division of Blaw-Knox Co. (N50)
Carbide and Carbon Chemicals Corporation (83-84)
Ertel Engineering Corp. (47)
Glascote Products, Inc. (77)
Leader Iron Works, Inc. (110)
Loeb Equipment Supply Co. (24-25)
The Pfaudler Co. (1)

SOLVENTS

American Cyanamid & Chemical Corporation (N49)
Anderson-Prichard Oil Corporation (N28)
Atlas Powder Co. (126)
Carbide and Carbon Chemicals Corporation (83-84)
Commercial Solvents Corporation (87)
The Dow Chemical Company (51-52-53-54)
Hercules Powder Company, Incorporated (70)
Skelly Oil Company (N2)
Socony-Vacuum Oil Company, Inc. (39)
Standard Oil Company (Indiana) (127-128)

SOLVENTS, Aromatic

Anderson-Prichard Oil Corporation (N28)
Oronite Chemical Company (N9)
Socony-Vacuum Oil Company, Inc. (39)
Standard Oil Company (Indiana) (127-128)
Velsicol Corporation (N56)

SORBITOL AND DERIVATIVES

Atlas Powder Co. (126)

**STARCHES AND STARCH
PRODUCTS**

American Cyanamid & Chemical Corporation (N49)
National Starch Products (3-4)

STEARATES

American Cyanamid & Chemical Corporation (N49)
Commercial Solvents Corporation (87)
The Emulsol Corporation (N59)
Foote Mineral Company (159-160)
Glyco Products Co., Inc. (122-123)
Mallinckrodt Chemical Works (18)

STEEL AND ALLOYS

The Carpenter Steel Company
Welded Alloy Tube Division (124)
Crucible Steel Company of America (17)
Michigan Steel Casting Company (146)
Sivyer Steel Casting Co. (107)

STILLS—See Distilling Equipment

(Continued on page 358)

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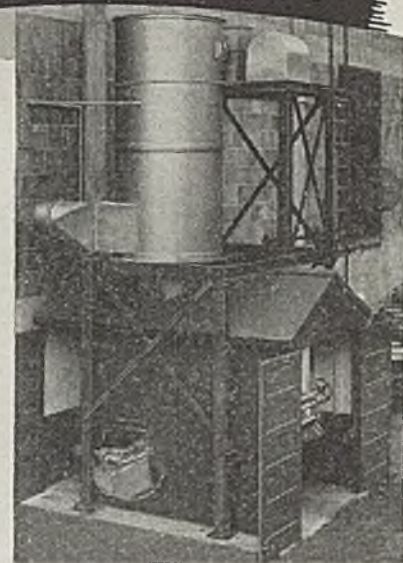
Where Schneible Multi-Wash Collectors are installed, acid fumes do not impair working efficiency or slow down production. Exhaust from refining, smelting, varnish cooking, pickling, plating, mixing, etching and other dust and fume-creating operations is readily and efficiently handled with Schneible collector equipment.

Where nuisance elimination only is desired, units of standard steel construction are recommended; using an alkaline solution as the recirculated liquid. If conditions require it, the collectors are fabricated of corrosion-resistant materials. Schneible engineers are qualified by broad experience to make correct recommendations.

CLAUDE B. SCHNEIBLE COMPANY

2827 Twenty-Fifth St., Detroit 16, Mich.

Engineering Representatives in Principal Cities



This Schneible Multi-Wash System controls a troublesome fume condition in a process plant.



•
Visit
Chemical Engineering
in
Booth 96
•

TRI-CLOVER presents . . .

type 316. Stainless Steel FLANGED -TYPE CONICAL END FITTINGS



The TRI-CLOVER Flanged Coupling—key to greater flexibility and efficiency from light gauge tubing. Built to withstand bursting pressure up to 1000 lbs. per square inch.

for light-gauge Tubing

With a background of over 25 years in the production of sanitary fittings and specialties, Tri-Clover now presents a complete line of Type 316 Stainless Steel Flanged Type Conical End Fittings for use with light gauge tubing. These modern fittings are particularly applicable in chemical and process fields, providing maximum economy wherever corrosion-resistant conveying lines are required.

here are 6 important operating features . . .

1. **LIGHT WEIGHT . . .** Fittings and tubing offer extremely light weight without sacrificing strength.
2. **SPEED and EASE . . .** Fittings require only simple tools to install and maintain lines.
3. **ADAPTABILITY . . .** Simple adapters readily connect fittings to IPS types, conical glass tubing, welding fittings, etc.
4. **STREAMLINED DESIGN . . .** Saves space, permits full flow of liquids through all fittings.
5. **SIMPLE UNIONS . . .** Every flanged coupling is easily dismantled for inspection, cleaning or replacement of line sections.
6. **LEAK-TIGHT . . .** Simple, efficient gaskets insure a completely tight joint at all times, under pressure or vacuum.

The combination of these money-saving features brings a new conception of the possibilities offered through the use of Tri-Clover fittings with commercial tolerance Stainless Steel tubing having outside diameters of 1", 1½", 2", 2½", 3" and 4". It will pay you to investigate this new Tri-Clover line today. See your Jobber or write for details covering the complete fittings line.

See these new fittings at the NATIONAL CHEMICAL EXPOSITION September 10-14 BOOTH 12

• WELDING FITTINGS and commercial tolerance Stainless Steel light gauge tubing, type 304 and 316, are available in sizes from 1" through 10" in a complete line including ELLS—TEES—CROSSES—REDUCERS—CAPS—LATERALS and ADAPTERS.

TRI-CLOVER  **MACHINE CO.**
Kenosha Wisconsin

TRIALLOY AND STAINLESS STEEL
Sanitary Fittings, Valves, Pumps, Tubing, Specialties
FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS



THE NAME TO WATCH IN CHEMICALS



IT TAKES A GOOD WEAVER TO CREATE A FINE CLOTH

The warp and woof of chemistry is intelligent research. Like the cloth from a loom, the chemical material you get is no better than the men who created it. For this reason, it is well to consider thoroughly the organization behind the product.

"Oronite"* is the name to watch in chemicals. You can look to this prime source for materials to fit your requirements—whether it's wetting agents for textiles... chemicals for protective coatings... naphthenic acids for metallic naphthenates... or cresylics for killing germs. Furthermore, you can enlist the assistance of an able group of research chemists in finding the solution to your special problems. Your letter incurs no obligation.

* Reg. U. S. Pat. Off.

1003

ORONITE CHEMICAL COMPANY

Russ Building, San Francisco 4, California
White-Henry-Stewart Bldg., Seattle 1, Wash.

30 Rockefeller Plaza, New York 20, N. Y.
Standard Oil Bldg., Los Angeles 15, Calif.

EXHIBITORS • Classified by Products • CONTINUED

STYRENES

The Dow Chemical Company (51-52-53-54)

SULFONATES

American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 The Emulsol Corporation (N59)
 Oronite Chemical Company (N9)
 Socony-Vacuum Oil Company, Inc. (39)
 L. Sonneborn Sons, Inc. (N43)
 Standard Oil Company (Indiana) 127-128)

SULFONIC ACIDS

Ansul Chemical Company (11)
 W. A. Cleary Corporation (116)
 Standard Oil Company (Indiana) (127-128)

SULFUR AND DERIVATIVES

American Cyanamid & Chemical Corporation (N4)
 Ansul Chemical Company (11)

SURFACE ACTIVE AGENTS

Alox Corporation (N24)
 American Cyanamid & Chemical Corporation (N49)
 Atlas Powder Co. (126)
 Bjorksten Laboratories (67)
 Carbide and Carbon Chemicals Corporation (83-84)
 W. A. Cleary Corporation (116)
 The Emulsol Corporation (N59)
 Glyco Products Co., Inc. (122-123)
 Hercules Powder Company, Incorporated (70)
 Oronite Chemical Company (N9)
 Ross & Rowe, Inc. (48)
 Victor Chemical Works (41-42-43)
 Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

TANKS

Aetna Scientific Company (168)
 American Hard Rubber Company (6)
 Chicago Carb-O-Tank Co. (28)
 Eppenbach, Inc. (N17)
 The Filter Paper Company (108-109)
 General Ceramics & Steatite Corporation Chemical Equipment Division (114)
 Glascote Products, Inc. (77)
 Groen Mfg. Co. (N21-N22)
 Haveg Corporation (94)
 O. G. Kelley & Company (N37)
 Maurice A. Knight (27)

Lead Industries Association (10)
 Leader Iron Works, Inc. (110)
 Loeb Equipment Supply Co. (24-25)
 Metal-Glass Products Co. (15-16)
 National Carbon Co., Inc. (85-86)
 The Pfaudler Co. (1)
 Process Equipment Corporation (N23)
 A. O. Smith Corporation (30)
 The U. S. Stoneware Co. (61-62)

TANNING—See Chemicals.

Leather

TANTALUM AND ALLOYS

THERMOMETERS, Industrial

Brown Instrument Company, Div. of Minneapolis - Honeywell Regulator Co. (N34-N35)
 Illinois Testing Laboratories, Inc. (N27)
 Leeds & Northrup Company (156-157-158)
 Moore Products Co. (137)
 Taylor Instrument Companies (143-144)
 Wheelco Instruments Company (N15)

TOWERS AND PACKING

The Garlock Packing Co. (N52)
 General Ceramics & Steatite Corporation Chemical Equipment Division (114)
 Haveg Corporation (94)
 Maurice A. Knight (27)
 National Carbon Co., Inc. (85-86)
 The Pfaudler Co. (1)
 A. O. Smith Corporation (30)
 The U. S. Stoneware Co. (61-62)

TUNGSTEN AND ALLOYS

UREA AND DERIVATIVES

American Cyanamid & Chemical Corporation (N49)
 Reichhold Chemicals, Inc. (50)

VALVES—See Fittings

VARNISH AND BASES

Atlas Powder Co. (126)
 Hercules Powder Company, Incorporated (70)
 Socony-Vacuum Oil Company, Inc. (39)
 L. Sonneborn Sons, Inc. (N43)

VENTILATING EQUIPMENT

Haveg Corporation (94)
 Maurice A. Knight (27)

VITAMINS

Special Chemicals and Industrial Divisions, Winthrop Chemical Company, Inc. (N38)

WATER TREATMENT CHEMICALS AND EQUIPMENT

Aetna Scientific Company (168)
 American Cyanamid & Chemical Corporation (N49)
 Ansul Chemical Company (11)
 Atlas Powder Co. (126)
 Barnstead Still and Sterilizer Co., Inc. (154)
 The Filter Paper Company (108-109)
 D. W. Haering & Co., Inc. (N13-N14)
 Illinois Water Treatment Company (29)
 Infilco, Inc. (95)
 Jensen Machinery Company, Inc. (105)
 Lead Industries Association (10)
 National Aluminate Corporation (136)
 Titeflex, Inc. (99-100)

WAXES

American Cyanamid & Chemical Corporation (N49)
 Bareco Oil Company (32-33)
 Carbide and Carbon Chemicals Corporation (83-84)
 Cornelius Products Company (141)
 Foote Mineral Company (159-160)
 Glyco Products Co., Inc. (122-123)
 Socony-Vacuum Oil Company, Inc. (39)
 L. Sonneborn Sons, Inc. (N43)
 Standard Oil Company (Indiana) (127-128)

WETTING AGENTS

American Cyanamid & Chemical Corporation (N49)
 Atlas Powder Co. (126)
 Carbide and Carbon Chemicals Corporation (83-84)
 W. A. Cleary Corporation (116)
 Commercial Solvents Corporation (87)
 The Emulsol Corporation (N59)
 Glyco Products Co., Inc. (122-123)
 Hercules Powder Company, Incorporated (70)
 Oronite Chemical Company (N9)
 Ross & Rowe, Inc. (48)
 Socony-Vacuum Oil Company, Inc. (39)
 Victor Chemical Works (41-42-43)

XANTHATES

The Dow Chemical Company (51-52-53-54)

Now! LIFT, MOVE, STACK Materials Electrically with NEW TRANSTACKER

Low price brings modern material handling methods within reach of all!

Now for the first time every business—every industry can use modern, money-saving material handling methods at new low cost.

Because in the new Transtacker, Automatic's engineers have developed a high-lift stacker that sells for as low as \$1800. And while it will move, lift and stack up to 4000 pounds, it weighs only 1900 pounds. This means you can safely use Transtacker, even if your floor and elevator capacities are limited.

With all the advantages of the famed Transporter that moves any kind of material with amazing "touch-of-your-thumb" ease, Transtacker now gives you an electric hydraulic lift that stacks your product at new heights to increase storage capacity. With finger-tip control it lifts up to 4000 pound loads in a matter of seconds . . . smooth, controlled lowering speed for utmost safety. Mail coupon for facts.

PRICED AT ONLY

\$1800

(Some Models Slightly Higher)



**PLATFORM TYPE
TRANSTACKER**

Capacity 4000 pounds
For stacking unit loads
on skid platforms.

OPEN FACE PALLET TYPE TRANSTACKER
—Capacity 3000 pounds—With suitable forks for stacking open face pallet loads.

SUSPENDED LOAD TYPE PALLET TRANSTACKER —Capacity 2500 pounds—With suitable forks for stacking double or open face pallets.

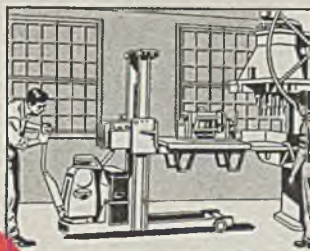
STRADDLE TYPE PALLET TRANSTACKER —Capacity 4000 pounds—With suitable forks for stacking double face or open face pallet loads.



FINGER TIP CONTROLS LOAD
Cartons, crated goods, hard-to-handle material—one man or girl hauls, lifts and stacks to full storage heights.



ENORMOUS SAVINGS IN SHIPPING
Pick up merchandise from ground level and deposit it on truck or trailer. A three-man operation becomes a one-man operation.



LIFTS HEAVY MACHINE PARTS
When heavy machine parts must be lifted to working height, let Transtacker safely lift it and place it.



ENDS BACK-BREAKING HANDLING
This can be your trucker—easily, efficiently stacking your material with Transtacker. Extra storage space is yours free.

PRE-TESTED IN INDUSTRY

- 1 Cuts loading and unloading time in half.
- 2 One man does the work of three with less effort—Transtacker cuts handling costs up to 60%.
- 3 Light in weight for limited floor and elevator load capacity.
- 4 Hauls any kind of product with "touch-of-thumb" ease.
- 5 Gives you extra storage space without added cost.
- 6 Lifts and stacks product from ground level to trucks and trailers.

**LOOK TO THE LEADER
FOR ALL THAT'S NEW!**

Transtacker
A PRODUCT OF AUTOMATIC

*Lightens
LIFE'S LOADS*

AUTOMATIC TRANSPORTATION COMPANY

DIV. OF THE YALE & TOWNE MFG. CO.

49 West 87th St., Dept. M, Chicago 20, Illinois

Please mail me without cost or obligation, complete facts about the NEW TRANSTACKER.

() Have an A.T.C. Specialist call and survey my material handling costs.

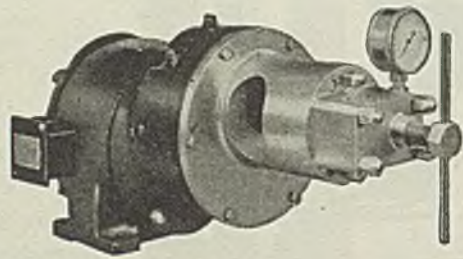
Company Name.....

By..... Position.....

Street Address.....

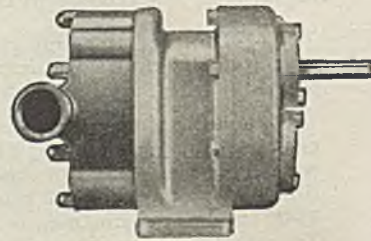
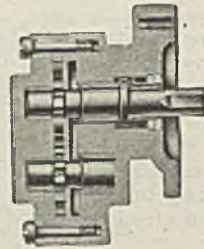
City..... State.....

APPLYING **FLOW-MASTER** EQUIPMENT to Continuous or Batch



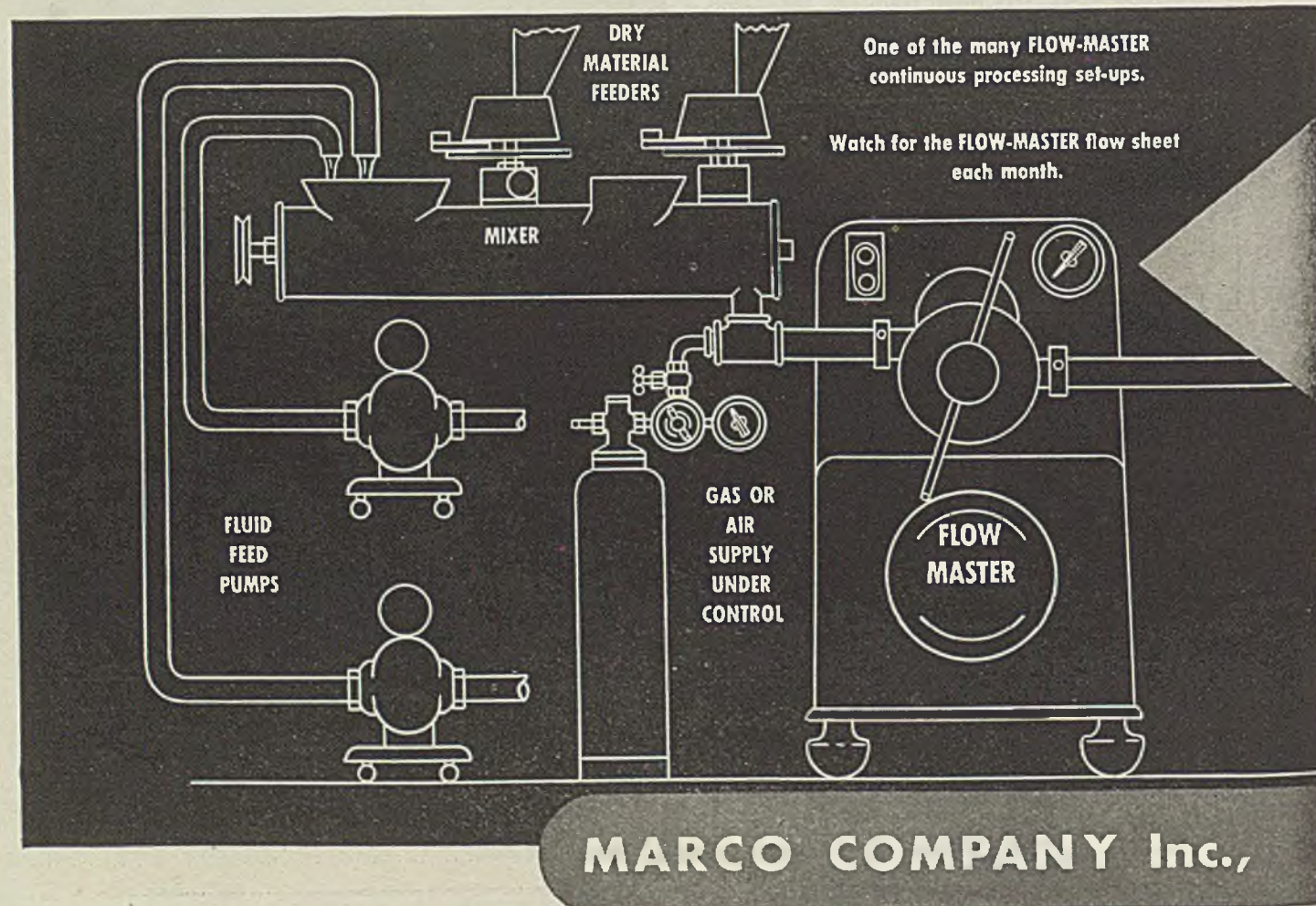
FLOW-MASTER LABORATORY MODEL

Used as a pilot machine or part of a pilot processing line, it enables you to check material variations and other factors with small quantities of material. Results so produced can be duplicated in actual production simply by using the same settings for temperature and pressure on your standard FLOW-MASTER equipment.

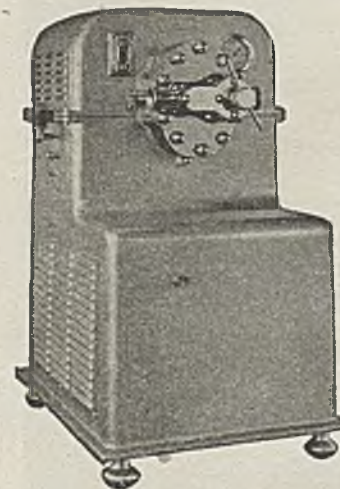


FLOW-MASTER SANITARY PUMPS

Will transfer, meter or proportion. Incorporate such unique FLOW-MASTER features as automatic compensating wear control which enables them to maintain volumetric efficiency longer. Handle light or heavy viscous material. Positive displacement. Stainless, easy to clean.

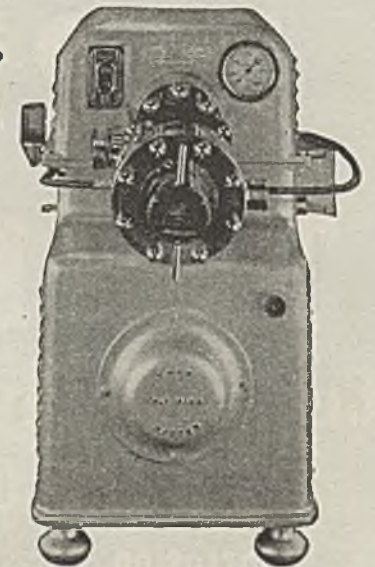


Processing of Chemical Products



FLOW-MASTER KOM-BI-NATOR

Combines many of the functions of several special-purpose machines—grinds, mixes, blends, texturizes, emulsifies, stabilizes, bleaches and, in addition, homogenizes by means of the FLOW-MASTER principle. One or more Kom-bi-nators, with FLOW-MASTER transferring, metering and proportioning pumps, can be adapted to continuous processing of a wide variety of products in a single, fast, continuous operation.



FLOW-MASTER HOMOGENIZER

Absolutely original in its application of a new, scientific principle of homogenization at comparatively low pressure. Homogenization is accomplished by a series of consecutive actions, each of which brings your product one step nearer perfection in one continuous trip through the machine. Features include automatic compensating wear control, stainless construction, quick, easy cleaning, etc.

FLOW-MASTER Equipment, by applying an entirely new, scientific principle to processing operations, makes it possible to convert hundreds of batch methods into fast, low-cost continuous operations.

By means of suitable combinations of FLOW-MASTER Proportioning Pumps, Continuous Mixers, Homogenizers and Kom-bi-nators, many of the operations of grinding, mixing, blending, texturizing, emulsifying, stabilizing, bleaching and homogenizing can be accomplished in a single, continuous operation.

The results: Faster production, product quality, lower manufacturing costs, new processes and often entirely new products.

Marco facilities include an experienced research laboratory which is prepared to help you convert from batch to continuous processing by means of FLOW-MASTER Equipment. Your inquiries and problems are invited. Or send for Catalog No. 10 which contains details and engineering data on FLOW-MASTER Homogenizers and Kom-bi-nators. Sanitary Pumps are covered in Catalog No. 25.

- Compounds • Asphalt Paint • Asphalt Emulsions • Waxes
- Textile Solutions • Organic Dyes • Paper Coatings • Varnishes
- Inks • Fibres • Blending • Latex • Pigments • Colloidal Suspensions
- Paints • Soaps • Dispersions • Greases • Oil or Wax Emulsions
- Adhesives • Waterproofing • Polishes . . . and Many Others



Third and Church Sts., Wilmington 50, Del.

MISCO

STAINLESS STEEL PIPE AND TUBES

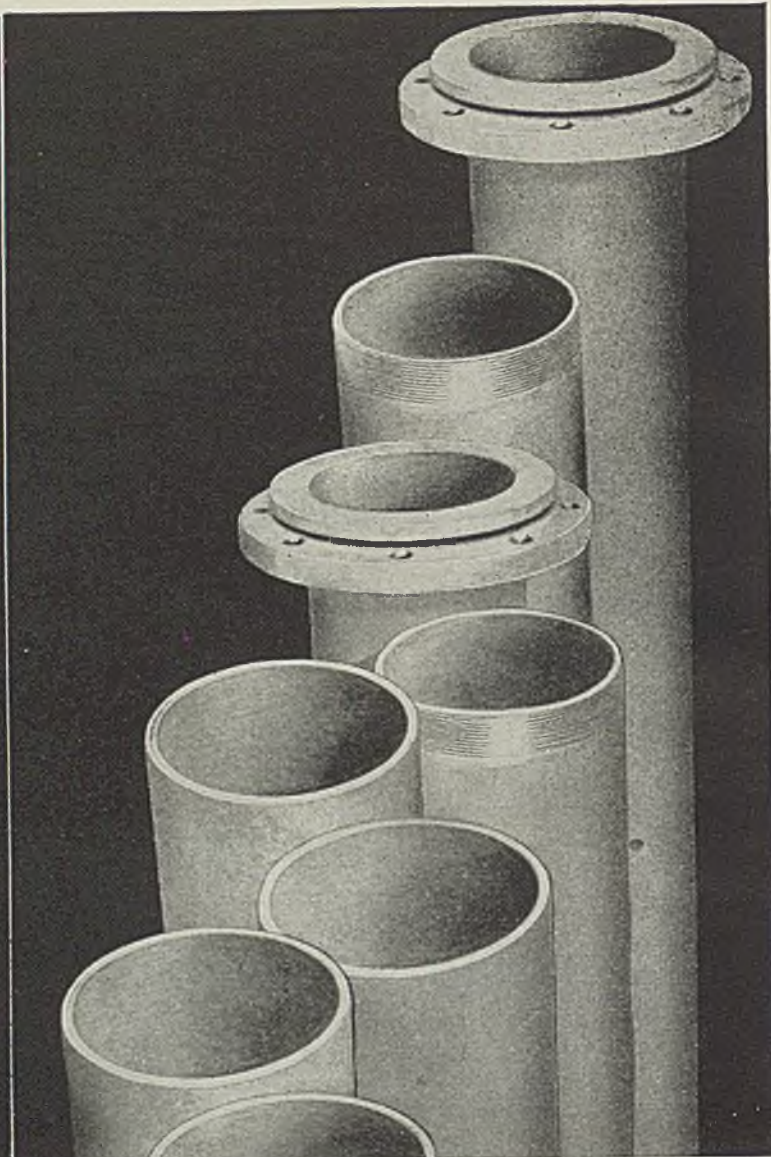
Centrifugally Cast

2½" to 20" O. D.

Corrosion Resisting
Heat Resisting

FLANGED • THREADED • PLAIN

Adaptable to many uses in the
Chemical Process Industries



MISCO "Centricast" stainless steel pipe and tubular products, made by the centrifugal casting process, are accurate, sound and smooth. Offering excellent resistance to corrosion, heat and abrasion, Misco stainless steel tubular products give efficient, continuous service under the most severe operating conditions. Produced in practically any stainless steel analysis required, they are of particular value in chemical process operations where maximum protection against the destructive action of many acid and alkali corrosive agents is essential. Consult Misco on any present or future application which involves stainless steel. We are pleased to furnish specific information on stainless steel tubular products for best resistance to corrosion, heat or abrasion.

MISCO Centrifugally Cast Tubes

Recommended for Pump Liners • Sleeves • Valve Seats • Shafting • Retorts • Fittings • Bushings • Rings of all kinds • Burner Pipes • Chemical Piping and many other applications requiring cylindrical castings.

Specify MISCO STAINLESS STEEL ALLOYS CAST • ROLLED • FABRICATED

for Fittings • Pump Castings • Castings for Mixing Machinery • Strainers • Fabricated Products • Centrifugal Castings • Miscellaneous Castings and Rolled Bars • Sheets, Plates, Tubes and Welding Rod. We are pleased to submit information on the proper design and application of stainless steel castings. Our engineering and production facilities are completely at your service.

ALLOY CASTING DIVISION

Michigan Steel Casting Company

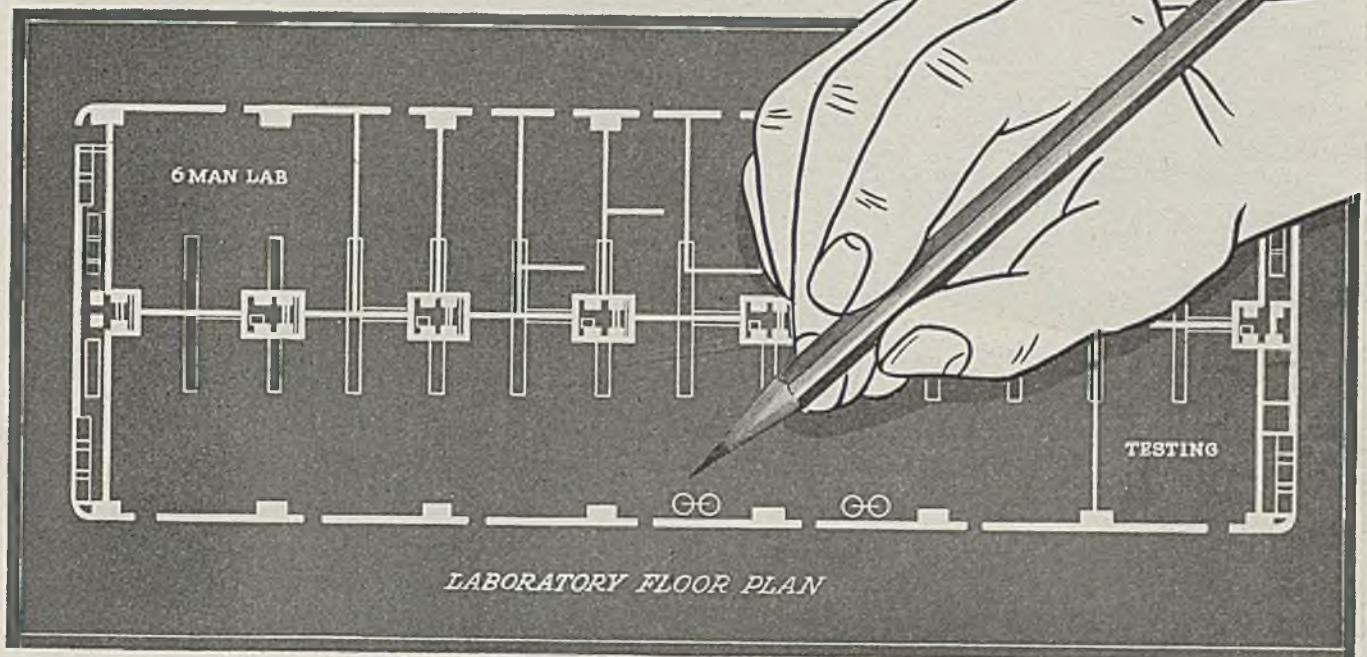


One of the World's Pioneer Producers of Heat and Corrosion Resisting Alloys

1999 GUOIN STREET • DETROIT 7, MICHIGAN

• AUGUST 1946 • CHEMICAL ENGINEERING

Modernize your Laboratory Water Supply with this . . .



NEW KIND OF WATER

You can use all you want at such low cost!



Why let a laboratory water still limit your laboratory activities? It's true, a water of the quality of distilled water is essential to chemical research and development, but it need not be a precious material, to be used sparingly.

By means of the Permutit* Demineralizing Process, a water can now be produced which compares favorably with distilled water. It may be used for almost any application, chemists agree, for which distilled water is satisfactory.

Yet the cost of producing this new kind of water is

so low you can use it as freely as tap water. It can be made available to all parts of the laboratory by suitable piping. It will pay for itself by saving laboratory man-hours. Demineralizing equipment takes up only a small amount of floor space in the lab. (See blueprint.)

Permutit provides both the ion exchange materials and equipment for demineralization. To find out more about this low-cost process write for bulletin to The Permutit Company, Dept. CM-8, 330 West 42nd Street, New York 18, N. Y. or Permutit Co. of Canada, Ltd., Montreal.

*Trademark Reg. U. S. Pat. Off.

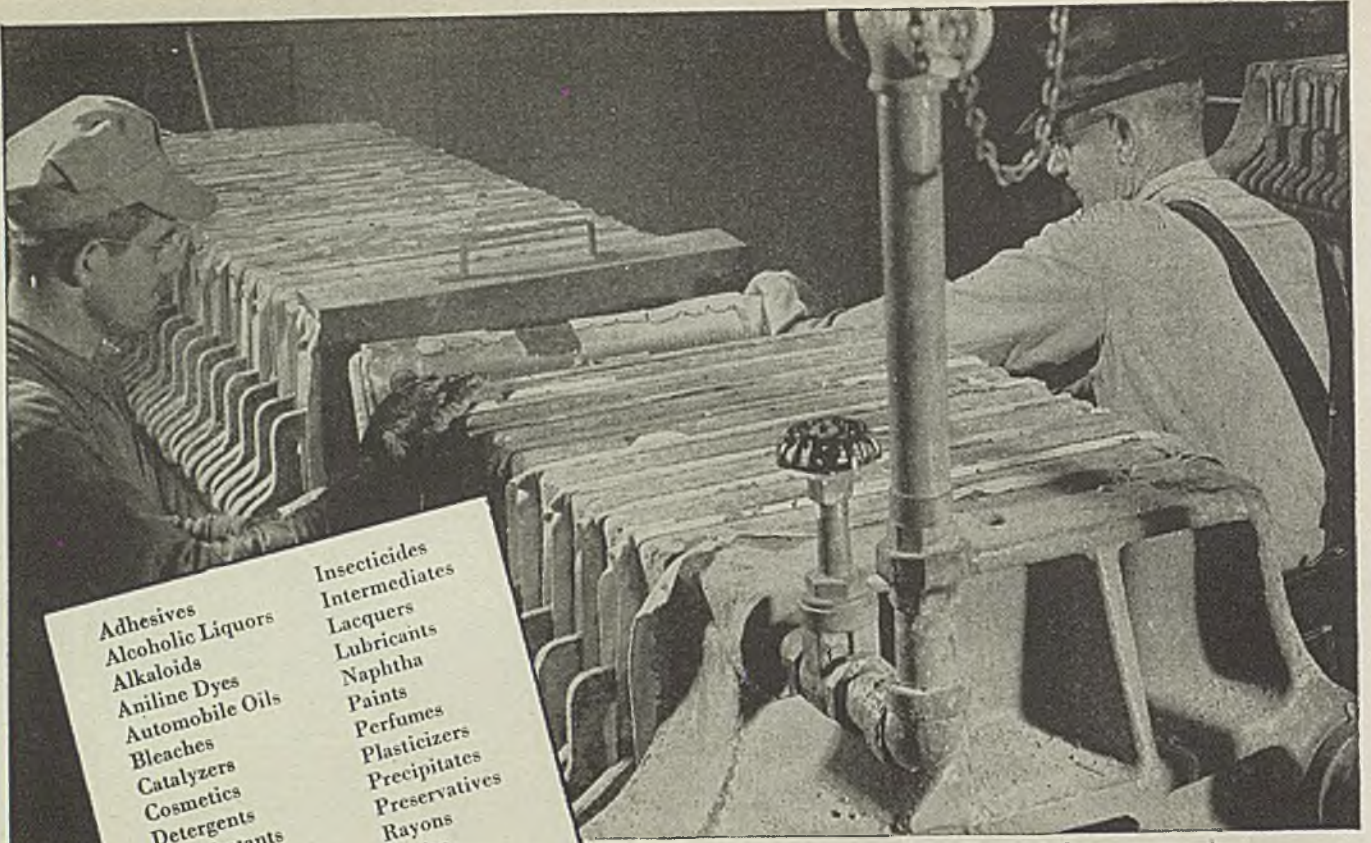
For more than 30 years

PERMUTIT

NEW USES FOR ION EXCHANGE

There's a great—and growing—field of usefulness for Permutit's Ion Exchange Process outside of water conditioning. Applications have been found in sugar refining, recovery of tartaric acid from waste products, and separation of valuable metals from waste solutions. Send for free bulletin. It may suggest opportunities in your field through ion exchange.

WATER CONDITIONING • ION EXCHANGES • MATERIALS AND EQUIPMENT • CHEMICALS



- | | |
|-------------------|----------------|
| Adhesives | Insecticides |
| Alcoholic Liquors | Intermediates |
| Alkaloids | Lacquers |
| Aniline Dyes | Lubricants |
| Automobile Oils | Naphtha |
| Bleaches | Paints |
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| Detergents | Precipitates |
| Disinfectants | Preservatives |
| Driers | Rayons |
| Dyes | Resins |
| Essential Oils | Soap |
| Extracts | Solvents |
| Film | Sugar |
| Fuel Oils | Tankage |
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| Hydrogenated Oils | Waterproofing |
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Installation of Sperry Filter Presses in large eastern plant

ALL THESE INDUSTRIES AND HUNDREDS MORE DEPEND ON

Sperry

FOR FILTRATION.

■ Diversity has played a substantial part in Sperry's record of achievement. For the past half century Sperry has been designing, manufacturing and installing filter presses of all sizes, for every industry and every use. The knowledge thus obtained, put to use by the specialized skill of Sperry engineers, enables us to meet and solve every imaginable type of problem in industrial filtration.

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Filtration Engineers for Over 50 Years

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FILTER PRESSES

Free . . . Valuable data and charts on industrial filtration in this booklet. Write Sperry for your copy.



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 SEPT. 10-14, 1946.

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CARBOWAX

TRADE-MARK

COMPOUNDS DO THESE JOBS WELL

1 rubber mold "release"

When dilute aqueous solutions of CARBOWAX compounds are used as mold lubricants, there is a minimum of carbon build-up. The cured articles are easily released from the mold.



4 medicinal ointments



CARBOWAX compounds are water-soluble, inert, and will facilitate the action of the active ingredients. Their use in topical preparations has been sanctioned by the Food and Drug Administration.

2 textile lubricants

CARBOWAX compounds and their water solutions serve as lubricants for rayon and other textile fibres. One water rinse is sufficient to remove the 'size'.



5 adhesives



CARBOWAX compounds are used to stabilize the moisture content of adhesives. In envelope flap glues they keep the paper from curling.

3 cosmetics

Cake make-up, shaving creams, hand lotions and hair preparations are among the many cosmetic formulations now made with CARBOWAX compounds. CARBOWAX compounds are water-soluble, and may be obtained in a wide range of viscosities permitting close control over the consistency of the finished product.



CARBOWAX solid polyethylene glycols are available in five different molecular weights, ranging in appearance and consistency from a soft petrolatum-like solid to a hard wax. Further information on their properties and uses will be found in the new booklet "Carbowax Compounds and Polyethylene Glycols" (Form 4772). Send for your copy today.

Have you tried them in your processes?



SYNTHETIC
ORGANIC
CHEMICALS

CARBIDE AND CARBON CHEMICALS CORPORATION

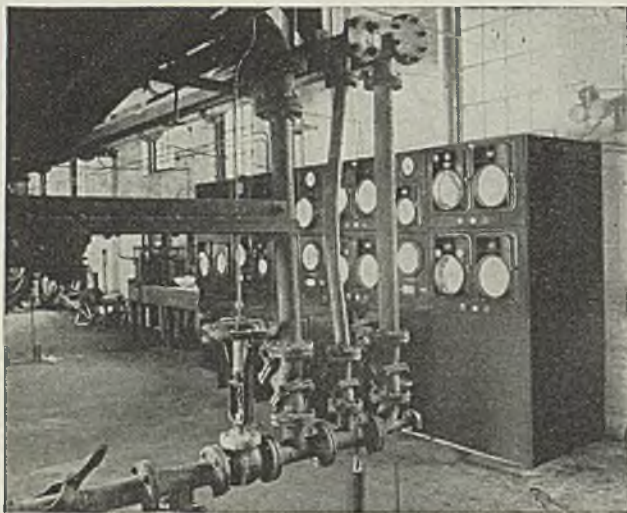
Unit of Union Carbide and Carbon Corporation



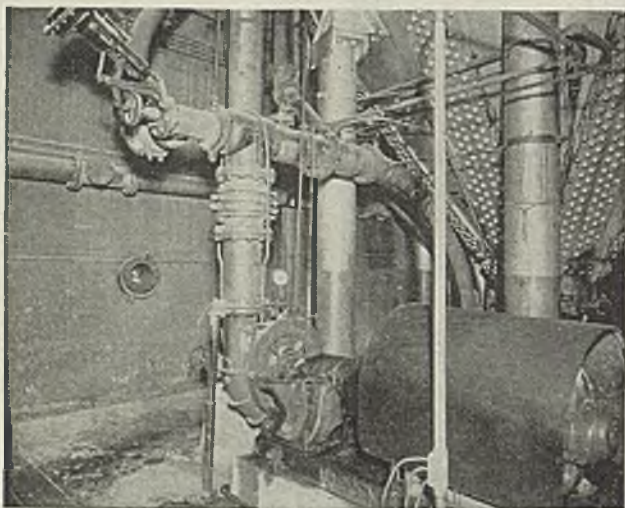
30 East 42nd Street, New York 17, N. Y.

"Carbowax" is a registered trade-mark of Carbide and Carbon Chemicals Corporation

Bristol Automatic Control Tones Up Sulphite Digestion



From this control panel, the entire operation is automatically controlled . . .



through synchro-air motors operating hydroheaters (above), and automatic valves.

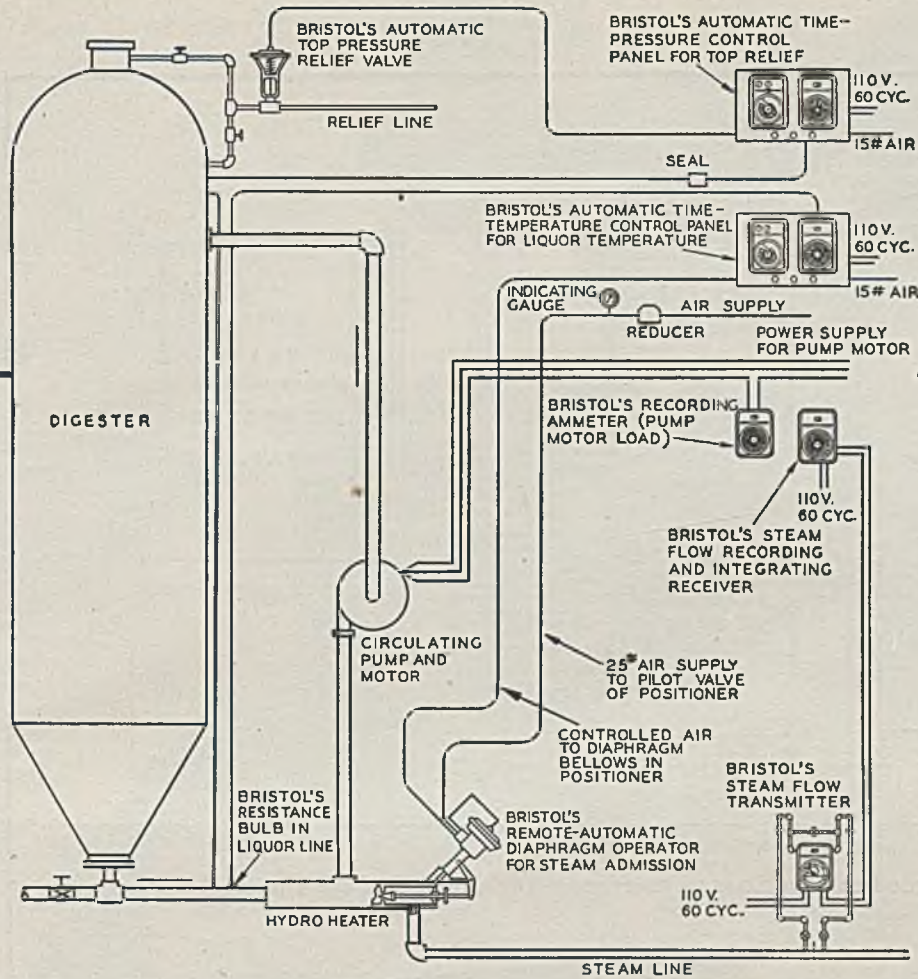
When temperature, pressure and flow are made to behave and acid strength stays where it belongs, uniform quality pulping is the result. Allowed to run loose, they cause both quality and costs to suffer.

The accompanying diagram of Bristol control instruments taking complete charge of a direct-heated circulating system for sulphite digesters will give you an idea of what can be done from a control panel.

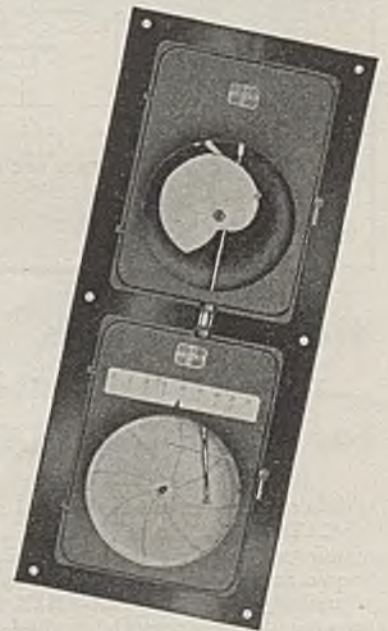
In this case, quality was greatly improved at the same time that important economies were being made.

Bristol's long and broad experience in instrumenting chemical processes suggests you can obtain valuable help from this source. When further instrumentation is taken up in your planning, have a Bristol engineer give you the benefit of his experience.

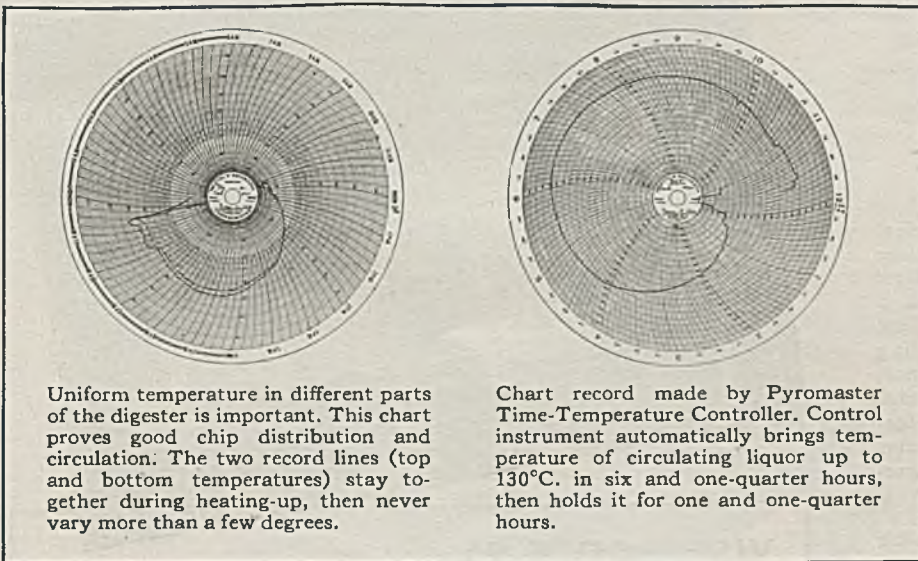
Address **THE BRISTOL COMPANY**,
109 Bristol Road, Waterbury 91, Conn.
(The Bristol Co. of Canada, Ltd., Toronto,
Ontario. Bristol's Instrument Co., Ltd.,
London N. W. 10, England).



Bristol instruments control temperatures of circulating liquor and digester . . . current input to pump motor . . . pressure in the digester . . . and steam flow to the digester.



Bristol Time-Temperature Controller, using potentiometer resistance thermometer measuring system and reset air-operated control mechanism. This instrument is described in detail in Bulletin P1200.



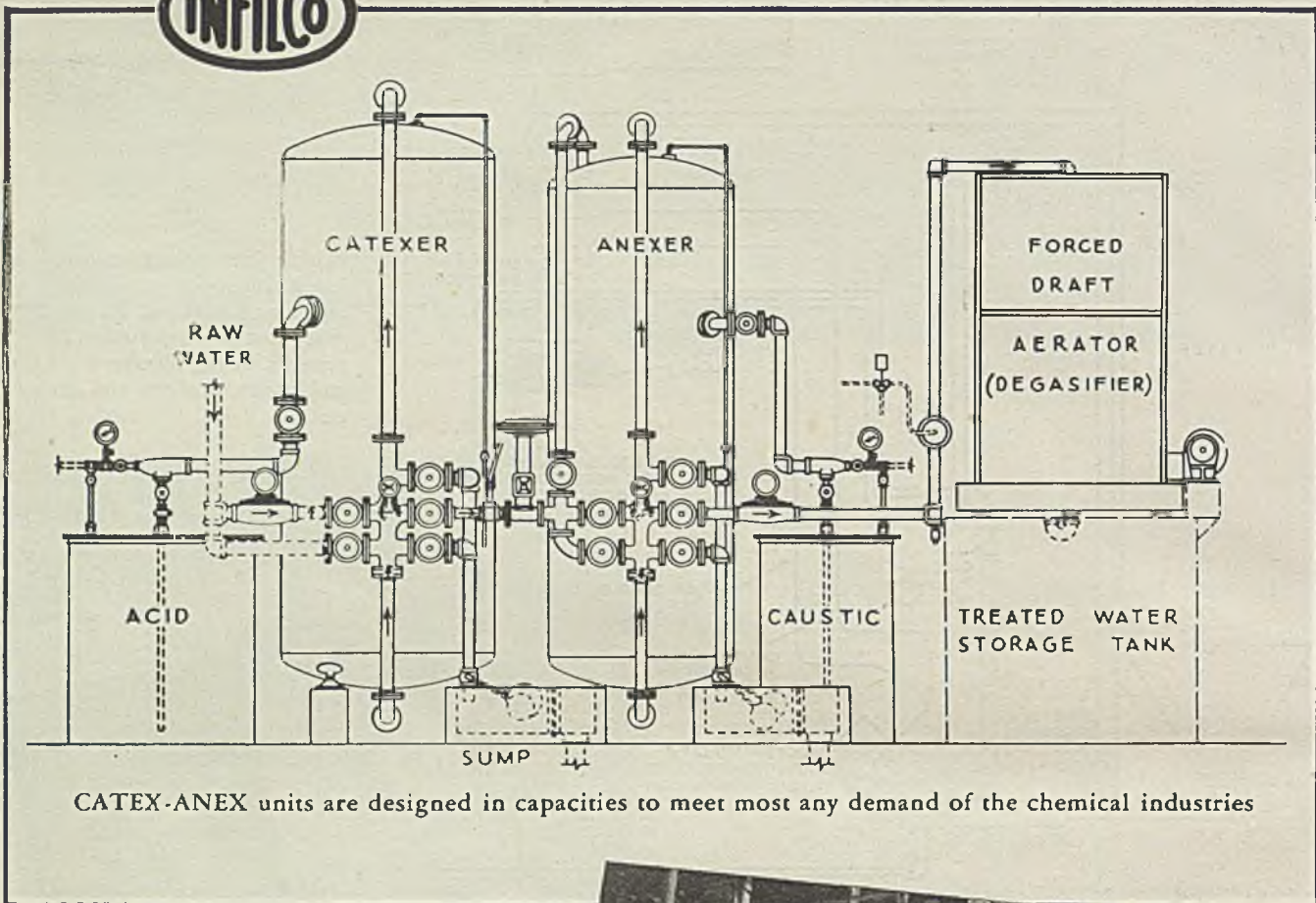
Uniform temperature in different parts of the digester is important. This chart proves good chip distribution and circulation. The two record lines (top and bottom temperatures) stay together during heating-up, then never vary more than a few degrees.

Chart record made by Pyromaster Time-Temperature Controller. Control instrument automatically brings temperature of circulating liquor up to 130°C. in six and one-quarter hours, then holds it for one and one-quarter hours.



Engineers process control for better products and profits

A U T O M A T I C C O N T R O L L I N G A N D R E C O R D I N G I N S T R U M E N T S

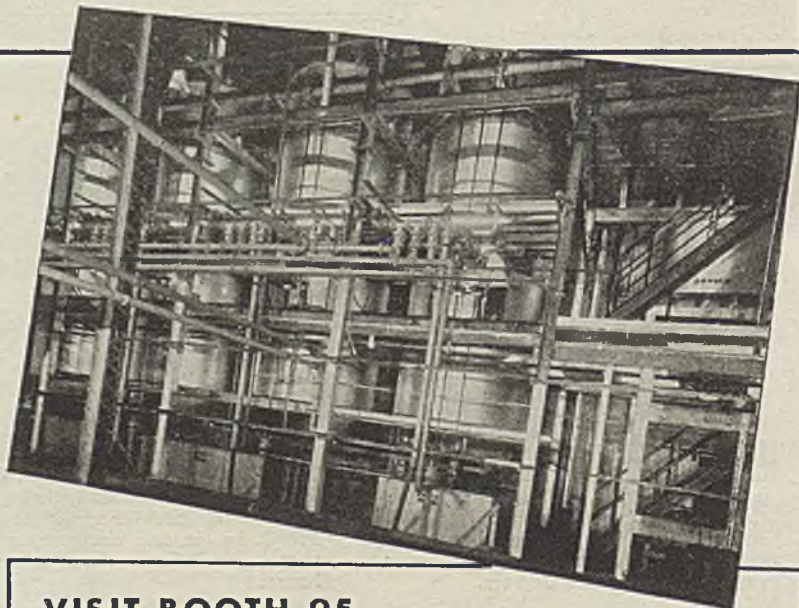


CATEX-ANEX units are designed in capacities to meet most any demand of the chemical industries

**More research
...more applications
for CATEX-ANEX**

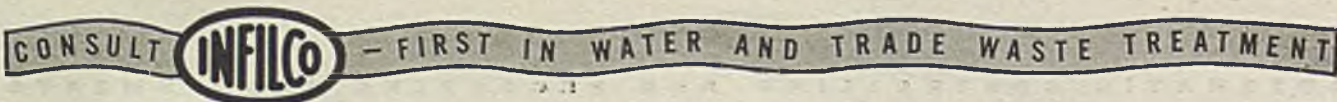
It didn't take long, in the chemical industries, for CATEX-ANEX to be known as a producer of things other than pure water alone. First known as the *complete* ion exchange method of treating water, CATEX-ANEX has since been found to be a potential method of treating many an aqueous solution. Now, for instance, possible applications include such widely different jobs as removing formic acid and formates from formaldehyde...recovering tartrates from wine residues...removing metallic impurities from pharmaceutical preparations.

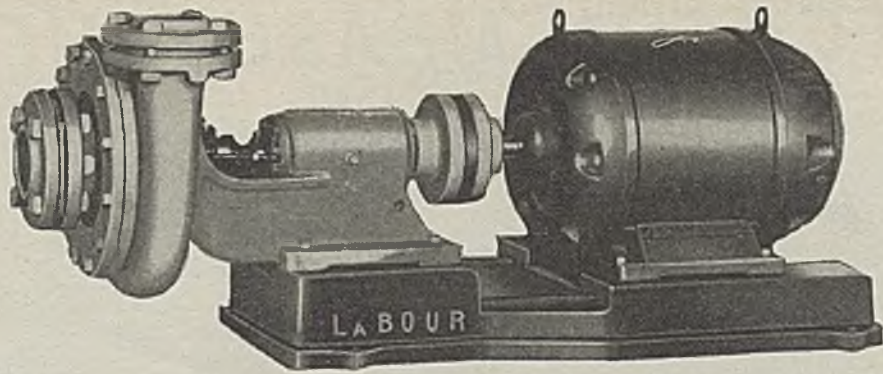
These jobs for CATEX-ANEX are possible under widely different operating conditions. Above is a typically efficient layout of a smaller treating unit. The other illustration shows a large-size series of units. And as the number of CATEX-ANEX installations has grown, so has its record of operating economies. Our project engineers will be glad to supply you with more information about particular applications. INFILCO INC., 325 West 25th Place, Chicago 16, Illinois.



**VISIT BOOTH 95
NATIONAL CHEMICAL EXPOSITION**

Coming to Chicago, September 10-14? INFILCO will be at the Coliseum to welcome you . . . Booth 95. Visit our exhibit and talk with our engineers about late developments in water and trade waste treatment.





This Pump Can't Suffer from "Middle Age Spread"

When pump efficiency depends upon maintenance of close clearances it isn't long before wear and corrosion produce a condition which can properly be called "middle age spread." As the clearances spread, efficiency drops rapidly, and the pump becomes old before its time.

That can't happen to any LaBour pump. It's particularly important in LaBour Type Q, which delivers efficiencies comparable to pumps equipped with sealing rings, yet is an open impeller pump with the

usual generous clearances. Consequently LaBour Type Q retains its high efficiency. In fact, as much as an extra $\frac{1}{8}$ " in clearances—and that would ordinarily require a long time by wear or corrosion—still leaves Type Q able to beat all centrifugal records for economical performance.

Whatever your specific need in pumping process liquids, you will find a type of LaBour that does the job in superlative fashion. And when you need a LaBour, nothing else will do.

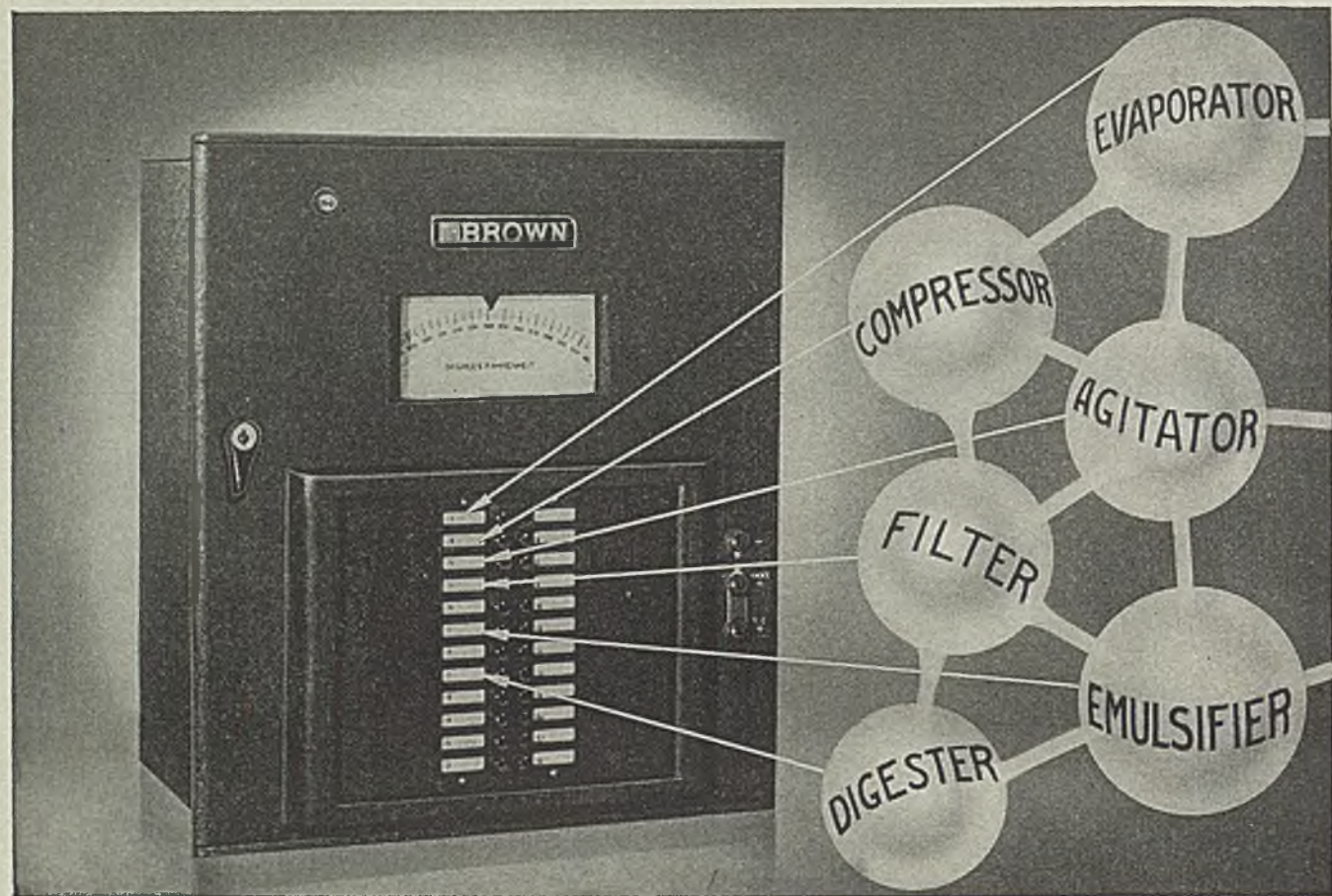
THE LABOUR COMPANY, Inc.
Elkhart, Indiana, U.S.A.

**IF YOU NEED A
LABOUR
NOTHING ELSE WILL DO**

The LaBour line includes a variety of types, both priming and non-priming, for chemical and hydraulic services.



PRECISION MEASUREMENT AND



ElectroniK Precision Indicator

For Batch or Continuous Processes

Increased recognition of the influence of temperature on chemical processes, and the evolution of complex processes having critical temperatures, have resulted in demands for advanced instruments capable of meeting most rigid specifications. Chemical process engineers know successful operation depends almost entirely on precision measuring and controlling within fractions of a degree.

Regardless of the complexity of the process, where indication, recording—electric or pneumatic control is needed, Brown ElectroniK Potentiometers have fulfilled every requirement.

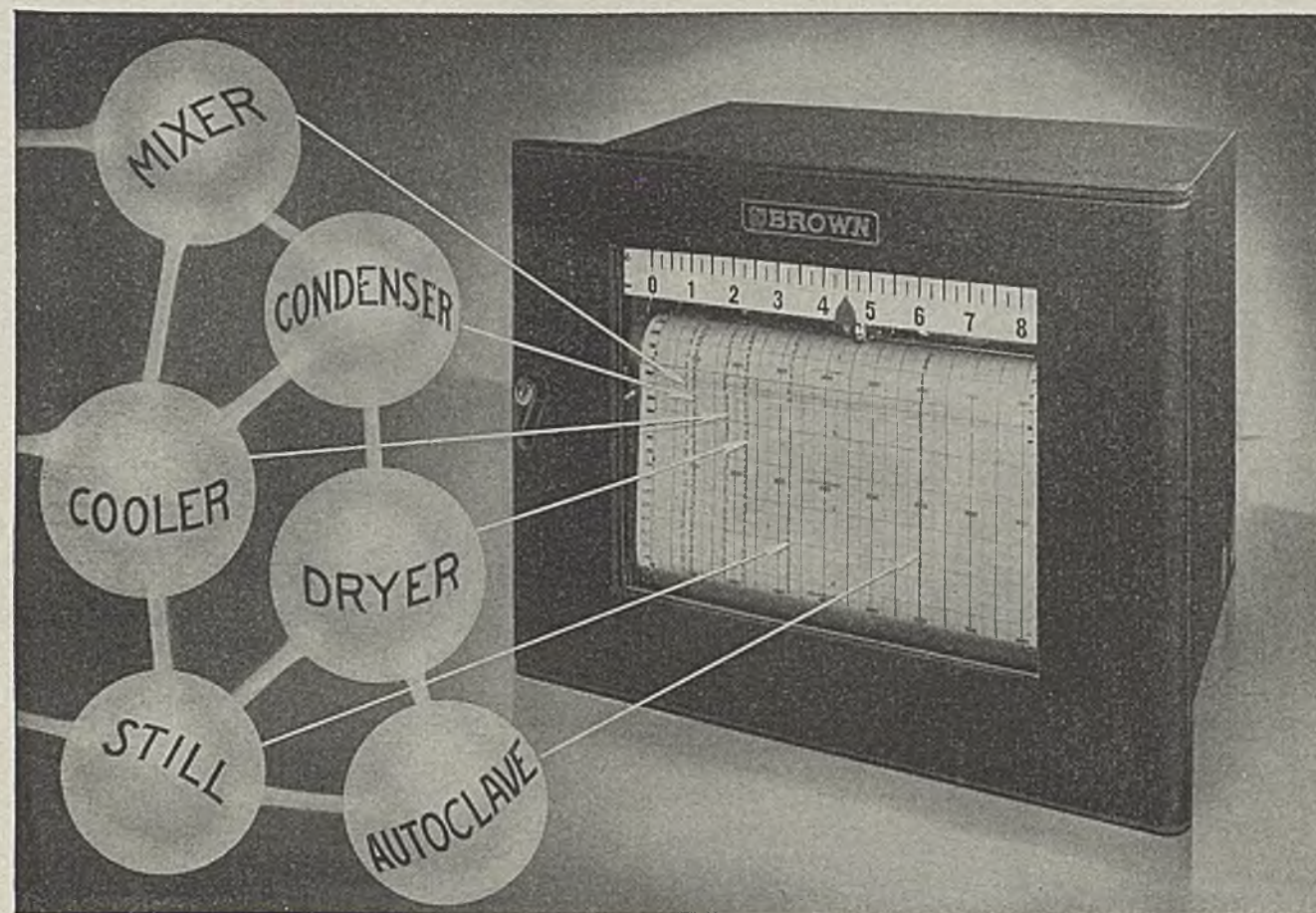
The merits of the "Continuous Balance" Principle have been proved by thousands of installations made during the last five years.

AN INVITATION
SEE THE
ElectroniK Family
ON DISPLAY AT THE
NATIONAL CHEMICAL EXPOSITION
BOOTHS N-34 & N-35
September 10 to 14, 1946
CHICAGO COLISEUM

Write for catalogs. THE BROWN INSTRUMENT COMPANY, a division of Minneapolis-Honeywell Regulator Company, 4478 Wayne Avenue, Philadelphia 44, Pa. Offices in all principal cities. Toronto, Canada; London, England; Stockholm, Sweden; Amsterdam, Holland.

BROWN ElectroniK

CONTROL OF TEMPERATURE



ElectroniK Strip Chart Recorder

Here are a few of the advantages which make the Brown ElectroniK the leader in precision measurement and control:

Sensitivity (1/32 percent of full scale) exceeds the smallest temperature change readable on the accurately calibrated charts and scales.

Throttling ranges are extremely narrow resulting in Positive response valve action and "Perfect Circle" control lines. Air or Electric control forms available.

Split-hair accuracy safeguarded by automatic push-button battery standardization.

Unaffected by *vibration*. Its simple mechanical construction has dependability and ruggedness through complete elimination of the galvanometer. Mechanical parts move when temperature is changing.

Synchro-Balance printing, an exclusive unusual feature, fully utilizes the speed of high speed recording model.

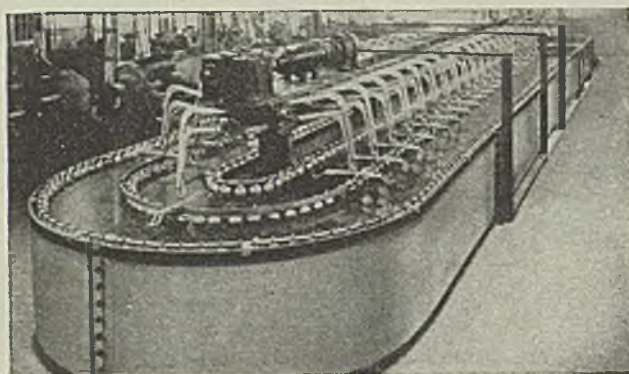


ElectroniK Circular Chart Controller

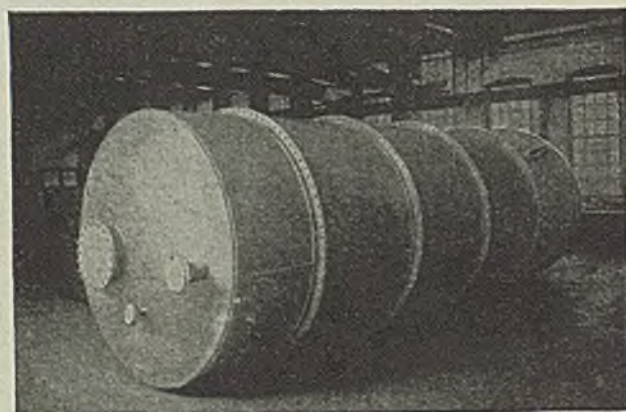
POTENTIOMETERS

OPERATE ON "CONTINUOUS BALANCE" PRINCIPLE

Eliminate Corrosion ON 3 FRONTS



Ace rubber lined sectional tank for paper processing



Ace rubber lined return-type plating tank

1. Prevent damage to finished product.
2. End contamination of valuable chemical solutions.
3. Avoid deterioration of equipment.

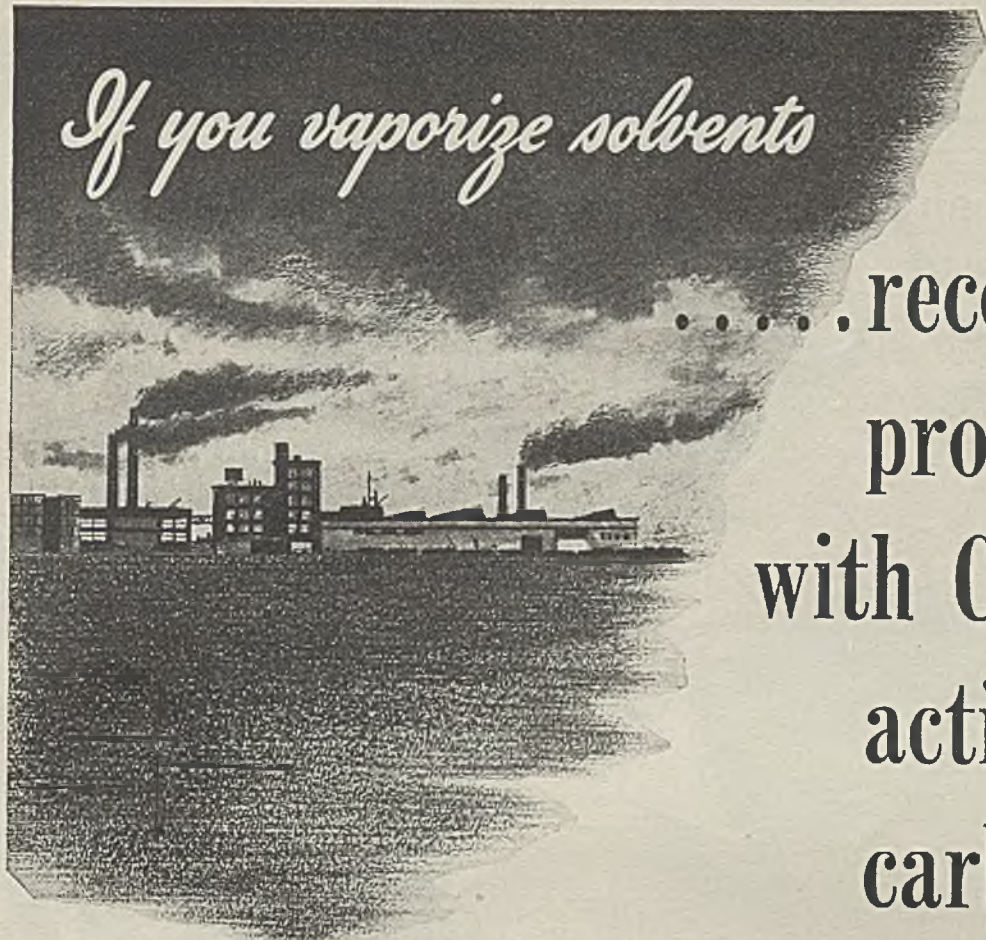
Draft Ace Hard Rubber in your war on corrosion affecting circulating, storage and processing operations. Ace Hard Rubber has been employed in leading industrial plants for corrosion-resistant services for nearly 75 years... with significant and substantial economies. Put Ace Hard Rubber to work in your plant—write for "ACE RUBBER PROTECTION", 64 page catalog containing important information for plant executives.

American Hard Rubber Company
11 Mercer Street, New York 13, N. Y.

Ace Hard Rubber

*Ace-Saran Anti-Corrosion Equipment
Hard and Soft Rubber Lined Tanks, Pipe and Fittings
All-Hard Rubber Pipe, Fittings and Utensils
Hard Rubber Pumps in a Wide Range of Sizes and Capacities
Made-to-Specification Equipment—Hard Rubber and
Hard Rubber Lined*

If you vaporize solvents



.....recover them
profitably
with **COLUMBIA**
activated
carbon

Yes—even concentrations as low as $\frac{1}{4}$ lb. of low-cost solvent in 1,000 cu. ft. of air can be recovered *economically* with COLUMBIA activated carbon. Recovery plants operate at a fraction of the cost of new solvents with moderate upkeep. Efficiency is high—better than 99 per cent of all solvent vapor passed to the adsorbers is consistently recovered! The plants can recover all types of volatile solvents—alone or in combination—even in the presence of water vapor.

If you vaporize solvents in your process, Carbide and Carbon Chemicals Corporation can supply you with a complete solvent-recovery plant, designed to meet the specific requirements of your process. Operating characteristics are guaranteed, and the plant can be completely automatic in operation.

The booklet "Solvent Recovery" (Form 4410) describes in detail this modern method of saving money by saving solvents. Write for your copy today.

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation



30 East 42nd Street, New York 17, N. Y.

COLUMBIA

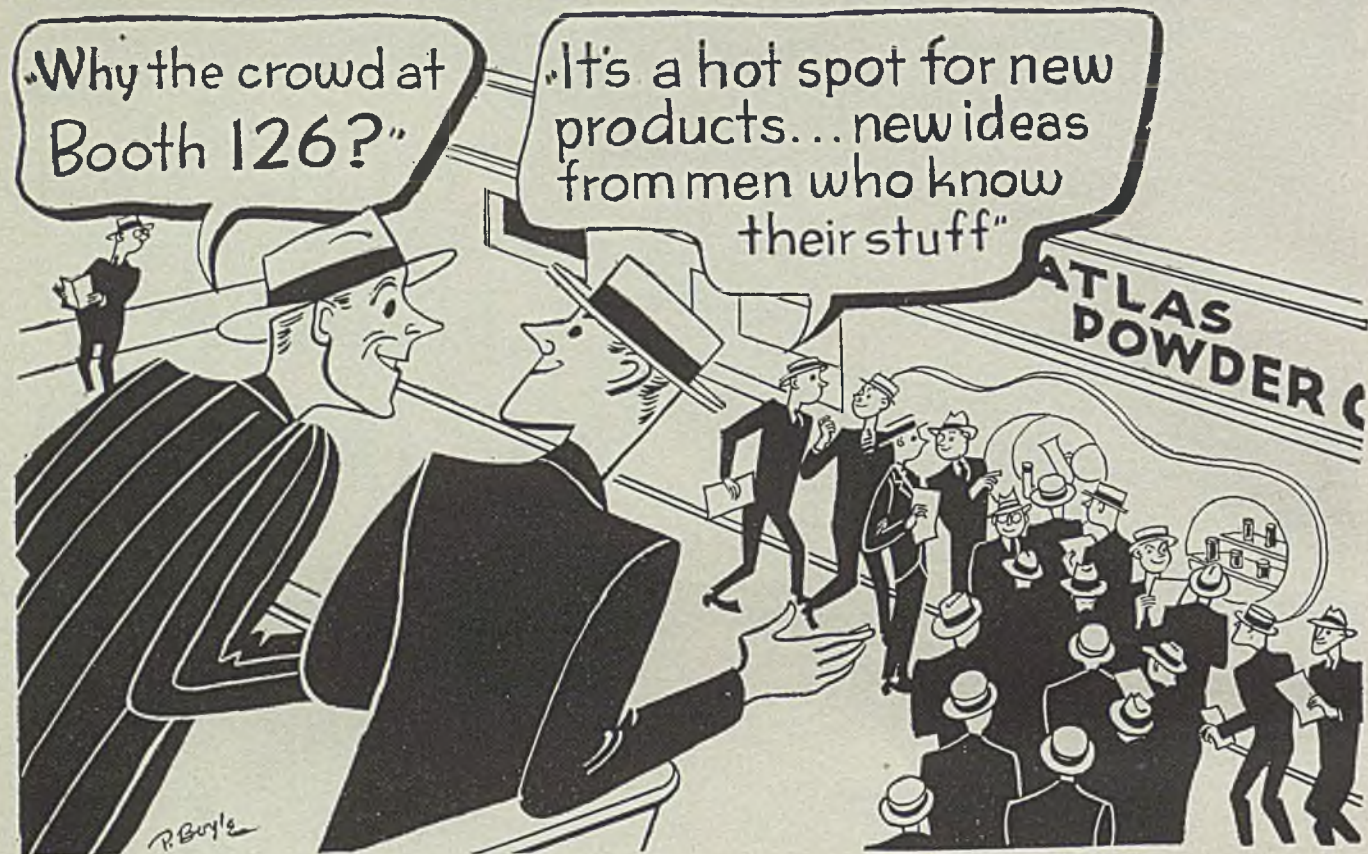
TRADE-MARK

*Activated
Carbon*

Life-Saver for Men and Materials

SOLVENT RECOVERY • CATALYSIS • GAS AND AIR PURIFICATION

Booth No. 126—Chicago Chemical Show



Make it a point to visit the Atlas Booth #126 at the Chicago Chemical Show. You will find experienced men prepared to discuss problems which may save money and time for you and your business.

LOOK FOR IDEAS—

For Cosmetics

Atlas Arlacels, and Atlas Spans and Tweens permit a new flexibility and freedom from restriction in the formulation of quality cosmetic creams and lotions, and in the solubilization of essential oils.

For Textiles

Non-ionic sizes and finishes for viscose rayon, acetate and hydrophobic fibers. (Developed jointly by Atlas and American Viscose Corp., manufactured by Atlas, and distributed by American Viscose Corp.)

Besides, you will find chemicals from sugar—polyalcohols, mannitol, sorbitol, dulcitol; hexide derivatives; sorbitol for paints, varnishes and resins; plasticizers; Brevon plastics; strippable coatings; Revolite plastic laundry roll cover material; Rockmaster blasting system.

For Parasiticiides

Atlas non-ionic emulsifiers, spreaders, wetting agents and synergistic chemicals are available for use in repellents, D.D.T. sprays, dormant oil sprays, weed killers, hormone sprays, and agricultural and horticultural insecticides and parasiticides.

For General Industrial Emulsions

Atlas non-ionic emulsifiers have a wide range of industrial uses such as emulsion polishes, emulsion paints, cutting oils of the water "soluble" type and water-proofing wax emulsions.

Arlacels, Spans & Tweens, Brevon, Revolite—Reg. U. S. Pat. Off.—"ROCKMASTER"—Trademark

ATLAS

INDUSTRIAL
CHEMICALS
DEPARTMENT



ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

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You will find the trip worth while. Darco carbons have four supremacies—purity, high adsorptive capacity, maximum filterability and low retention loss. These four supremacies make for highest efficiency in four specific uses.

① *Purity Maintenance in Continuously Used Liquids*

For many years Darco DC has been used for the removal of color, odor and fatty acids from drycleaning solvents, permitting their continual reuse.

Darco S-51 is used for continuous removal of impurities from electroplating solutions, thus maintaining a high purity level and permitting maximum brightness, adhesion and corrosion protection by electro-deposit.

② *Color, Odor and Colloid Removal*

This is, of course, the best known and most widely used application for Darco. Corn, cane and beet sugars, vegetable oils and fats, industrial and fine chemicals, municipal and industrial water supplies, and a host of other things are purified with Darco.

③ *Concentration by Adsorption and Elution*

Penicillin is being concentrated in large scale operation by adsorption on Darco G-60, followed by elution (desorption) with a small volume of suitable solvent.

The principle of this concentration process is being studied for the recovery of other organic products, and indicates a large new field of use for activated carbons.

④ *Catalyst and Catalyst Carrier*

The enormous surface presented by activated carbon has led to its use in many catalytic processes. Both powdered and granular grades are used in this field.

Carbon may promote reactions by concentrating the reagents at its surface, or it may be used as a base for metal and metal oxide catalysts. Platinum and palladium on Darco G-60 are successful illustrations of this use.



DARCO—REG. U. S. PAT. OFF.

**DARCO
CORPORATION**

60 East 42nd Street, New York 17, N. Y.

Up to 250°F in

USE PYREX PIPE for

1. VISIBILITY
2. CORROSION RESISTANCE
3. PURITY MAINTENANCE

Pyrex Pipe Characteristics

VISIBILITY. The crystal clear transparency of PYREX Pipe permits visual inspection of every foot of your pipe line at any time. This feature serves to forewarn you of unexpected trouble in your pipe lines.

MAINTAINING PRODUCT PURITY. PYREX Pipe is resistant to all acids (except H.F.) and moderate alkalis. There is no heavy metal pick-up or danger of metallic contamination. PYREX Pipe lines assure the ultimate in obtaining product purity.

EASE OF INSTALLATION. Your own men can install a PYREX Glass Pipe Line. No special tools or special training are required. The Pipe, the fittings and the hardware come to your installation point ready for assembly. Stock adaptor flanges are available to connect PYREX Pipe to metal pipe and other plant equipment.

SIZES AND FITTINGS. PYREX Glass Pipe is now available in 1", 1½", 2", 3", and 4". A complete line of

standard PYREX fittings includes ells, tees, return bends, laterals and reducers. Special fittings can be readily made to your specifications.

Standard fittings and adaptor connections are available to connect PYREX Pipe to your present equipment.

LOW COST. The initial cost of PYREX Pipe (accessories included) is about the same or less than the cost of full weight copper or brass piping in comparable sizes, and is considerably less than the cost of most other corrosion resistant alloys. Whether you figure costs of new equipment in terms of initial outlay or in terms of overall costs—spread over the length of service it will give you—PYREX Pipe is your best bet.

OPERATING PRESSURES. Most installations operate at pressures up to 50 p.s.i.—but pressures as high as 100 p.s.i. can be considered.

GLASS

PIPE

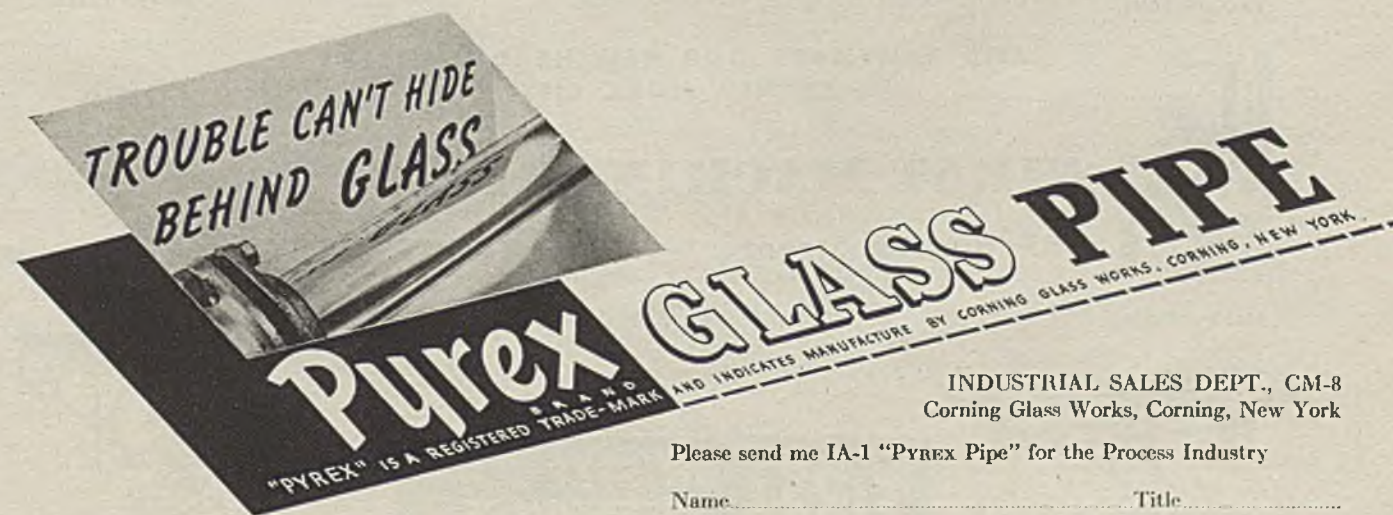
PYREX brand Glass Pipe will withstand operating temperatures as high as 250° F and temperatures up to 400° F can be considered. Furthermore, PYREX brand glass has remarkable ability to withstand sudden temperature changes.

Its resistance to thermal shock makes it possible to flush Pyrex Pipe Lines with live steam immediately followed by cold water—a procedure often followed as a cleaning process. It is one of many reasons which make PYREX Pipe practical plant equipment.

It is the only pipe that possesses the combined advantages of corrosion resistance, visibility and purity maintenance. Its sturdiness and serviceability have been thoroughly proved by miles of pipe lines that have been in actual plant service for many years. You can install it with confidence.

Corning Engineers will gladly furnish you with complete details. Write to Industrial Sales Department CM-8.

CORNING GLASS WORKS
CORNING, NEW YORK



INDUSTRIAL SALES DEPT., CM-8
Corning Glass Works, Corning, New York

Please send me IA-1 "PYREX Pipe" for the Process Industry

Name..... Title.....

Firm.....

Address.....

First
IN CHICAGO

**FIRST THING YOU DO
VISIT**

F M C

Booth

N6

at the Coliseum

"FIRST" at the CHEMICAL SHOW

CHICAGO - SEPT. 10-14-1946

The new and greater First Machinery Corp. now offers greatly enlarged and augmented facilities in every department. Our complete line of new equipment for the chemical and process industries includes many needed units which heretofore have not been available.

Regardless of your requirements, we urge you to stop at our booth No. N6 at Chicago Coliseum September 10th to 14th and consult with our sales engineers and attendants.

**NEW "FMC" EQUIPMENT
FOR REASONABLY PROMPT SHIPMENT**

Greatly improved conditions in raw material and labor enable FMC to make fairly prompt shipments on our complete line of new equipment. Illustrated here you will find many of the items we are prepared to supply immediately. Lack of space permits showing many others. Kindly send us your inquiry. We will be glad to quote you on any of your requirements. If you are not coming to the Chicago Show, please write, wire or phone our New York Headquarters. (see address below).

**AND REMEMBER OUR NEW HEADQUARTERS
IN NEW YORK CITY**

FIRST MACHINERY CORP.

157 Hudson Street

New York 13, N. Y.

Phone WOrth 4-5900



FMC SYPHON FILLERS



FMC PORTABLE
AGITATORS

FMC PORTABLE CAP
TIGHTENERS



FMC STAINLESS STEEL
KETTLES, TANKS and
VACUUM PANS;



FMC PULVERIZER



FMC BELT CONVEYOR



FMC VACUUM FILLER



STAINLESS STEEL
EQUIPMENT



FMC STRAIGHT LINE
SYPHON FILLER

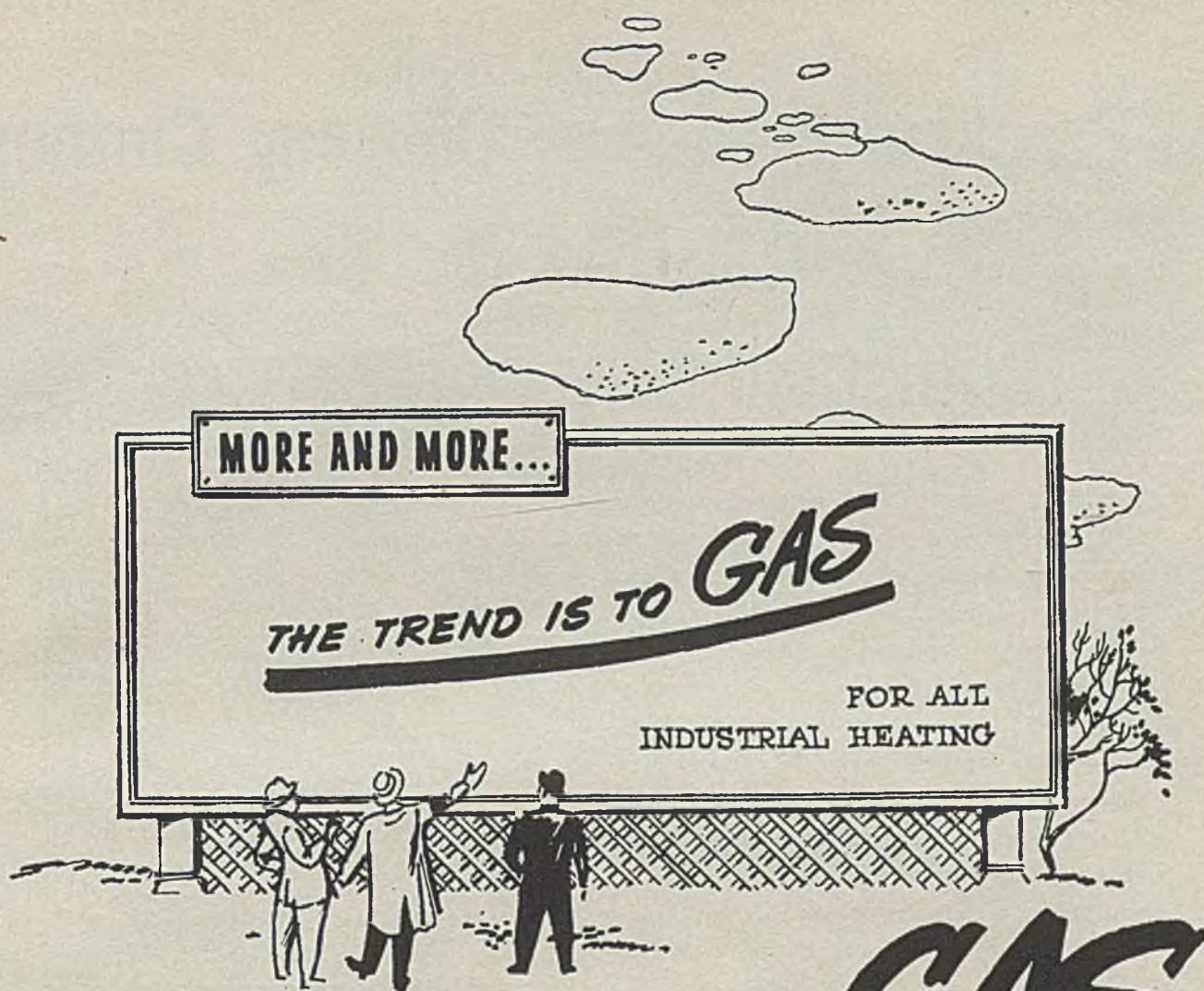


FMC TUMBLING BATCH
MIXERS



FMC DRY POWDER
MIXERS

**FIRST IN SIZE
IN SERVICE
IN ACCESSIBILITY**



When you need heat.... you need **GAS**

More and more "The Trend is to GAS" for the difficult heating jobs of industry. More and more, GAS and modern Gas equipment fulfill the exacting specifications set up by engineers and production executives for all industrial processes requiring heat.

On every count, in comparison with other heat sources, GAS is the ideal heating medium. Wherever heat is required in manufacturing processes, there's a job for GAS. Characteristics of GAS—features of importance to management—include:

- Flexibility
- Cleanliness
- Rapid Heating
- Economy of Operation
- Precise Controllability
- Dependability
- Versatility of Application
- Labor-Saving Automatic Regulation

Your local Gas Company will send an Industrial Representative to explain why:

When You Need Heat—You Need GAS:

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE

NEW YORK 17, N. Y.

In Cracking Crudes or Cleaning Clothes ... ANACONDA Metals Withstand Corrosive Service

THE TWO APPLICATIONS illustrated are typical of the thousands of installations in which Anaconda Copper and Copper Alloys are providing dependable, economical service under corrosive conditions.

Widely used in the construction of processing and heat transfer equipment, these metals are produced in all commercial shapes, in a range of alloys to meet a great variety of service requirements. Manufacturers and users of processing and heat transfer equipment are invited to consult our Technical Department on unusual problems. For

detailed information on Anaconda Alloys and Anaconda Condenser Tubes and Plates, write for Publications B-28 and B-2. 49221

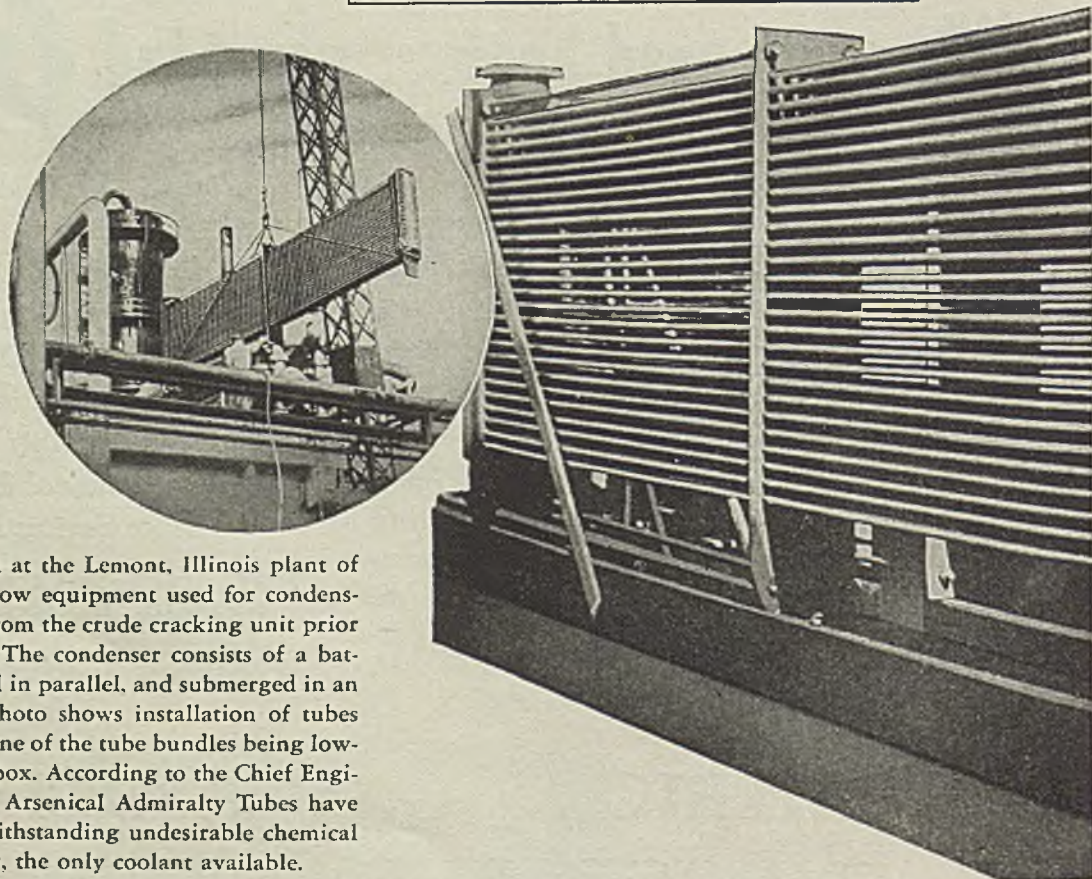
ANACONDA
from pipe to machinery

Anaconda

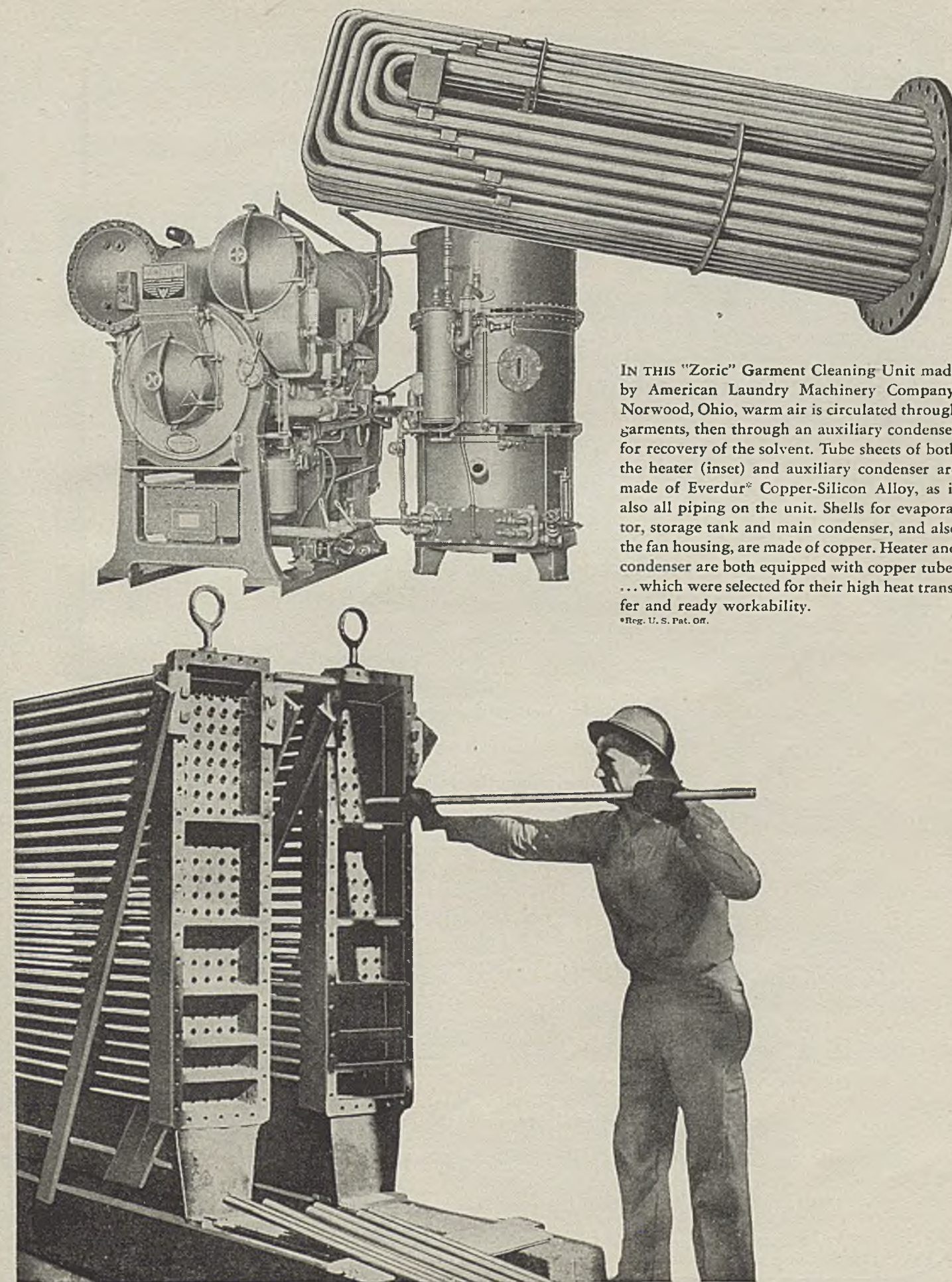
COPPER & COPPER ALLOYS

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
 In Canada: ANACONDA AMERICAN BRASS LTD.,
 New Toronto, Ont.



THESE PHOTOGRAPHS taken at the Lemont, Illinois plant of Globe Oil & Refining Co., show equipment used for condensing cracked gasoline vapors from the crude cracking unit prior to stabilization and treating. The condenser consists of a battery of tube bundles connected in parallel, and submerged in an open-top water box. Large photo shows installation of tubes in bundle, while inset shows one of the tube bundles being lowered into the open-top water box. According to the Chief Engineer of Globe Oil, Anaconda Arsenical Admiralty Tubes have proven very satisfactory in withstanding undesirable chemical constituents of polluted water, the only coolant available.



IN THIS "Zoric" Garment Cleaning Unit made by American Laundry Machinery Company, Norwood, Ohio, warm air is circulated through garments, then through an auxiliary condenser for recovery of the solvent. Tube sheets of both the heater (inset) and auxiliary condenser are made of Everdur® Copper-Silicon Alloy, as is also all piping on the unit. Shells for evaporator, storage tank and main condenser, and also the fan housing, are made of copper. Heater and condenser are both equipped with copper tubes ... which were selected for their high heat transfer and ready workability.

*Reg. U. S. Pat. Off.

A
New

EDGE MOOR SERVICE
to the PROCESS INDUSTRIES

• Edge Moor has installed a complete chemical laboratory and pilot plant for the collection of all data necessary in the designing of equipment for any processing procedure. The use of these facilities is available without cost to anyone requiring equipment or a complete plant for some particular process. Submit your problems to Edge Moor for a solution based on sound engineering practice and reliable pilot plant data.

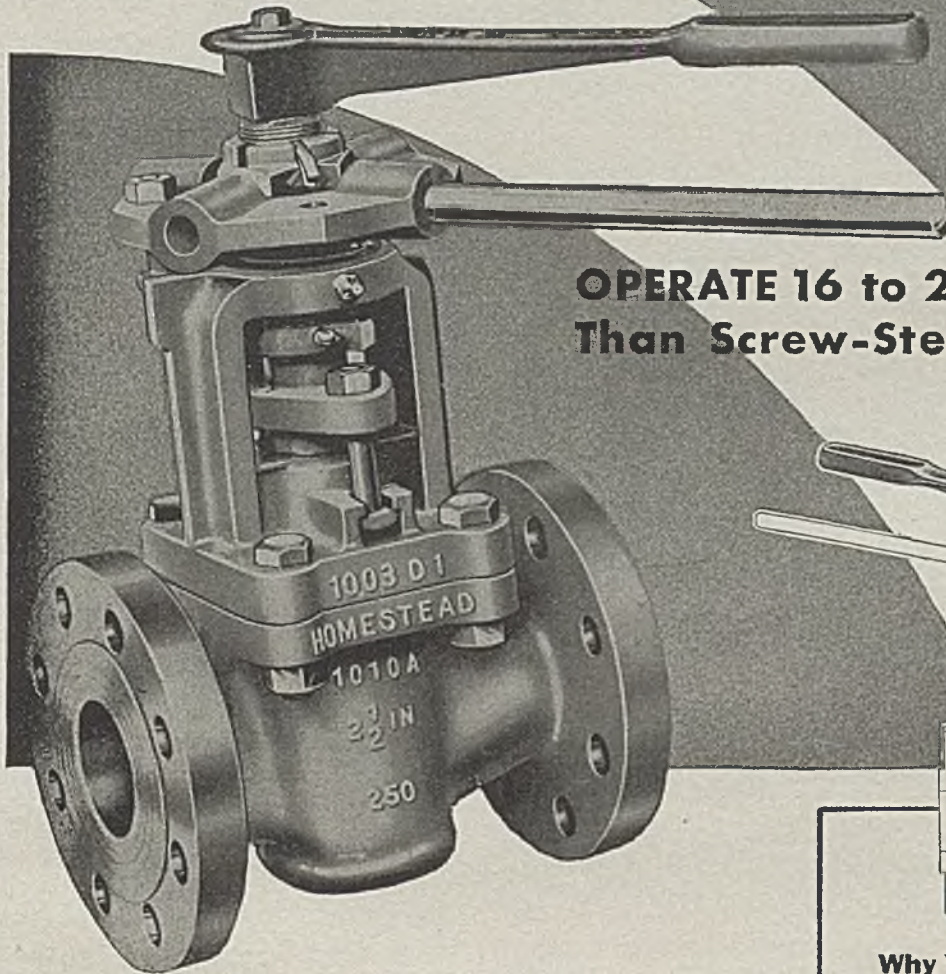
EDGE MOOR IRON WORKS, Inc.

Edge Moor, Delaware

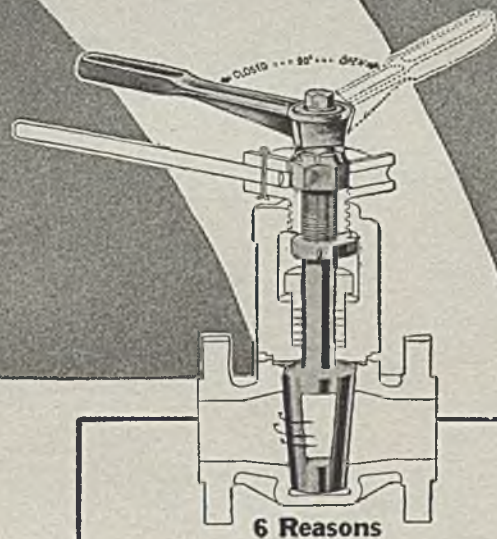


Quick Action Every Time

with Homestead Lever-Seald Valves



**OPERATE 16 to 28 TIMES FASTER
Than Screw-Stem Type Valves**



Why You Should Use Homestead LEVER-SEALD VALVES:

1. Instant Stick-proof operation.
2. QUARTER-TURN FULLY OPENS OR CLOSSES.
3. Positive seal without lubrication.
4. Seating surfaces always protected in both open and closed positions. Corrosion practically eliminated.
5. Unobstructed straight-line fluid flow.
6. All operating parts protected from damaging effects of service conditions and weather.

Operation of HOMESTEAD LEVER-SEALD VALVES is quick and positive. From wide-open to fully-closed requires only a *quarter-turn* of the upper lever—and that's 16 to 28 times faster operation than the 6 to 7 full turns required by screw-stem-type valves. Not only do HOMESTEAD LEVER-SEALD VALVES operate quickly, but they are built to operate under all conditions; for built right into every valve is a powerful lever and screw device which relieves seating pressure between the plug and body just enough to overcome friction and permit easy turning. For fast, positive, labor-saving operation, they can't be beat! And the small space required by the Quarter-Turn, permits their use where other valves could not be operated.

HOMESTEAD LEVER-SEALD VALVES are made in combinations of metals and alloys to meet your service requirements, in sizes 1½" to 10", for pressure ranges from 150 pounds to 1500 pounds. Special valves may be designed to meet your specific requirements. Write now for Valve Reference Book No. 38.

Homestead VALVES

LEVER-SEALD VALVES

HOMESTEAD VALVE MFG. CO. • • • P. O. BOX 13 • • • CORAOPOLIS, PA.

CHEMICAL ENGINEERING • AUGUST 1946 •



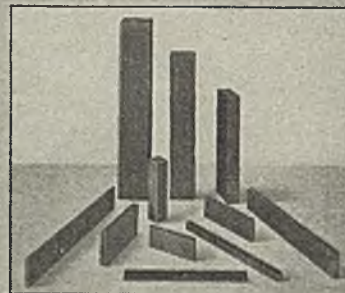
"M" Pennant with three additional gold stars—highest Maritime production award yet given to the men and women of any manufacturing company.

names worth remembering . . .

★★★★★ **Hisinger**

for discovering electrolytic decomposition

of neutral salt solutions into acid and metal, 1804.



★★★★★ **INTERNATIONAL**

for graphite anodes

with the *right* electrical properties.

UNUSUALLY favorable power consumption is only one of the advantages of using INTERNATIONAL Graphite Anodes in electrolytic cells. Their dense, tightly-knit structure, entirely and uniformly graphitized, give INTERNATIONAL Anodes the right electrical properties that assure *low anode cost* per pound of production.

The same extreme care in selecting materials and at every stage in manufacture that makes INTERNATIONAL Anodes "electrically right" also gives them the other cost-saving properties listed below. No wonder leading producers of high grade alkalies, acids and other chemicals find INTERNATIONAL Graphite Anodes so economical and dependable.

High quality INTERNATIONAL Graphite Anodes can be supplied in every desired shape or form, plain or impregnated, to meet *your* most exacting requirements.

Write us today:

OTHER ADVANTAGES

High degree of purity • Favorable power consumption • High resistance to chemical disintegration • Low ultimate cost per unit of production • Ease of machining and assembly
Close dimensional tolerances.

⊕ 1345



**International
Graphite &
Electrode Corp.**

SAINT MARYS, PA.



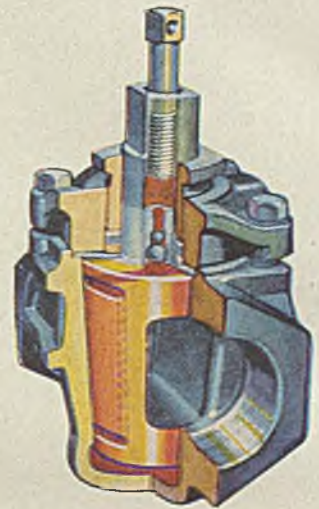
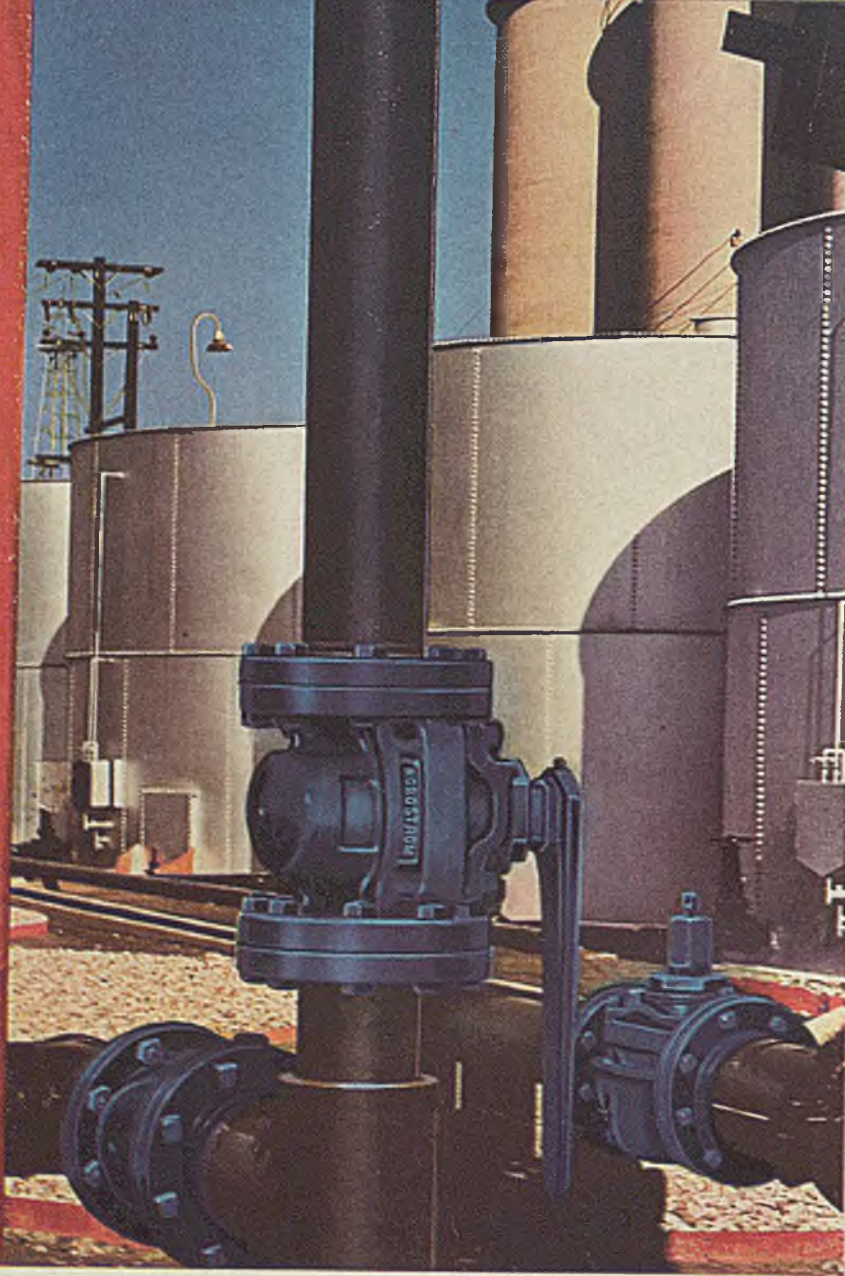
PERFECT CONTROL
with Safety

KEEP UPKEEP DOWN

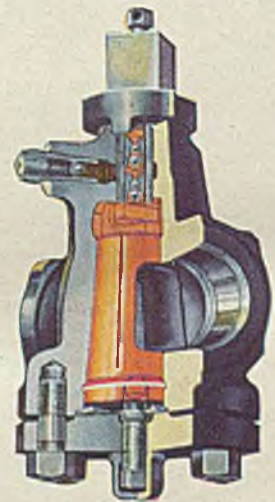
NORDSTROM LUBRICATED VALVES



Pennies for
LUBRICATION
buy years of
valve life



STANDARD TYPE



HYPRESEAL TYPE

Metal to metal friction means rapid *wear*. But add lubrication between metal contacts and wear is prevented. Add pressure to the lubricant of a valve plug and another function is provided—*jacking action* to the plug, to insure easy turning. Add the Nordstrom patented "*Sealdport*" principle and still another function is provided—the *positive sealing* of the valve by forming a pressure seal around each port when the valve is closed. This is accomplished by the simple act of pressure lubrication.

Nordstrom

LUBRICATED

FOR
ALL-PURPOSE
SERVICE

VALVES

Sealdport Lubrication

NORDSTROM VALVE COMPANY — *Division of Rockwell Manufacturing Company*

WORLD'S LARGEST MANUFACTURERS OF LUBRICATED PLUG VALVES

Main Office:

400 North Lexington Ave.



Pittsburgh 8, Pennsylvania

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Export: Rockwell International Corporation, 7701 Empire State Bldg., New York 1, N.Y.

DO YOU NEED A BETTER REFRACTORORY?

● Corhart Electrocast Refractories are high-duty products which have proved considerably more effective than conventional refractories in certain severe services. If your processes contain spots where a better refractory is needed to provide a balanced unit and to reduce frequent repairs, Corhart Electrocast Refractories may possibly be the answer. The brief outline below gives some of the basic facts about our products. Further information will be gladly sent you on request.

Corhart Refractories Company, Incorporated, Sixteenth and Lee Streets, Louisville 10, Kentucky.

"Corhart" is a trade-mark, registered U. S. Patent Office.

PRODUCTS

The Corhart Refractories Company manufactures Electrocast refractory products exclusively. Corhart Electrocast Refractories are made by melting selected and controlled refractory batches in electric furnaces and casting the molten material into molds of any desired reasonable shape and size. After careful annealing, the castings are ready for shipment and use. Three Electrocast refractory compositions are commercially available:

CORHART STANDARD ELECTROCAST—a high-duty corundum-mullite refractory, with density of approximately 183 lbs. per cu. ft.

CORHART ZED ELECTROCAST—a high-duty zirconia-bearing aluminous refractory, with density of approximately 205 lbs. per cu. ft.

CORHART ZAC ELECTROCAST—a high-duty zirconia-bearing refractory, with density of approximately 220 lbs. per cu. ft.

Other Corhart products are:

CORHART STANDARD MORTAR—a high-temperature, high-quality, hot-setting cement for laying up Electrocast, or any aluminous refractory.

CORHART ACID-PROOF MORTARS—rapid cold-setting, vitrifiable mortars of minimum porosities.

CORHART ELECTROPLAST—a high-temperature, hot-setting plastic refractory, designed for ramming and made from crushed Standard Electrocast.

CORHART ELECTROCAST GRAINS—Standard Electrocast crushed to desired screen size for use in many commercial applications.

PROPERTIES

Due to the unique method of manufacture, the Electrocast refractory line possesses a combination of characteristics found in no other type of refractory. Data on properties will be sent on request.

POROSITY: Apparent porosity of Corhart Electrocast refractories is practically nil—therefore virtually no absorption.

HARDNESS: 8-9 on Mineralogist's scale.

THERMAL EXPANSION: Less than that of conventional fire clay bodies.

THERMAL CONDUCTIVITY: Approximately one and one-half times that of conventional fire clay bodies.

REFRACTORINESS: Many industrial furnaces continuously operated up to approximately 3000° F. are built of Corhart Electrocast.

CORROSION: Because of exceedingly low porosity and inherent chemical compositions, Corhart Electrocast refractories are resistant to corrosive action of slag, ashes, glasses, and most non-ferrous metals as well as to disintegrating effects of molten electrolyte salt mixtures.

APPLICATIONS

Most heat and metallurgical processes present spots where better refractory materials are

needed, in order to provide a balanced unit and reduce the expense of repeated repairs. It is for such places of severe service that we invite inquiries regarding Corhart Products as the fortifying agents to provide the balance desired. A partial list of applications in which Corhart Electrocast products have proved economical follows:

GLASS TANKS—entire installation of sidewalls and bottoms, breastwalls, ports, tuckstones, throats, forehearth, bushings, bowls, recuperators, etc., for lime, lead, opal and borosilicate glasses.

ELECTROLYTIC CELLS—for production of magnesium and other light metals.

SODIUM SILICATE FURNACES—sidewalls, bottoms, and breastwalls.

PIGMENT FRIT FURNACES—complete tank furnaces for melting metallic oxides and salts for pigment manufacture.

ALKALI AND BORAX MELTING FURNACES—fast-eroding portions.

BOILERS—clinker line.

RECUPERATORS—tile, headers, separators, etc.

ENAMEL FRIT FURNACES—flux walls and bottoms.

BRASS FURNACES—metal contact linings.

ELECTRIC FURNACES—linings for rocking type and rammed linings of Electroplast for this and other types.

NON-FERROUS SMELTERS—complete hearths, sidewalls, and tapping hole portions.



CORHART ELECTROCAST REFRACTORIES



... If it's a Phoenix Flange there's strength, dependability and long life ... there's complete assurance of safety, satisfaction and service ... and there's the certainty that once installed Phoenix Flanges are on the job to stay.

Phoenix Flanges are made of mild steel especially suited to welding and machining and are available in a wide range of styles and sizes. They can also be supplied in stainless steel, Everdur brass and other alloys.

Every Phoenix Flange complies with ASA requirements and ASME and ASTM specifications.

Write for your free copy of the new Phoenix Flange Catalog today. It might be the beginning of a beautiful "Flange-ship."



Flange Division of

PHOENIX MANUFACTURING COMPANY

CATASAUQUA, PA.

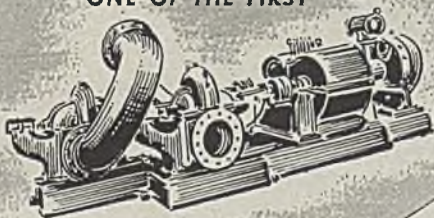


JOLIET, ILLINOIS

45 Years of PUMP

IMPROVEMENT

ONE OF THE FIRST



Built by De Laval in 1902

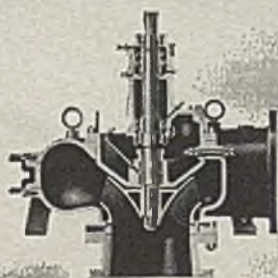
Modern De Laval centrifugal pumps represent the culmination of more than 45 years of continual improvement and perfection. This long period of concentration upon the problems of centrifugal pump design and application places at the user's command a complete line of modern, high quality pumps and a vast store of knowledge concerning pump application problems.



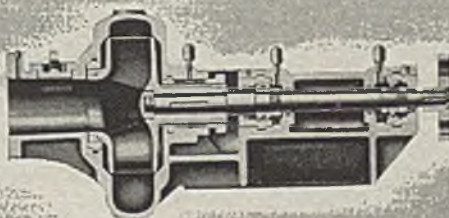
SINGLE STAGE, DOUBLE SUCTION PUMP



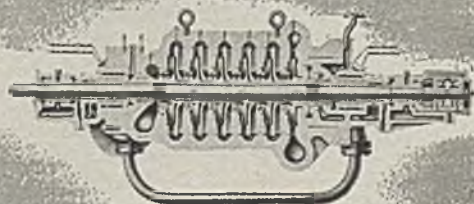
FOUR STAGE, OPPOSED IMPELLER PUMP



MIXED FLOW PUMP



CLOGLESS PUMP



HIGH PRESSURE, MULTI-STAGE PUMP

GP-1

TURBINES • HELICAL GEARS • WORM GEAR SPEED REDUCERS • CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS AND COMPRESSORS • IMO OIL PUMPS

DE LAVAL

**STEAM TURBINE
COMPANY**
TRENTON 2, NEW JERSEY

SALES OFFICES: ATLANTA • BOSTON • CHARLOTTE • CHICAGO • CLEVELAND • DENVER • DETROIT • DULUTH • EDMONTON • GREAT FALLS • HAYANA • HELENA • HOUSTON • KANSAS CITY • LOS ANGELES • MONTREAL
NEW ORLEANS • NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TORONTO • TULSA • VANCOUVER • WASHINGTON, D. C. • WINNIPEG

FEATURED CHEMICALS in the PFIZER FAMILY

- Acetyl Tributyl Citrate
- Acetyl Triethyl Citrate
- ✓ Ammonium Oxalate
- Ascorbic Acid
- Bi-Cap Flour Enrichment Mixtures
- Bismuth Preparations
- Calcium Gluconate
- Citric Acid
- Citrate Esters
- Cream Tartar
- Fumaric Acid
- Gluconic Acid
- Glucono Delta Lactone
- Iron and Ammonium Citrates
- ✓ Iron and Ammonium Oxalate
- Iron Gluconate
- ✓ Iron Oxalate
- Itaconic Acid
- Niacin
- Niacinamide
- ✓ Oxalates
- Penicillin
- Potassium Iodide
- ✓ Potassium Oxalate
- Riboflavin
- Rochelle Salt
- Sodium Citrate
- Sodium Gluconate
- Tartaric Acid
- Thiamine
- Triethyl Citrate
- and many other chemica's

no. 3 in a series:

The OXALATES

Here is a chemical "family within a family" — the Pfizer Oxalates. Among its members are Ammonium Oxalate, Potassium Oxalate, Iron Oxalate, Iron and Ammonium Oxalate and Iron and Sodium Oxalate.



In connection with each of these products, bear this in mind. Each is a worthy member of a larger family — one of more than a hundred Pfizer products. That means a near-century background that has always been a quality background . . . a high degree of physical uniformity and purity . . . the kind of reliability which can only be assured by such essentials as accurate control, modern equipment, ample capacity, technical skill and trained personnel throughout the organiza-



tion. Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y., 444 West Grand Avenue, Chicago 10, Ill.; 605 Third Street, San Francisco 7, Cal.

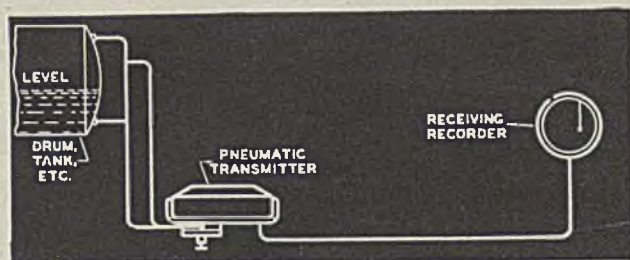
PFIZER

Manufacturing Chemists Since 1849



PNEUMATIC TRANSMITTERS

FOR THE REMOTE METERING AND CONTROL OF
Flow • Pressure • Level • Density



Typical installation for measuring liquid level

LEVEL

There are three types of pneumatic transmitters by which liquid level measurement and control, in either open or closed vessels, may be secured.

1. The differential pressure type, in which the level is measured between the liquid level and a known reference level.

2. The buoyancy type, in which the buoyant force exerted by the liquid against a displacer tube is measured. It may be installed with the tube inside the vessel, or may be arranged for mounting outside the vessel in which the level is measured. This transmitter is used where a condensable vapor is not present. May also be used to measure liquid-to-liquid interface.

3. The weigh tube type, in which the weight of the liquid in a tube is measured. It is suitable only for mounting outside the vessel. This transmitter is especially well suited for very high operating pressures or for the measurement of level of very corrosive liquids.

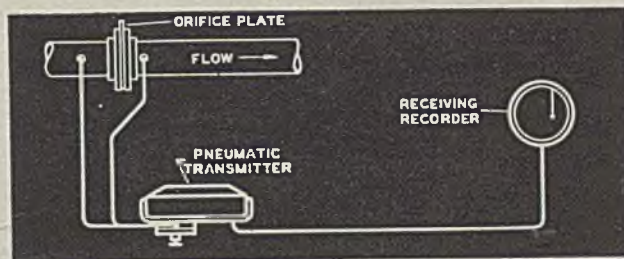


Typical installation for measurement and regulation of density

DENSITY

Republic pneumatic density transmitters are ideal for the measurement and control of the density of a liquid flowing in a line.

Transmitters can be furnished for liquids of densities from 0.5 sp. gr. (compared to water at 60°F.), to the heaviest liquid known.

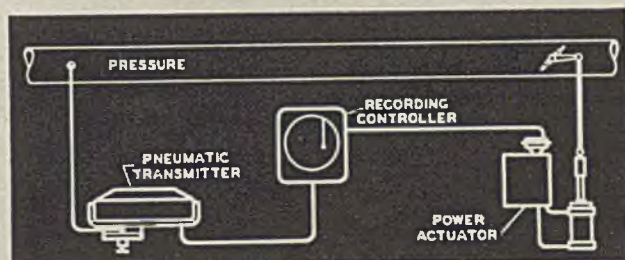


Typical installation for measuring flow

FLOW

Republic pneumatic transmitters are particularly adaptable to the flow measurement and control of steam, water, gas, air or oil at static pressures up to 600 lb. per sq. in. They are built to operate on differentials as low as 0.9 in. of water and as high as 800 in. of water.

Pneumatic transmitters are also provided for the flow measurement of viscous or vaporous liquids which will either congeal or vaporize in lead lines exposed to atmospheric temperature.



Typical pressure control installation

PRESSURE

Ideal for installations where it is undesirable to run long pressure taps due to safety hazards. Built for pressures ranging from 1.0 in. of water to 1500 lb. sq. in.

ADVANTAGES

Republic pneumatic remote metering and control systems permit the desirable centralization of process records without the necessity of running lines containing poisonous or explosive products into control rooms. They also eliminate the necessity of running long lead lines to flow meters or pressure gages with the consequent troubles due to vaporization or freezing of the lines. The transmitter is located close to the point of measurement and the value transmitted pneumatically to some distant point where it can be either indicated, recorded or controlled.

WRITE FOR DATA BOOK No. 1000

REPUBLIC FLOW METERS CO.

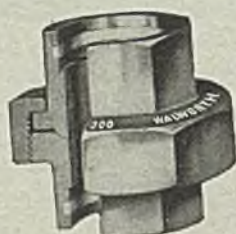
2240 Diversey Parkway, Chicago 47, Illinois

Leakproof SILBRAZ* joints

IN COPPER OR BRASS PIPE



with WALSEAL* fittings, flanges, valves



WALSEAL UNION



WALSEAL 90° ELBOW



WALSEAL Y BRANCH



WALSEAL TEE



WALSEAL GLOBE VALVE



WALSEAL CROSS



WALSEAL OPEN RETURN BEND



WALSEAL COUPLING



WALSEAL FLANGE

(This illustration shows only a few of the many Walseal valves, fittings, and flanges made by Walworth.)

Silbraz joints are the strongest joints that can be made on brass or copper pipe or tubing. They cannot creep or pull apart under any temperature or pressure which the pipe or tubing itself can safely withstand.

Silbraz joints are easily made with an oxyacetylene torch. When alterations to the line are necessary, Silbraz joints can be taken apart by reheating with the torch. The Walseal valves or fittings used for making Silbraz joints may be re-used in the same or a new position. Enough alloy usually remains in the insert groove of the valve or fitting to permit a second Silbraz joint to be made, without the necessity of inserting additional alloy.

Walseal valves, fittings, and flanges for making Silbraz joints are a modern development of the Walworth Company—manufacturers of valves and pipe fittings for more than a century. For detailed information about Walseal products, write for Circular 84. For information on Walworth's complete line of valves, fittings, and pipe wrenches write on your company letterhead for a free copy of Catalog 42.

*Registered trade marks

WALWORTH valves and fittings

60 East 42d Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

One-Piece PIPE LINES

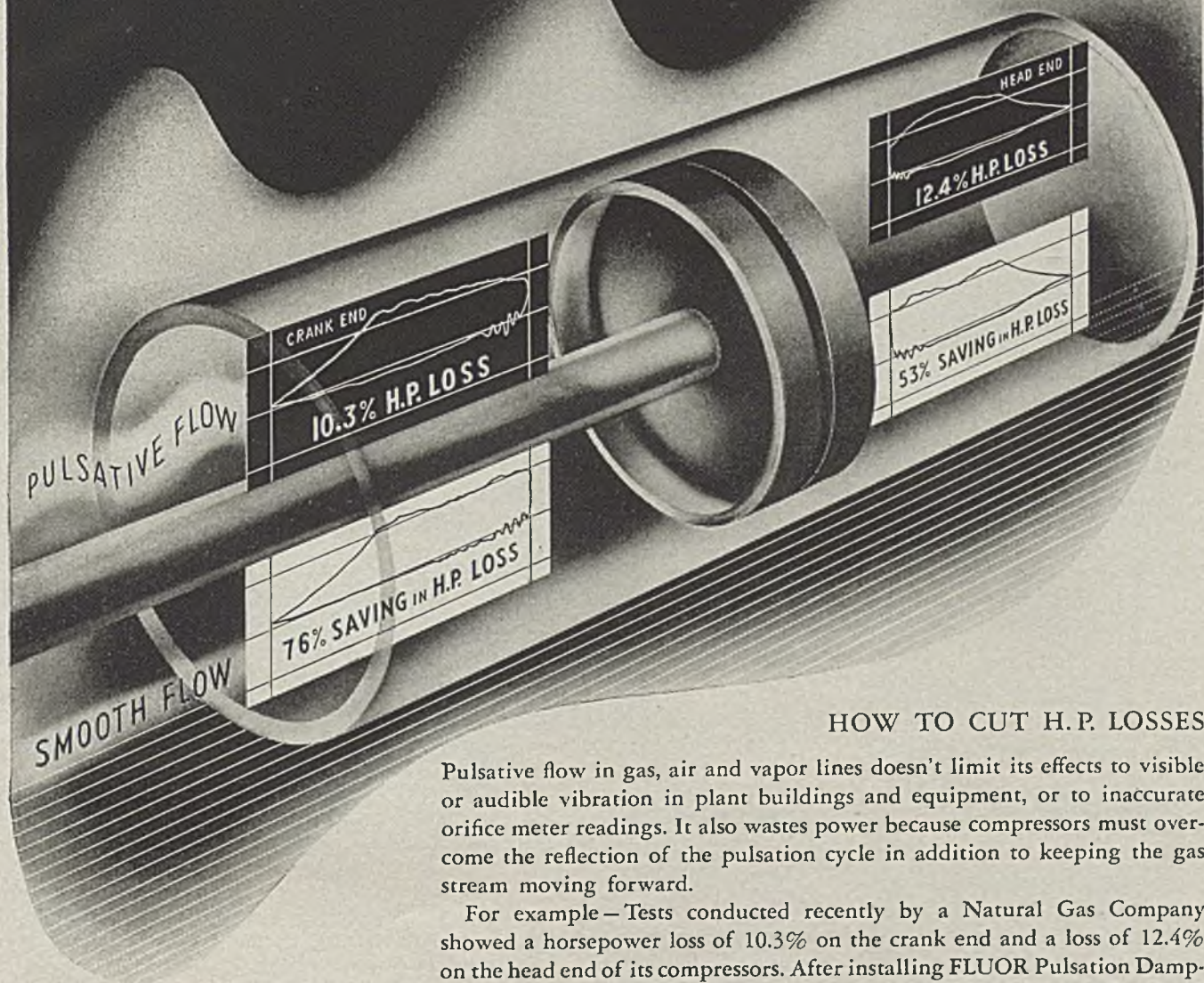


The above illustrates the details of a Walseal tee and Silbraz joints. The center port has been cut away to show the ring of silver brazing alloy which is inserted by the manufacturer in the ports of every Walseal product.

The right-hand port has been cut away to show the penetration of the alloy after the pipe and fitting have been silver brazed.

The left side of the tee shows the fillet of silver brazing alloy which completely encircles the pipe at the juncture of pipe and fitting—indicating that the Silbraz joint is completed. Because the brazing alloy penetrates both pipe and fitting, the resulting Silbraz joint actually makes the pipe and fitting into a one-piece pipe line.

DOES PULSATION PLAY TRICKS IN YOUR PLANT?



HOW TO CUT H. P. LOSSES

Pulsative flow in gas, air and vapor lines doesn't limit its effects to visible or audible vibration in plant buildings and equipment, or to inaccurate orifice meter readings. It also wastes power because compressors must overcome the reflection of the pulsation cycle in addition to keeping the gas stream moving forward.

For example—Tests conducted recently by a Natural Gas Company showed a horsepower loss of 10.3% on the crank end and a loss of 12.4% on the head end of its compressors. After installing FLUOR Pulsation Dampeners on discharge lines, *this power loss was reduced 76% on the crank end and 53% on the head end.* By eliminating pulsative flow and its adverse characteristics, the FLUOR Pulsation Dampener quickly pays for itself through the saving it effects in power cost. Only 24 hours were required to make this installation.

The FLUOR Pulsation Dampener has no moving parts. It operates with beneficial effects on friction losses, horsepower savings and rate of flow. If vibration plays *tricks* in *your* plant, it may be due to pulsative flow in air, gas or vapor lines. In that case, the FLUOR Pulsation Dampener is your answer.



FLUOR PULSATION DAMPENER

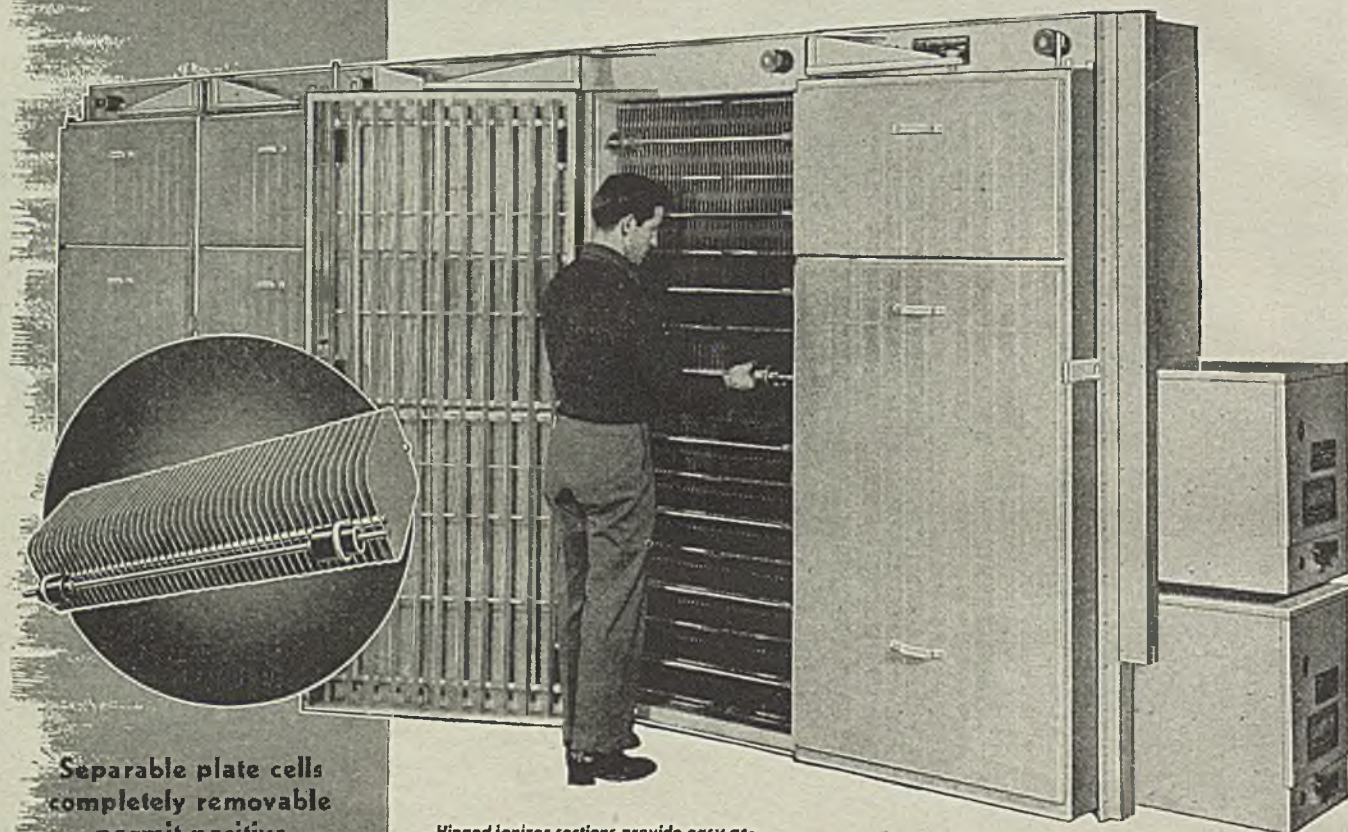
THE FLUOR CORPORATION, LTD. 2500 South Atlantic Boulevard, Los Angeles 22
NEW YORK • PITTSBURGH • KANSAS CITY • HOUSTON • TULSA • BOSTON

ENGINEERS • MANUFACTURERS • CONSTRUCTORS

AAF

Electro-CELL

CELL TYPE Electronic PRECIPITATOR



Separable plate cells completely removable permit positive maintenance.

Hinged ionizer sections provide easy access to collector plate cells for cleaning.

HINGED, FULL HEIGHT IONIZERS

SEPARABLE COLLECTOR PLATES

SECTIONAL CONSTRUCTION

The Electro-Cell is an electronic air filter of new and unusual design that offers the advantages of sectional construction, removable collector plates, full-height hinged ionizers and totally enclosed high voltage wiring. These features, exclusive to the Electro-Cell, are developments of major importance because they simplify installation, improve performance, promote safety and offer a choice of maintenance methods.

The Electro-Cell filter is one of three electronic precipitators developed by this company to meet any requirement for super-clean air. Each type has distinctive advantages under certain operating conditions, and is the result of more than ten years of research and experimentation in the field of electronic dust control.

AMERICAN AIR FILTER COMPANY INC.

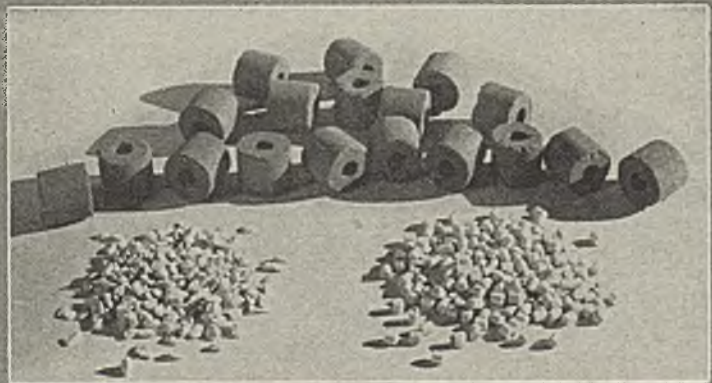
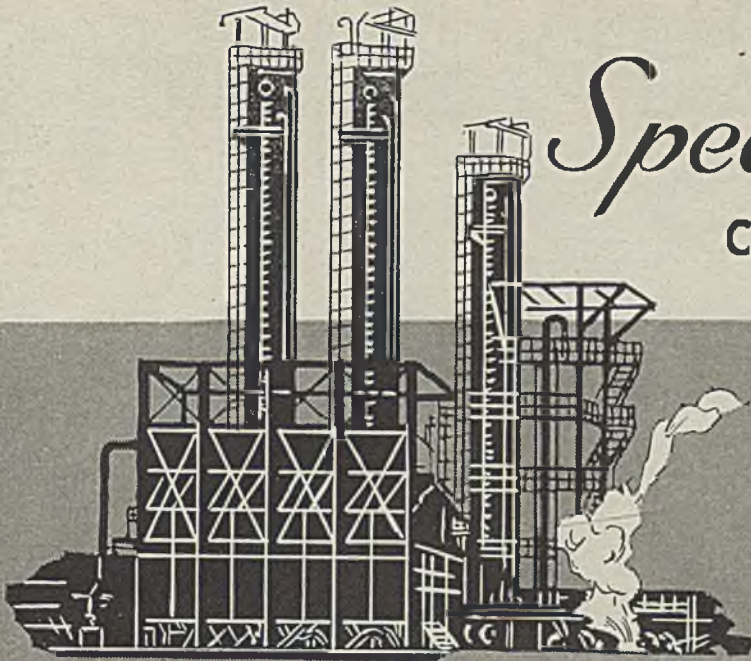
Louisville 8, Kentucky

• 326 Central Avenue

In Canada: Darling Bros., Ltd. Montreal, P. Q.



Specified for CATALYTIC SUPPORTS



ALUNDUM Granules, Pellets, Rings—

Norton Company manufactures ALUNDUM catalyst supports in two grades of chemical purity (alumina 85% and alumina 77%) in the form of porous granules, pellets and rings or tubular shapes. These are available in a wide range of sizes and can be made to fit the needs of the process under consideration.

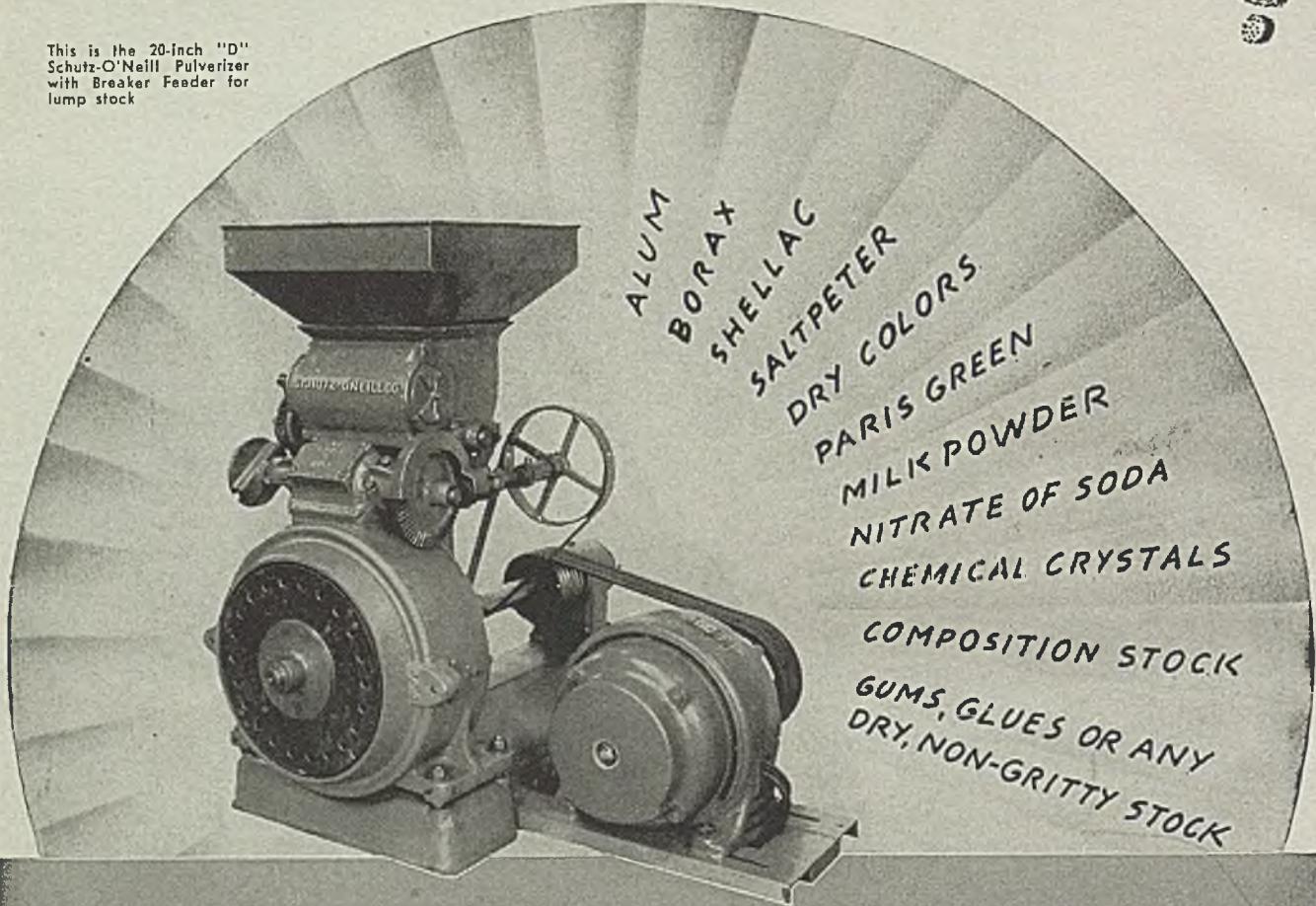
NORTON COMPANY
Worcester 6, Massachusetts

NORTON REFRACTORIES

T. M. REG. U. S. PAT. OFF.

WHAT DO YOU PULVERIZE ?

This is the 20-inch "D" Schutz-O'Neill Pulverizer with Breaker Feeder for lump stock

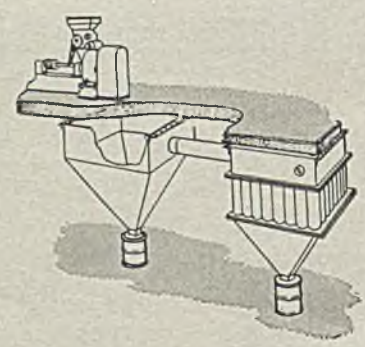


You Can do it *Finer, Faster and Better*

with the SCHUTZ-O'NEILL PULVERIZER

The Schutz-O'Neill Pulverizer is a centrifugal air force impact pulverizer for continuous or batch operation. For extremely fine grinding and uniformity, the principle of centrifugal impact when carried by the air stream has never been surpassed. The product is floated off on air —there is no screen to clog or wear out. Thousands of Schutz-O'Neill Pulverizers have proven their sturdiness, long life, low power consumption, high output and ease of operation. With a range of sizes in several styles, any dry, grindable stock can be efficiently pulverized

CONSULT US ON YOUR PULVERIZING PROBLEMS. Write us your requirements, products to be pulverized, output desired, and send a sample. This in no way obligates you. Literature sent on request.



MILL PLAN 32. Mill discharges directly to bin carried below base of mill and then to Tubular Dust Collector on the same level.



SCHUTZ-O'NEILL CO. DIVISION OF PARTEN MACHINERY CO.

PULVERIZERS • BREAKER MILLS • ROLLER MILLS • BURR MILLS • HAMMER MILLS

301 SIXTH AVENUE SOUTH • MINNEAPOLIS 15, MINNESOTA



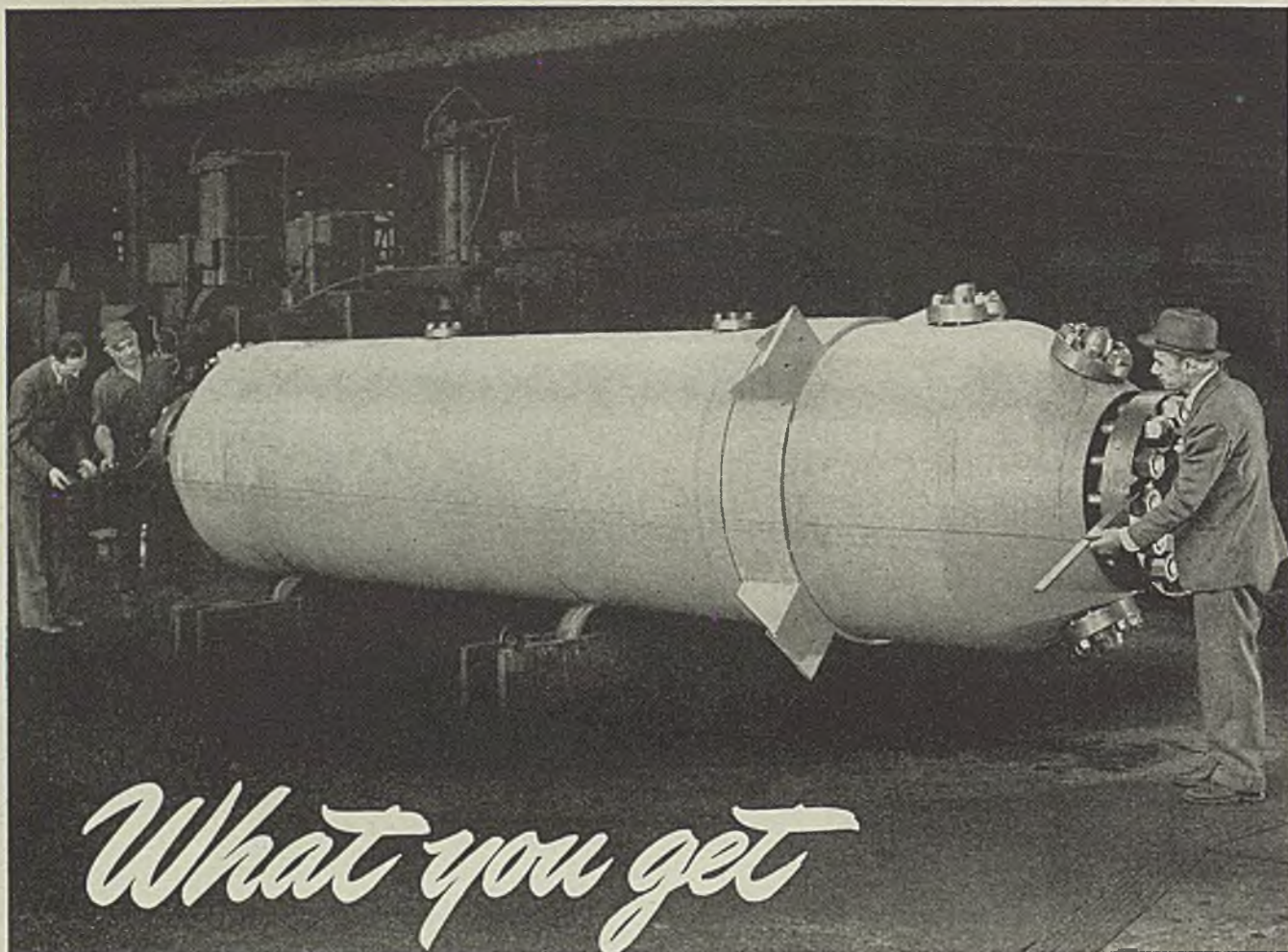
Producers of
SULPHUR

Large stocks carried at all times,
permitting prompt shipments . . .

Uniformly high purity of 99½%
or better . . . Free of arsenic,
selenium and tellurium.



TEXAS GULF  **SULPHUR** **CO.**
75 E. 45th Street New York 17, N.Y.
Mine: Newgulf, Texas
INC.



What you get

in a **BETHLEHEM** **FORGED PRESSURE VESSEL**

Here are several Bethlehem features worth careful study. Individually and as a group, they are important to a safe, durable, and easily-installed pressure vessel:

- ★★ Seamless, one-piece, hollow-forged shell
- ★★ Carbon or alloy steel, heat-treated as required by service conditions
- ★★ Completely or partially machined; if desired, finished ready for installation

Small units to giant size—we make them all. Bethlehem has the steel-making facilities, the forging presses, the heat-treating furnaces, and the machines—all of ample capacity. Before it is shipped from the plant, every Bethlehem forged pressure vessel is given thorough tests in accordance with your specifications.

A final point: Bethlehem vessels are Bethlehem-built and -controlled from the ore to the finished product. They are made, assembled, tested, and inspected by *one company*—with the attendant advantages of *one responsibility*.

Call in a Bethlehem engineer for consultation.



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation

• AUGUST 1946 • CHEMICAL ENGINEERING

If you BUY or Use **GASKETS** you'll want this File-worthy new U. S. Gasket catalog

Purchasing agents, engineers, operating men—everyone who purchases, specifies, or uses Gaskets—should have this important U. S. Gasket Catalog, No. 303, at hand for quick, easy-to-use reference.

No matter what kind of Gaskets you use—high or low pressure, marine or industrial, from AJAX Spiral Wound Metal-Asbestos to die-cut cork sheet, U. S. Gasket makes them and the new catalog has full information about them.

Catalog No. 303 is designed for use; its material is arranged to give you the greatest possible assistance in selecting and ordering the RIGHT Gaskets for your particular requirements.

Detailed data on sizes, materials, temperature and pressure ranges, bolt stresses, etc., is presented in clear, concise, tabular form. Pertinent engineering reference tables are included for your convenience.

Special sheets have been prepared to facilitate your orders or inquiries, showing drawings of basic flange types with dimensions carefully keyed to reduce your time and effort to a minimum.

Send the coupon for your copy of this valuable bulletin—today!



UNITED STATES GASKET CO.

626 N. 10TH STREET

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Gentlemen: I'd like to have a copy of your new Gasket Catalog, No. 303, for my reference files.

NAME _____ TITLE _____

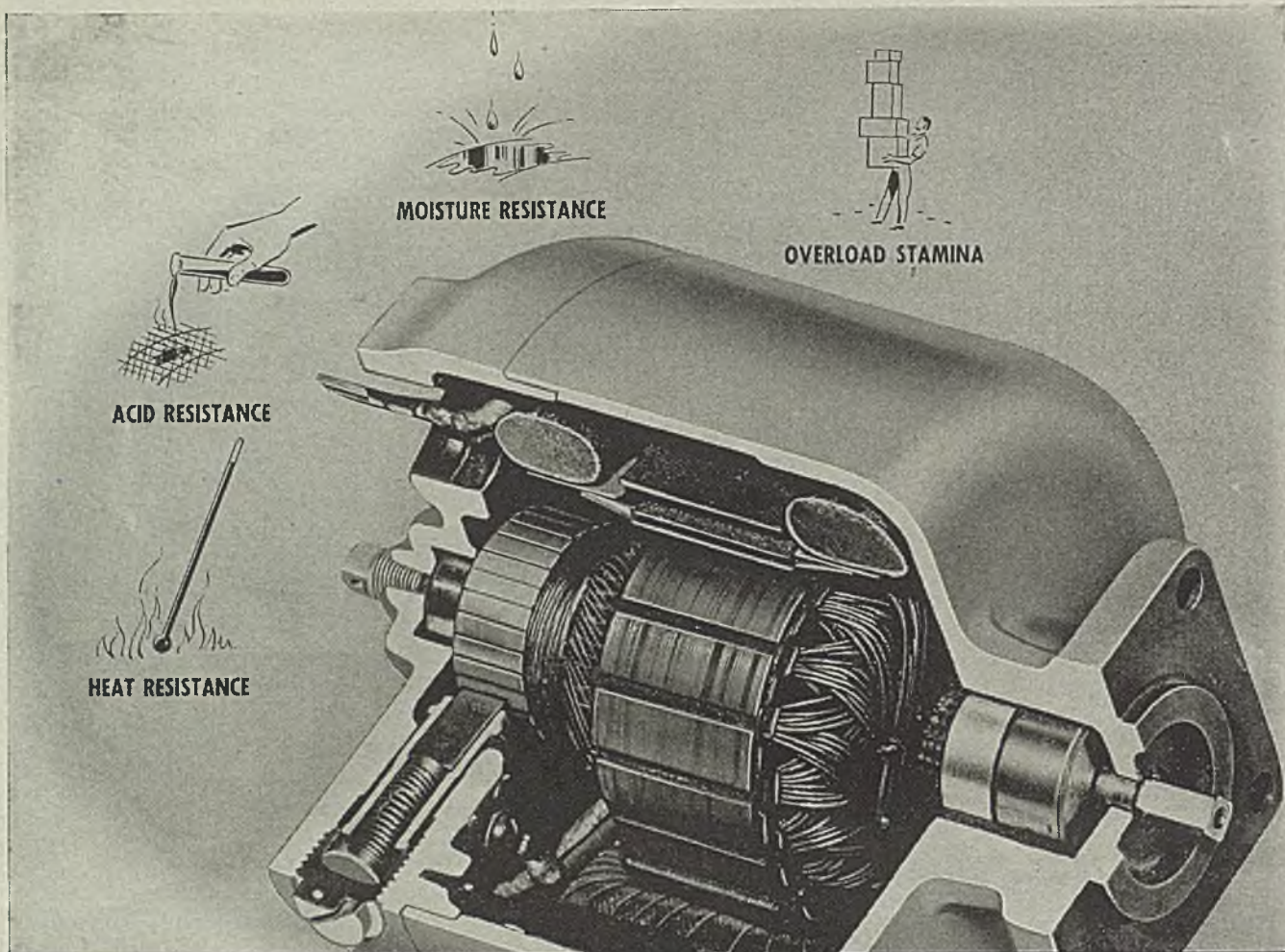
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ADDRESS _____

CITY _____ ZONE NO. _____ STATE _____



POWER
and PROCESS FILES



How much is "High-Safety-Factor" insulation worth to you?

It's worth plenty, if efficient, dependable operation of electrical equipment is important to your business—if moisture, oil, heat, overload, corrosive acids and vapors and human carelessness or inexperience represent hazards that can throw expensive machinery out of service or cause costly delays.

Fortunately, the cost of added protection against the penalties frequently imposed by these conditions is slight—far less than the penalty imposed by failures that can be avoided. For the advantages of High-Safety-Factor Insulation can be added at only a small fraction of the cost of the equipment.

That's why the swing is to Fiberglas Electrical Insulation Materials

—why so many engineers, production executives and maintenance men are insisting on Fiberglas Insulation for the equipment they buy and for their maintenance work.

Get complete information about this better electrical insulation material—write for your copy of

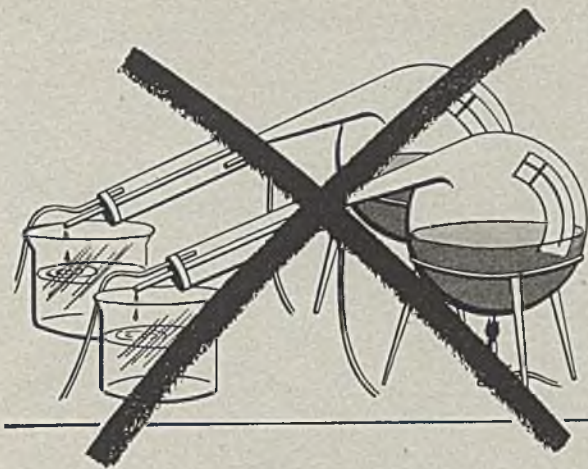
the folder "Are your motors a good insurance risk?" The names of the Distributors serving your locality will also be furnished, if you desire. Owens-Corning Fiberglas Corporation, Department 950, Toledo 1, Ohio. Branches in principal cities.

In Canada: Fiberglas Canada Ltd., Toronto, Ontario

ASK FOR FIBERGLAS IN YOUR NEW MOTORS—AND ON YOUR NEXT REWINDS

OWENS-CORNING
FIBERGLAS
U.S. PAT. OFF.

Fiberglas is the trade name for these electrical insulation materials and many other products made from fine, strong, pliable, moisture and heat-resistant, ageless glass fibers.



To extract the alcoholic juice from macerated fruit . . . separating it from the water and pulp . . . a manufacturer was faced with a slow, costly, double-distillation process . . . unless a faster, cheaper method could be found.

AGAIN . . . the answer is centrifuging

This is a typical example of what centrifugal force can bring to the processing industries . . . one of a long list of applications in which AT&M Centrifugals save time, space and costs. Whatever your production problem, there's a good chance that either a standard AT&M Centrifugal or a survey by AT&M's experienced engineering service can give you a better product — faster — for less. A confidential consideration of your problem involves neither cost nor obligation. The coupon will give you a preview of what AT&M offers. AMERICAN TOOL & MACHINE COMPANY, 1415 Hyde Park Ave., Boston 36, Mass., 30A Church St., New York 7, N. Y.

SAVE TIME, SPACE AND COSTS WITH

A.T. and M. CENTRIFUGING

AMERICAN TOOL & MACHINE COMPANY,
1415 Hyde Park Ave., Boston 36, Mass.

Please send information on centrifuging applied to the following processes:

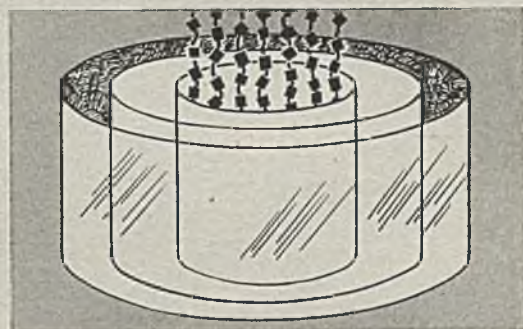
- Extraction Filtration Dehydration Coating
 Precipitation Sedimentation Impregnation

Write here any other process.....

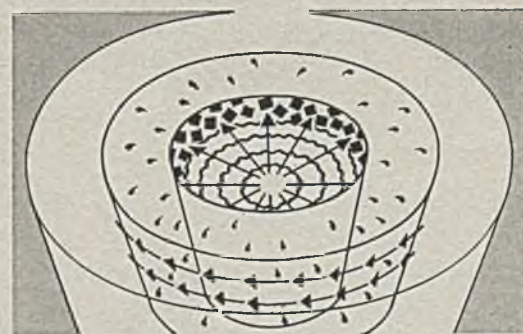
Name.....

Company.....

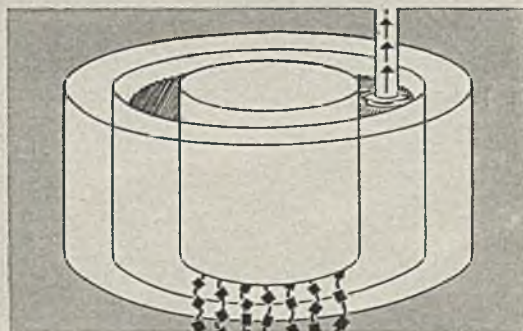
Address.....



The mashed fruit . . . frozen to ice-crystal consistency . . . is loaded into a special AT&M Centrifugal Extractor totally enclosed in a refrigerated jacket.



The Centrifugal, rotating at high speed, forces the unfrozen alcoholic liquid through a filter screen which retains the frozen pulp and water.

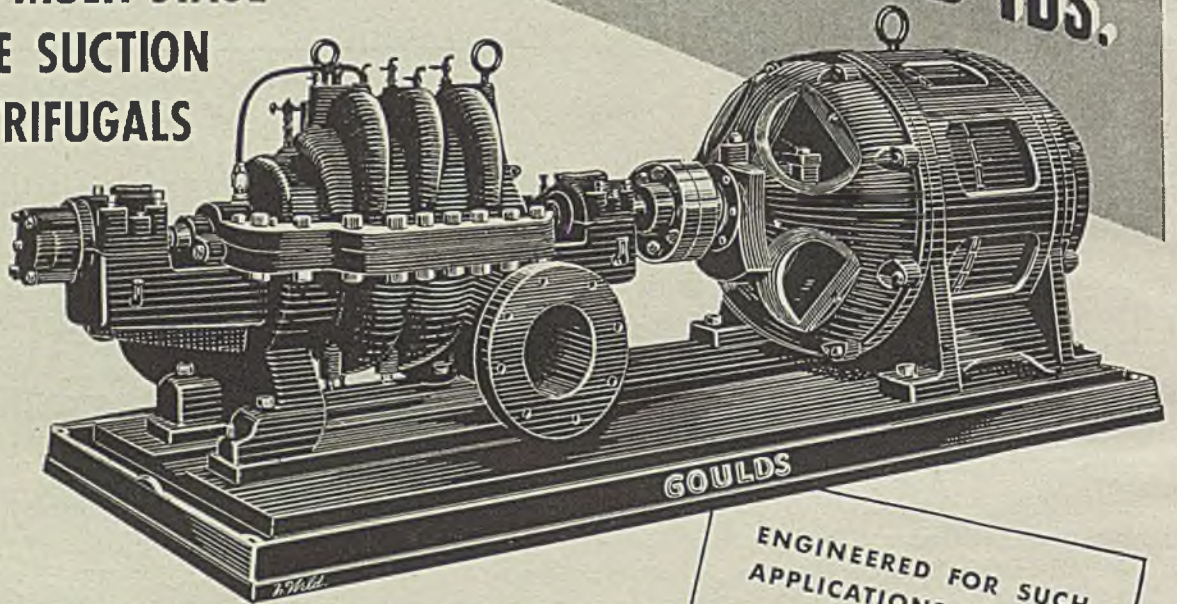


The liquid is piped off and the pulp-and-water ice crystals are plowed out through the bottom of the basket.

FOR PRESSURES UP TO 350 lbs.

Goulds

**Fig. 3330 MULTI-STAGE
SINGLE SUCTION
CENTRIFUGALS**



It's not uncommon for Goulds Multi-Stage Single Suction Centrifugal pumps to operate years without maintenance . . . not that the practice is advocated. But these pumps are popular with pump users because they are rugged. As it does with most pumps in the line, Goulds builds this series in sizes which enable you to select the one that meets your requirements most economically. Specifically, this means pumps of two to six stages and a capacity range of 100 to 1700 G. P. M. with heads up to 800 ft., depending on capacity.

THRUST BALANCE PERMANENT

An important thing to keep in mind about these pumps is thrust balance. To absorb any unbalanced thrust which might occur from clogged impellers or uneven or excessive wear at sealing surfaces, a double acting, double row ball thrust bearing is provided, securely locked in position. This operates in a continuous oil bath. It is one of the features contributing to low maintenance cost and the popularity of this pump.

**ENGINEERED FOR SUCH
APPLICATIONS AS...**

- General water service.
- Humidifier service in textile mills.
- Dewatering mines.
- Boiler feeding.

ONE OF MANY TYPES

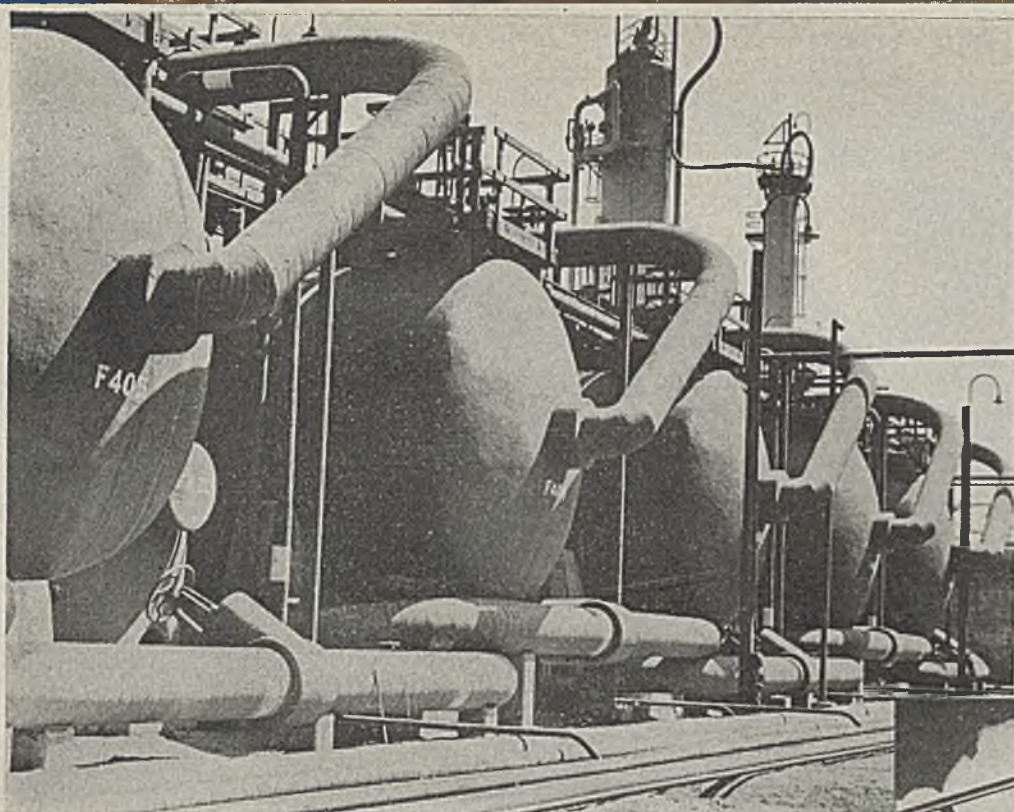
This is one of many types of centrifugals manufactured by Goulds. Whether you need single or double suction, single or multi-stage units, Goulds has the pump for the job. Write or call Pump Headquarters or your nearest Goulds Office.

Goulds

the PUMP FOR the JOB

PUMPS, INC.

SENECA FALLS, N. Y.



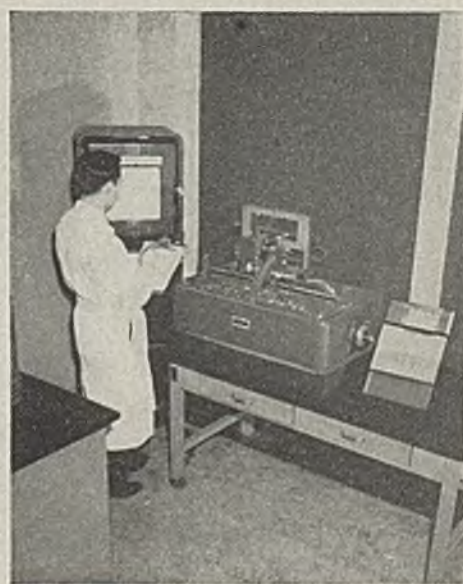
BRING PROCESS-CONTROL PROBLEMS TO THE CHEM SHOW!

Today's chemical processes, often seven-league strides ahead of just a few years ago, are calling for instrumentation which can keep pace with their need for new and more accurate control.

If one of your plant processes has such a problem, look in on the L&N display at the National Chemical Exposition, September 10-14, considering our instruments from the viewpoint of your particular process needs. There we will show the well-known Micromax line, for both pneumatic and electric control; in strip-and round-chart models; and with the emphasis in this case on temperature electrolytic conductivity gas analysis and pH. Accuracy, dependable performance and rugged construction make Micromax an excellent choice for a wide variety of measuring jobs.

In some instances, L&N's Speedomax high-speed recorders have additional advantages. They can be particularly useful for specialized applications in observation or control of fast-moving processes, or processes involving low temperatures, short ranges and similar conditions. In the laboratory, Speedomax is a quiet and highly dependable assistant for microphotometry, and for X-ray, infra-red and mass spectrometry.

If you don't see us at the Chem Show, we'd be glad to have you write us outlining your problem.



LEEDS & NORTHRUP COMPANY, 4916 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS • TELEMETERS • AUTOMATIC CONTROLS • HEAT-TREATING FURNACES

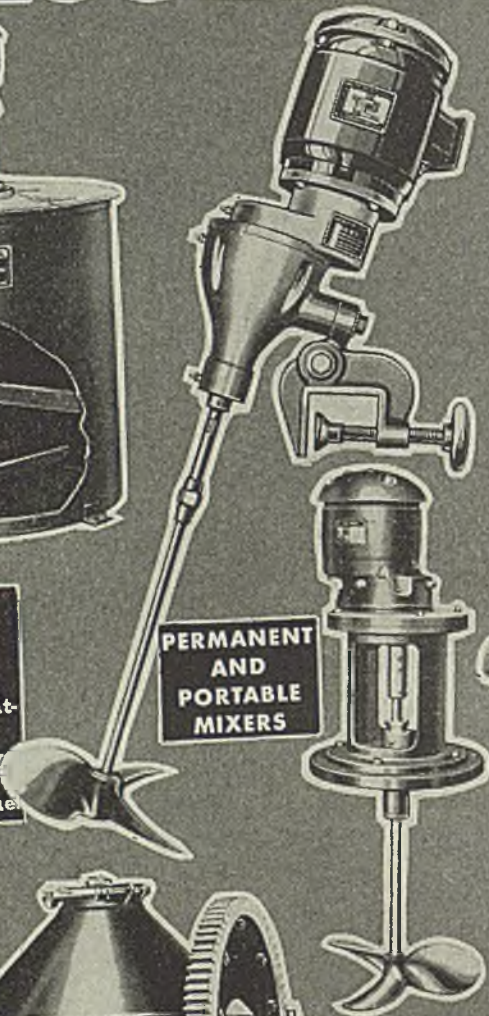
Jrl. Ad EN-0600B(20)

Photo Credits: Top, Philip Gendreau, N. Y.; Center, Hercules Powder Co.; Bottom, Koppers Co., American Hammered Piston Ring Div.

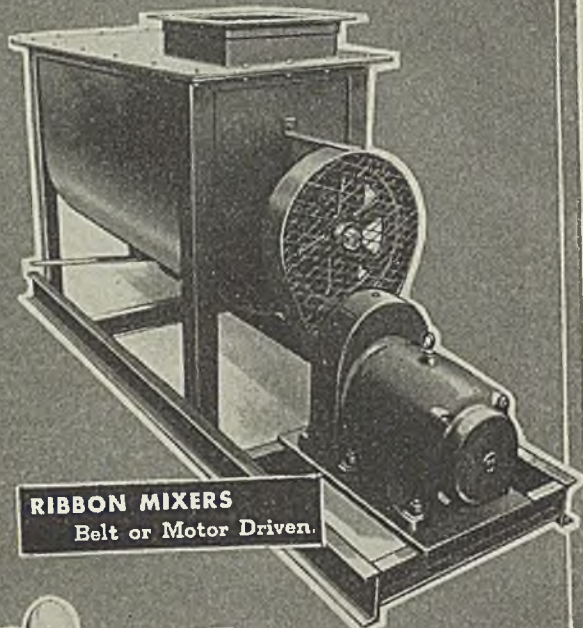
International



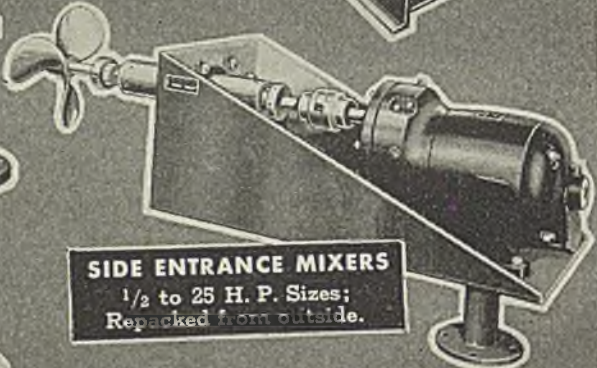
MIXERS AND KETTLES
Complete with Tank and Drive Unit in various types and sizes, with any style stirrers, propellers or turbine.



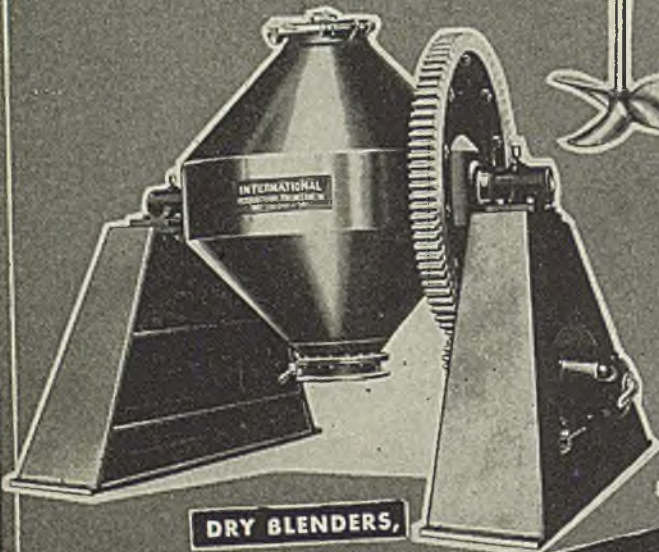
PERMANENT AND PORTABLE MIXERS



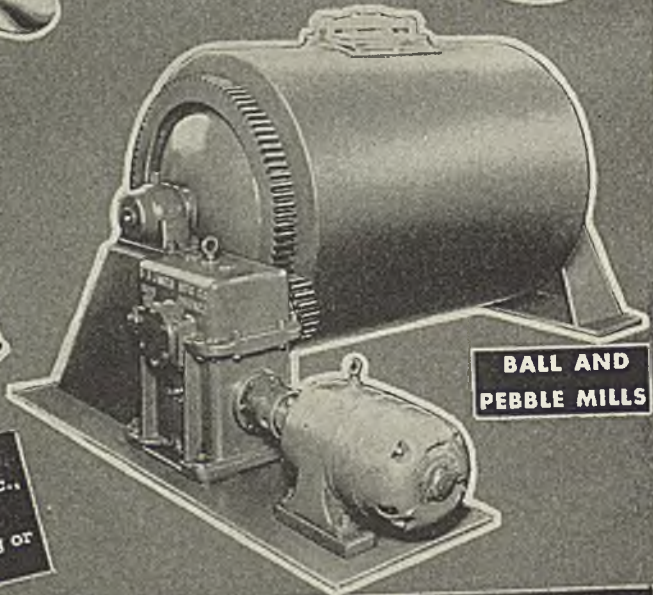
RIBBON MIXERS
Belt or Motor Driven.



SIDE ENTRANCE MIXERS
1/2 to 25 H. P. Sizes; Repacked from outside.



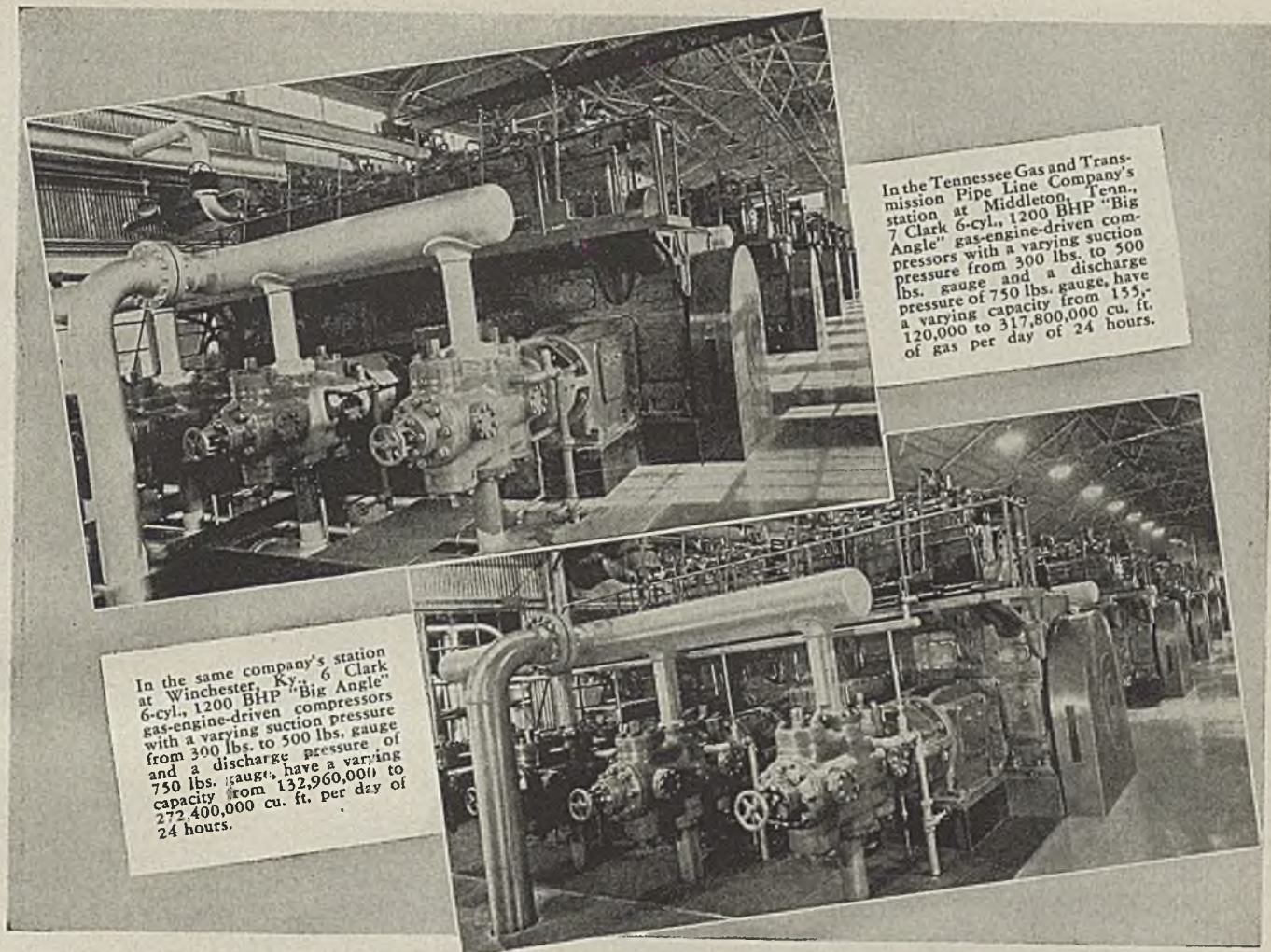
DRY BLENDERS,



BALL AND PEBBLE MILLS

CATALOG
On Mixers, Agitators, Blenders, Ribbon Mixers, etc., No. 110. Now ready.
CATALOG No. 85 on BALL MILLS—Either catalog or both sent on request.

INTERNATIONAL ENGINEERING, INC., DAYTON, OHIO
NEW YORK—15 Park Row CHICAGO—407 S. Dearborn St.



In the Tennessee Gas and Transmission Pipe Line Company's station at Middleton, Tenn., 7 Clark 6-cyl., 1200 BHP "Big Angle" gas-engine-driven compressors with a varying suction pressure from 300 lbs. to 500 lbs. gauge and a discharge pressure of 750 lbs. gauge, have a varying capacity from 155,120,000 to 317,800,000 cu. ft. of gas per day of 24 hours.

In the same company's station at Winchester, Ky., 6 Clark 6-cyl., 1200 BHP "Big Angle" gas-engine-driven compressors with a varying suction pressure from 300 lbs. to 500 lbs. gauge and a discharge pressure of 750 lbs. gauge, have a varying capacity from 132,960,000 to 272,400,000 cu. ft. per day of 24 hours.

CLARK "BIG ANGLES"

Serve on the Tennessee Gas & Transmission Pipe Line

Rating 200 brake horsepower per cylinder, the Clark "Big Angle" unit is the most powerful right-angle, gas-engine-driven compressor ever built. It fulfills the industry's demand for greater power in less space and at lower overall cost.

The extraordinary simplicity and accessibility of this unit result in most economical operation. Ease and speed of maintenance operations, users state, is "simply phenomenal".

Vibration is at a minimum.

For high-pressure pipe line pumping and large scale pressure maintenance, the Clark "Big Angle"—BA 17—offers unique advantages. This unit is built in three sizes: 5-cyl., 1000 BHP; 6-cyl., 1200 BHP; 8-cyl., 1600 BHP.

CLARK BROS. CO., INC., OLEAN, NEW YORK

New York • Tulsa • Houston • Chicago • Boston • Washington
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CLARK

ONE OF THE DRESSER INDUSTRIES

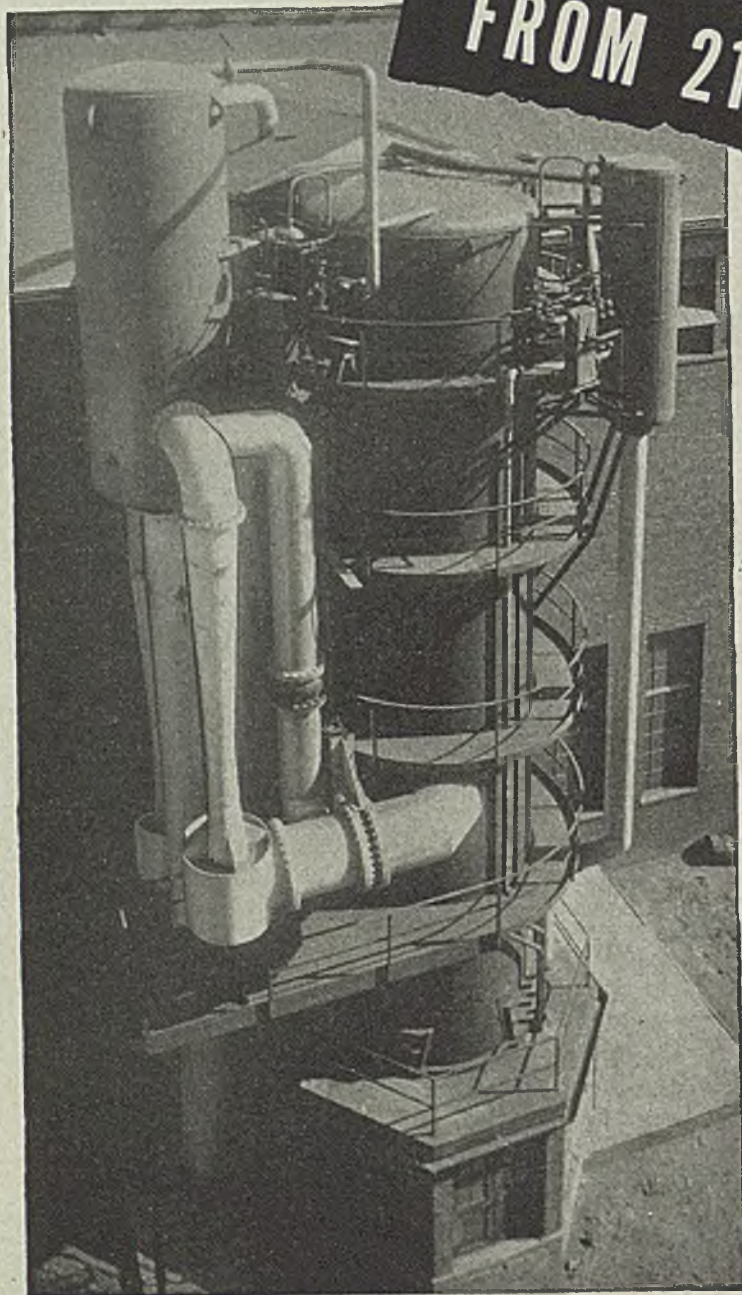


Send for new catalog containing complete specifications and data on the BA-17, including dimensional drawings, also typical installation design for modern pipe line stations.

GUARDITE

EVAPORATIVE COOLERS

for COOLING LIQUIDS
FROM 212°F TO 40°F



These coolers are designed to either continuous or batch operation. The cooler shown at left is designed to continuously cool 376,000# distillery mash and slops per hour from 190° to 75° F. The completely automatic controls system eliminates the necessity for an operator. There are no moving parts to wear. These units can be furnished in sizes to meet your requirements and fabricated of the proper materials to meet your conditions. When writing please state kind and quantity of material to be cooled, amount and temperature of cooling water available, steam available, and pressure.

We will be pleased to give complete information as to operation and costs.

The GUARDITE CORPORATION

Vacuum Process Engineers

332 S. MICHIGAN AVENUE • CHICAGO, ILLINOIS

WHEN

O₂ AND CO₂ AND H₂O—ALL 3—
MUST BE EXCLUDED



YOU'VE JUGGLED YOUR SHARE
OF NITROGEN BOTTLES



76¢ PER Mcf LOOKS BETTER
THAN \$10 PER Mcf



THEN

make your own nitrogen (99+%)
with a KEMP on-the-spot generator

THE gaseous environments for modern products and processes are getting fussier every day. And desiccated nitrogen is becoming increasingly important in forestalling carbonation, oxidation, and hydration.

But why juggle nitrogen bottles when it's cheaper not to?

Counting initial cost, installation, fuel and power, and amortization—the whole business—you can make

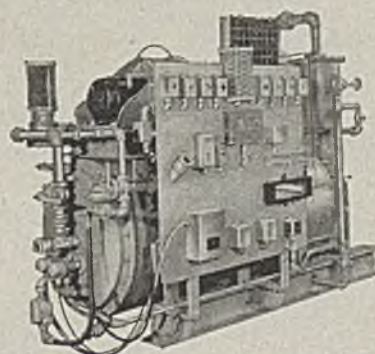
your own 99+% nitrogen and pipe it all over the plant for 76¢ per Mcf. That's an average figure. Even in cases involving high peak demands, limited storage facilities, and intermittent usage, overall costs of on-the-spot KEMP-produced nitrogen need never exceed \$1.35 per Mcf.

Quite a difference from bottled gas prices! And quite a step forward in reducing manufacturing cost! There's a coupon in the corner.

HERE'S THE BASIS-UNIT OF A 2000-CFH SYSTEM

The principle is simple: (1) complete combustion of gas with just the right amount of air to yield combustion products totally free of oxygen, (2) absorption of the CO₂ by amine scrubbing, and (3) desiccation in silica gel or activated alumina to remove water vapor. The result is 99+% nitrogen.

The engineering isn't so simple. It requires equal knowledge and experience in both combustion and chemical engineering. But note the result—compact, automatic in every respect, and rugged! (Amine scrubber and desiccating towers not shown.)



KEMP OF BALTIMORE

PRECISION CARBURETION + ADAPTED COMBUSTION
FOR INDUSTRY'S HEAT-USING PROCESSES
ATMOSPHERE GENERATION & ADSORPTIVE DRYER SYSTEMS
FOR PROCESS CONTROL AND PROTECTION

The C. M. Kemp Mfg. Co.
405 E. Oliver St., Baltimore 2, Md.

Dept. K-112a

Have one of your field engineers call.....

Make sure we get the new literature
and data you are developing.....

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TITLE _____

COMPANY _____

PLACE _____



You'll need a laboratory 50,000 feet high . . .

Physics has a new dimension. Materials and products must now perform satisfactorily at stratospheric levels, at supersonic speeds. You'll need a new laboratory, therefore, matching conditions at 50,000 feet for testing them.

Lectrodryers are already helping forward-looking manufacturers obtain the DRYness encountered at such heights. Dew points below -110° F. are possible with air, gases and many organic liquids, in volumes to suit the needs.

Equip your laboratory for stratospheric testing, and be ready to guarantee the performance of your products at these new heights. You can get complete data on DRYing by writing Pittsburgh Lectrodryer Corporation, 303 32nd Street, Pittsburgh 30, Pennsylvania.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.

In Australia: Birlec, Limited, 51 Parramatta Road, Glebe, Sydney.

PITTSBURGH

LECTRODRYER

CORPORATION

LIKE THE
BRUSSELS
GUILD
MARK



ON BEAUTIFUL
TAPESTRY...

KOVEN HAS BEEN THE HALLMARK OF SUPERIOR CHEMICAL EQUIPMENT

Since 1881

Beautiful tapestry—the master's touch. In industry too, the master's touch is essential. That is why chemical manufacturers have learned to look to KOVEN for equipment—because the name KOVEN is assurance of master craftsmanship in efficiency and dependability.

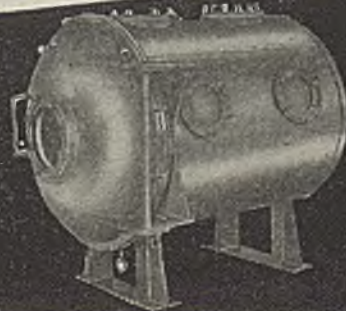
65 years of progress in the design and manufacture of individualized chemical equipment made to exact specifications has made KOVEN a leader in the field. KOVEN'S experience is yours for the asking. A consultation can be arranged, without obligation to you, by writing or calling KOVEN.

KOVEN equipment includes: pressure vessels, extractors, mixers, stills, condensers, kettles, tanks, chutes, containers, stacks, coils.

L. O. KOVEN & BRO., INC.
154 OGDEN AVE. JERSEY CITY 7, N. J.

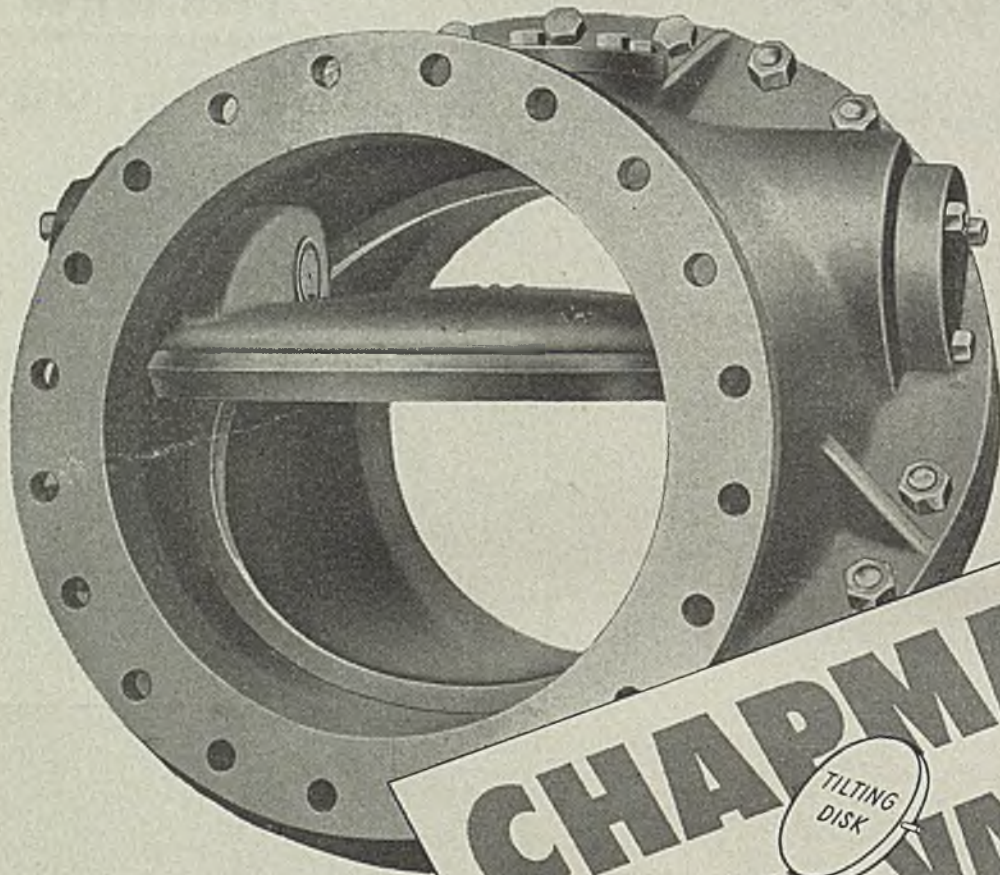


PLANTS:
Jersey City, N.J. Dover, N.J.



STOP THE SLAMMING

and you'll cut maintenance costs!



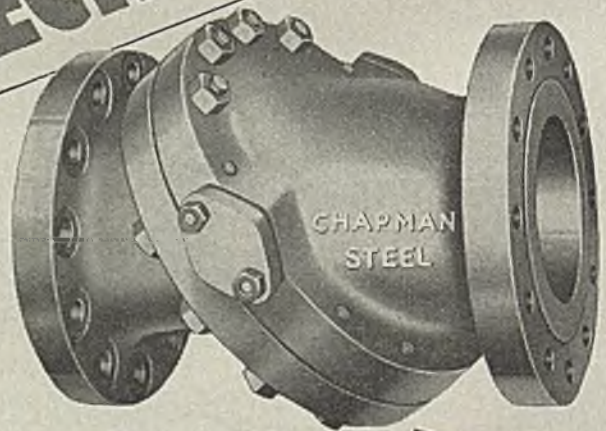
**CHAPMAN
CHECK VALVES**

TILTING
DISK

Slamming jars pipelines, starts surging and opens up joints, thus necessitating high maintenance costs. The Chapman Tilting Disc Check Valve employs a balanced hinge-pinned disc which rides evenly in the flow when the valve is open and cushions quietly to a drop-tight seat when the flow slows down.

Experience has proved that Chapman Tilting Disc Check Valves invariably save from 65% to 80% in head losses over conventional type check valves.

Chapman Tilting Disc Check Valves are made in iron and steel.



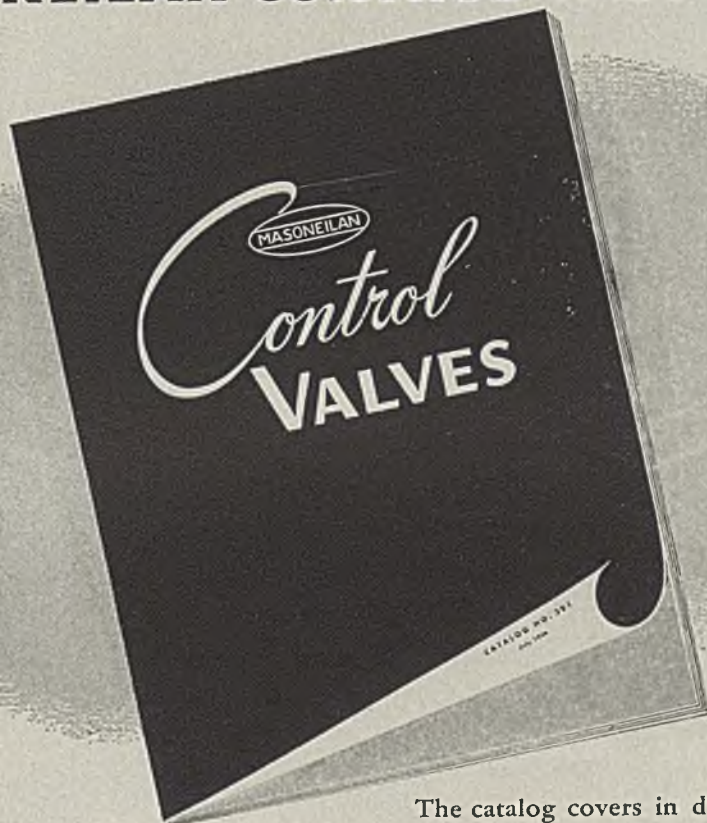
Send for free engineering data and reports of tests.



The Chapman Valve Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS

Announcing . . .

THE NEW MASON-NEILAN CONTROL VALVE CATALOG



This new Mason-Neilan Control Valve Catalog contains complete factual information and covers every phase of control valve selection including C_v . . . Valve Flow Coefficient . . . which is a basic means for comparing flow capacities and characteristics.

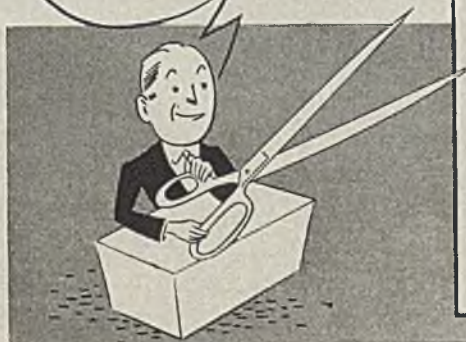
The catalog covers in detail such essential information as control valve flow characteristics, flow coefficient and flow curves, materials and construction, selection of types, handwheels, dimensions, weights and other specification data. Write for your copy of this important catalog today.

MASON-NEILAN REGULATOR COMPANY

1197 ADAMS STREET  BOSTON 24, MASS.

Main Office: Boston 24, Mass.

CLIP
AND MAIL FOR
YOUR COPY
NOW!



MASON-NEILAN REGULATOR COMPANY

1197 Adams St., Boston 24, Mass.

Gentlemen: Please send me your new CONTROL VALVE CATALOG.

Name.....

Position.....

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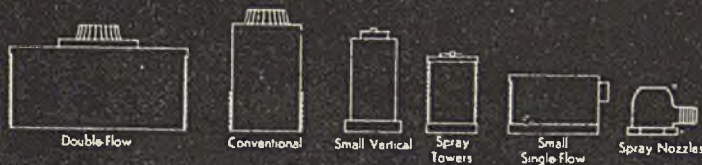
Address.....

City..... State.....



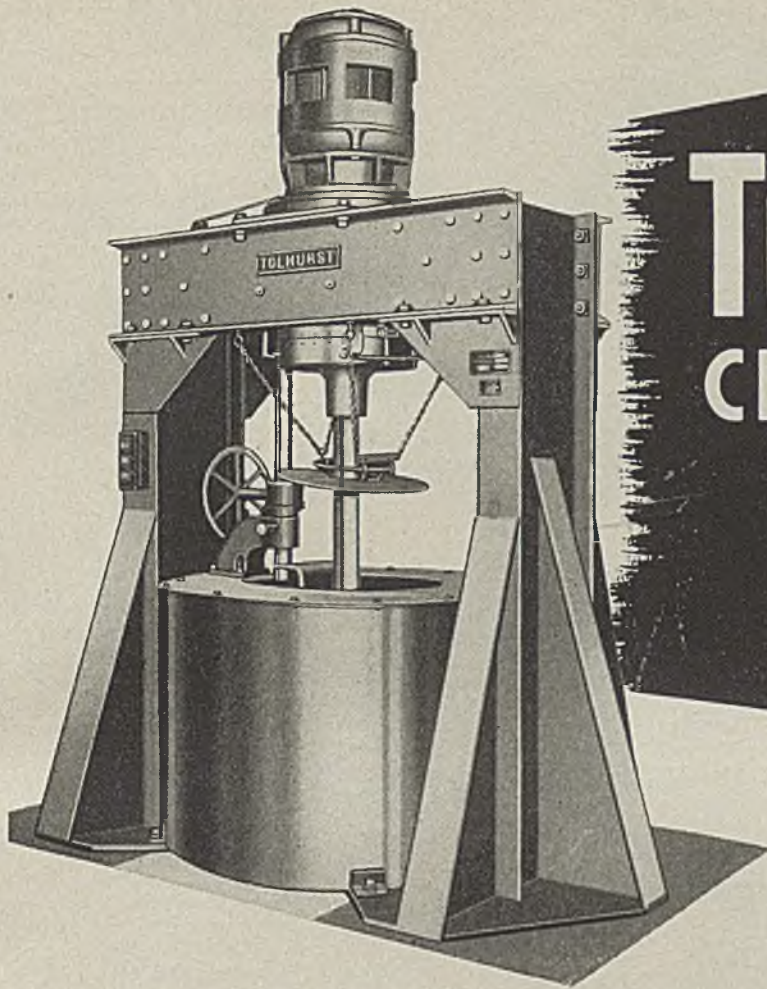
THE MARK OF SUPERIORITY

**. . . in design, construction
and operational excellence**



THE MARLEY COMPANY, INC.

KANSAS CITY 15, KANSAS

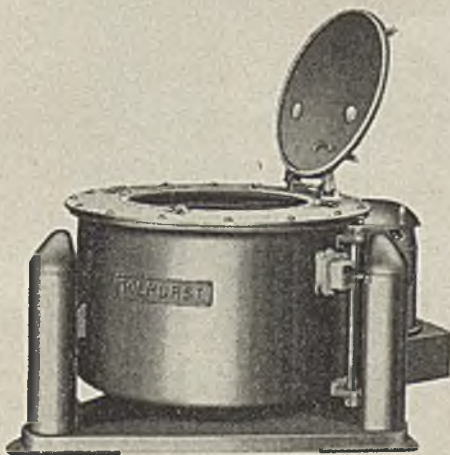


TOLHURST CENTRIFUGALS

*Serving the
Process Industries*
SINCE 1852

SUSPENDED MODELS available in 26", 32", 40" and 48" diameters. Baskets are of welded steel, monel, stainless steel, rubber covered construction as specified. Perforate or imperforate baskets. Fume-tight covers can be furnished. 2-speed motor standard equipment.

PILOT PLANT MODEL in 26" size comes equipped with infinitely variable speed changer to produce centrifugal force ranging up to 1700 g.



CENTER-SLUNG MODELS are available in 30", 40" and 48" diameters. Baskets are welded steel, monel, stainless steel or rubber covered as specified. Perforate or imperforate baskets with backing and filtering screens supplied if required. Fume-tight covers also available.

FOR NEARLY A CENTURY, the process industries have found TOLHURST CENTRIFUGALS to be the faster, more economical equipment for DRAINING, FILTERING, DEHYDRATING, CLARIFYING, THICKENING, and SEPARATING operations.

During these years, TOLHURST has developed many revolutionary processes which have since become standard. The facilities of TOLHURST engineering and research laboratories are available to give intelligent, confidential consulting service on centrifugal problems.

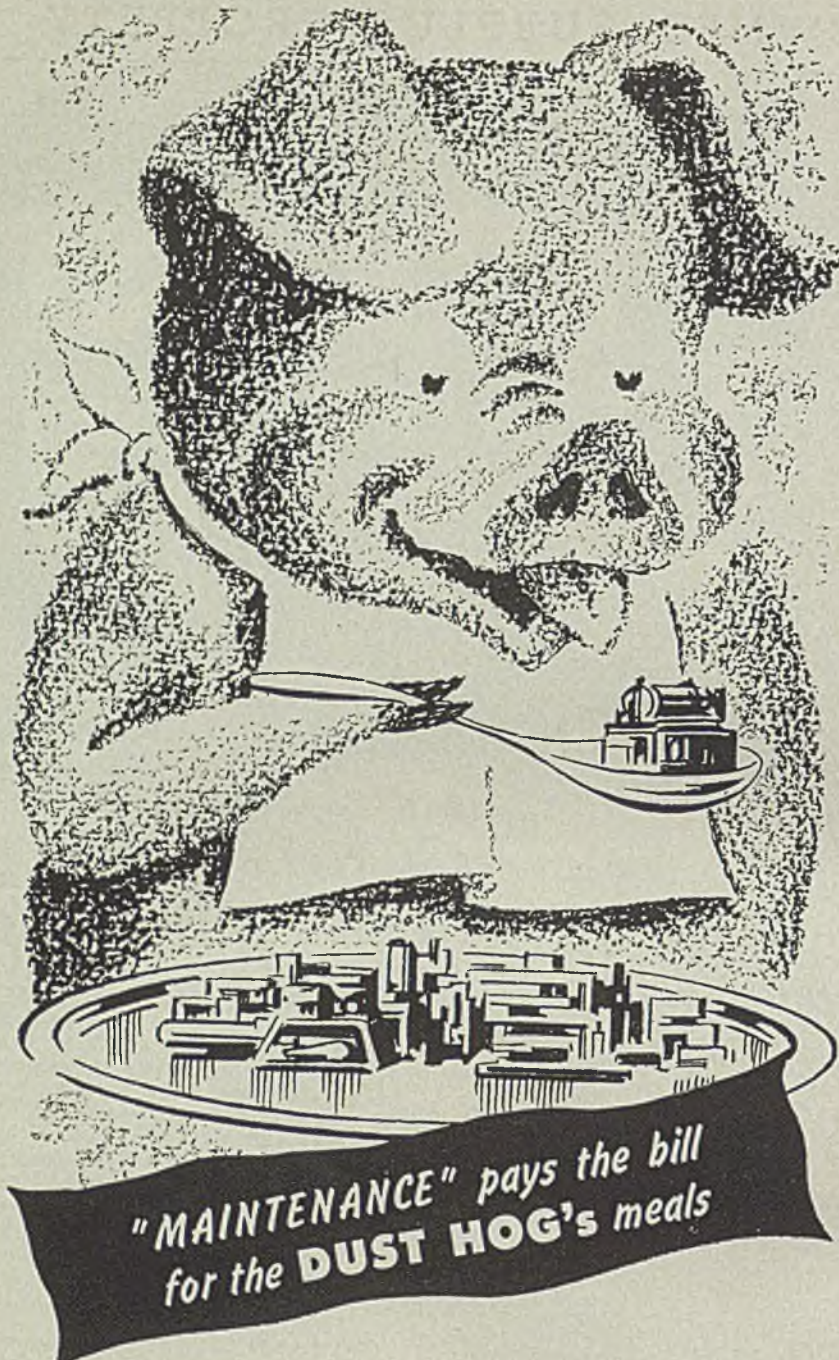
TOLHURST CENTRIFUGALS

DIVISION OF

American Machine and Metals, Inc., East Moline, Illinois

Sales Engineering Offices in Principal Cities

In Canada: American Machine and Metals (Canada) Ltd.,
Montreal, P. Q.



**"MAINTENANCE" pays the bill
for the DUST HOG's meals**

While DUST HOG fattens on inefficiency, slowing up workers, ruining machinery, spoiling quality, causing accidents—maintenance costs go up. So the cost of *controlling* dust can usually be paid for out of savings in maintenance—and often by reclaiming dust by-products.

Clear out those "dust pockets" where DUST HOG is adding to your costs. A free booklet, "Control of Industrial Dust", shows how "plant housekeeping" is easier, cheaper with Pangborn equipment on the job. Write Pangborn Corporation, 283 Pangborn Boulevard, Hagerstown, Maryland—*world's largest manufacturer of dust control and blast cleaning equipment.*

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

DUST

CONTROLLING IT IS PROFITABLE

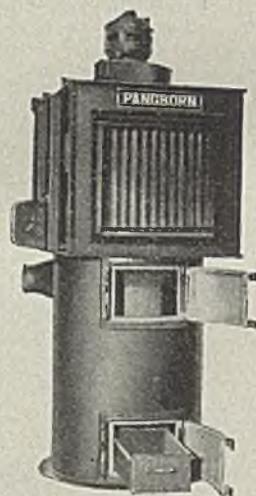
Here are several experiences of Pangborn customers that show what can be accomplished through efficient control of dust.

Manganese dust with a salvage value of \$5.00 is removed each day by a Pangborn collector, and other savings amount to \$1.50 per day. Yet operating cost is only \$60.00 per year, and maintenance cost only \$150.00 per year. The collector quickly paid for itself.

A musical instrument manufacturer uses wood dust for fuel, saving \$2500.00 per year on coal bills. Operating cost is \$1,200.00 per year and maintenance runs \$650.00 per year.

Product quality is improved and plant maintenance greatly reduced by a soap manufacturer who pays only \$120.00 per year for operating the Pangborn equipment and \$60.00 for maintaining it. Value of salvaged soap powder exceeds this cost.

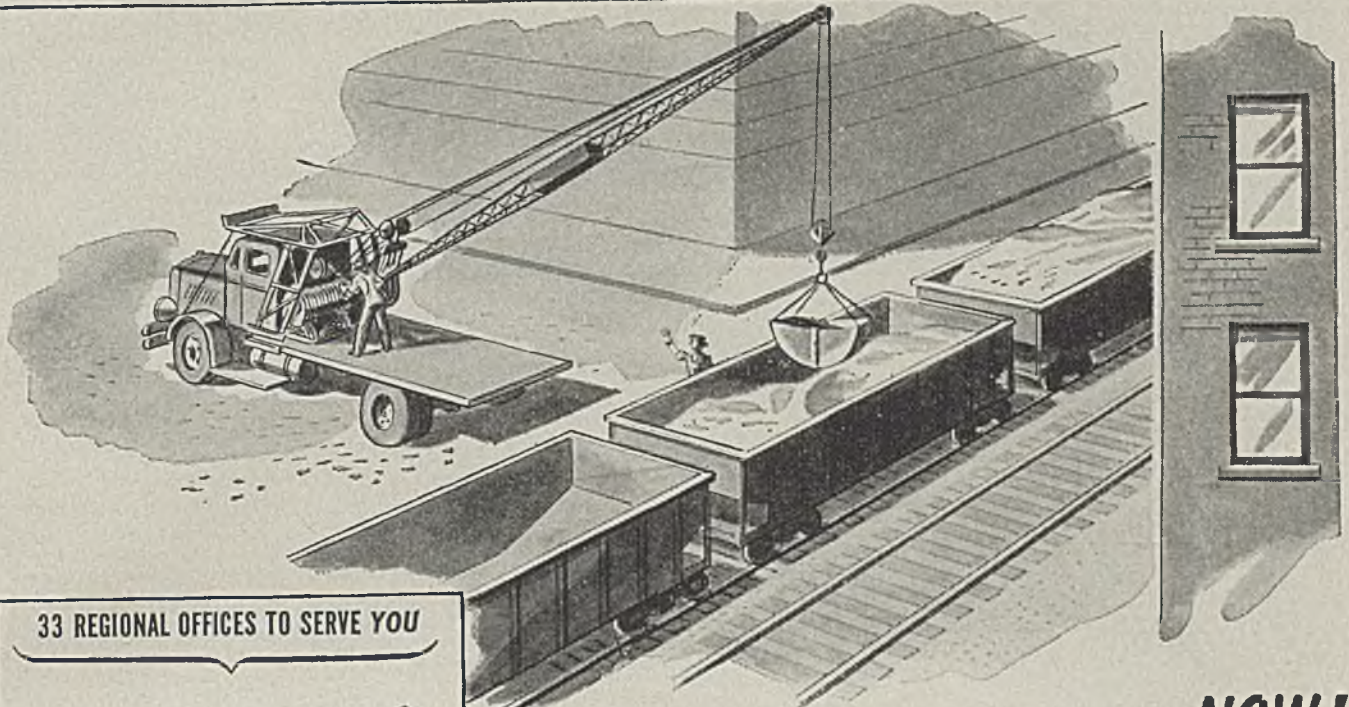
Dust—regarded in many plants as merely a nuisance—is often so expensive a liability that large savings can be made through efficient dust control. A Pangborn booklet, "Control of Industrial Dust", gives valuable information from the 41-year experience of Pangborn engineers. Address Pangborn Corporation, 283 Pangborn Boulevard, Hagerstown, Maryland.



FOR LOCALIZED "DUST POCKETS"

If your plant does not require a complete dust control system, consider Pangborn's new "CK" for locations where dust conditions are worst. The "CK" has many features of larger Pangborn collectors—yet it occupies minimum floor space, is easily accessible, requires little piping and installation expense. It is adaptable to a variety of work—grinding, polishing, buffing, blast cleaning, etc. Write for Bulletin 910. Pangborn Corporation, 283 Pangborn Boulevard, Hagerstown, Maryland.

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HUNDREDS OF ITEMS at unusual values

- Acetone
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- Gas cylinders (all types)
- Hexachloroethane
- Calcium carbide
- Methyl bromide
- Dyes
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- Silica gel
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- Dimethylaniline
- Copper naphthenate
- Synthetic & natural glues
- Printing inks (black & colors) and most other chemicals

REPLENISH YOUR STOCK PILES *NOW!* INDUSTRIAL CHEMICALS

AT LOW CASH COSTS

NEVER again will there be similar opportunity to obtain standard and special specification industrial chemicals at such savings.

Included in the hundreds of available items are a few chemicals now in short supply from usual sources, and items of special interest to research chemists.

All items are ready for quick sale.

Credit terms may be arranged. It will pay you to first call your War Assets Administration Regional Office when replenishing chemical stocks or planning new production. Items not available in your Region will be located for you through the special Inter-Office Product Location Service. This sales method means quick action, prompt delivery.

EXPORTERS:

Most surplus property is available to the export market. Merchandise in short supply is withheld from export and if such items appear in this advertisement, they will be so identified by an asterisk.

FREE FACTS

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War Assets Administration (address nearest Regional Office)

Please supply without obligation, prices, available quantities and locations of items written in below:

(Note: Washington to supply list of items)

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(Describe item wanted)

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City..... Phone..... 155-4

All chemicals are subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

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Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

Sound Advice on Reducing Valves for Steam Heating



"... and remember, Stan, a good heating system makes contented employees, and accurate pressure control makes a good heating system."

Here's WHAT It Is . . .

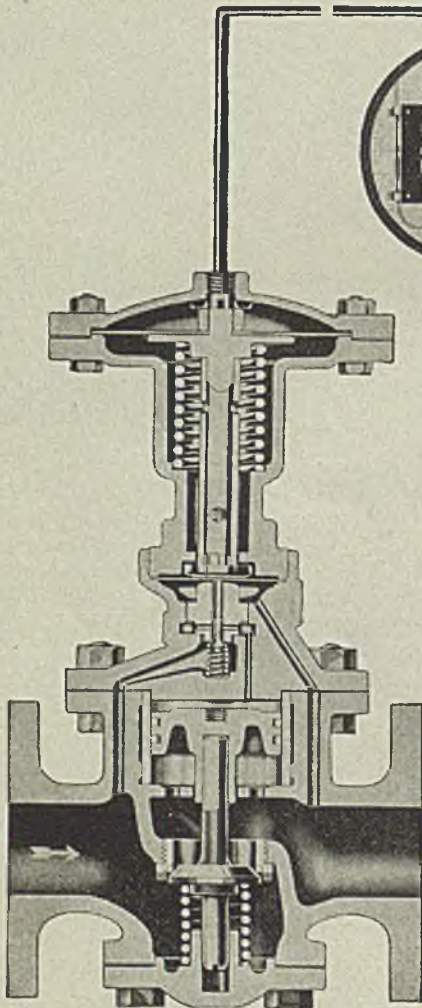
LESLIE Class LT-3 Pressure Reducing Valve combined with Type ARP Air Loading Panel. An ideal pressure control which provides simple readjustment of reduced pressures necessary for efficient operation of steam heating systems.

CLASS LT-3 is a single-seated, internal pilot, piston-operated reducing valve with 800 Brinell stainless steel main valve and STELLITED seat ring that assure tight dead-end shut-off.

AIR LOADING PANEL includes a small 1/8" combination pressure reducing and relief valve (no continuous leakage) which can be installed at a central control station or in any other convenient location.



Air Loading Panel, Type ARP



Remotely Adjusted Reducing Valve, Class LT-3 (Screwed or flanged connections, 1/2"-4")

Here's HOW It Operates . . .

Simply and accurately with only 25 psi air pressure. You merely turn the adjusting knob (see illustration) increasing or decreasing the loading force on the reducing valve until you obtain the steam pressure you want. Steam can be entirely shut off by removing all airloading pressure.

Here's WHY You'll Want It . . .

Because this ideal LESLIE combination allows you to instantly and conveniently readjust reduced pressures to conform with changing weather conditions—assures economical operating pressures at all times—eliminates wasteful overheating.

Where LESLIE Reducing Valves (handwheel adjustment) are now in service, only the diaphragm superstructure and Air Loading Panel are needed to convert to this modern, money-saving method.

FOR A FREE TRIAL INSTALLATION

—without cost or obligation—contact your nearest LESLIE representative. Write for Bulletin 461.

PROMPT SHIPMENT FROM STOCK

Look for LESLIE Regulators under "Valves" or "Regulators" in your classified telephone directory in the following cities where LESLIE factory trained engineers are located:

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Houston, Tex.
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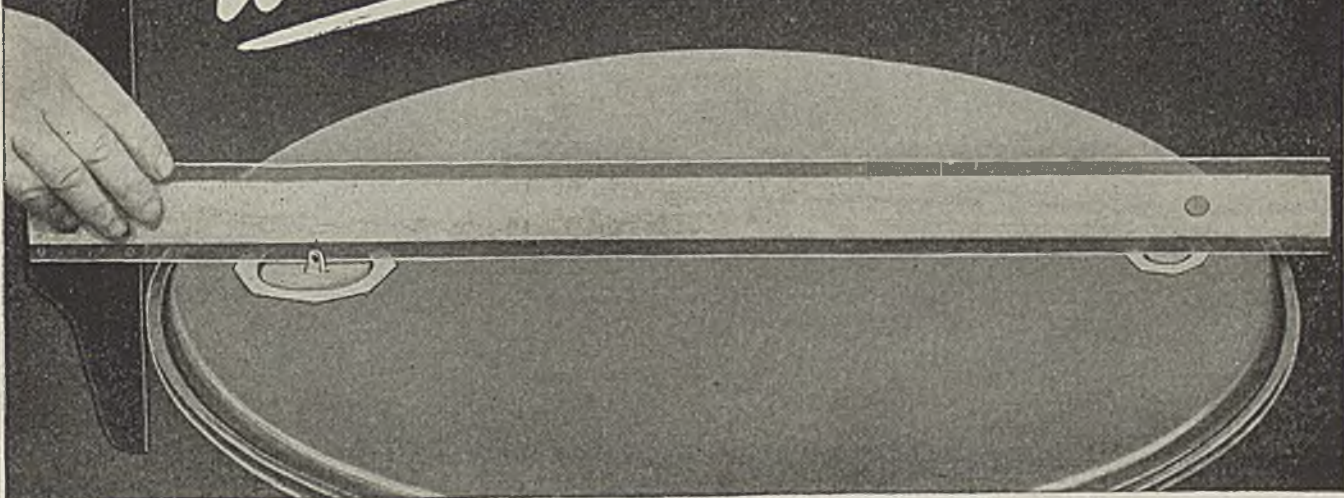
PRESSURE REDUCING VALVES
TEMPERATURE REGULATORS

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• **SELF CLEANING STRAINERS**

• **PRESSURE CONTROLLERS**
• **LESLIE-TYFON WHISTLES**

Tri-Sure Closures assure **FULL DRAINAGE**

washing *solutions*
of



—provide **CLEAN** drums for re-use

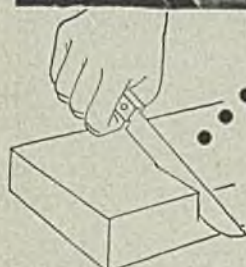
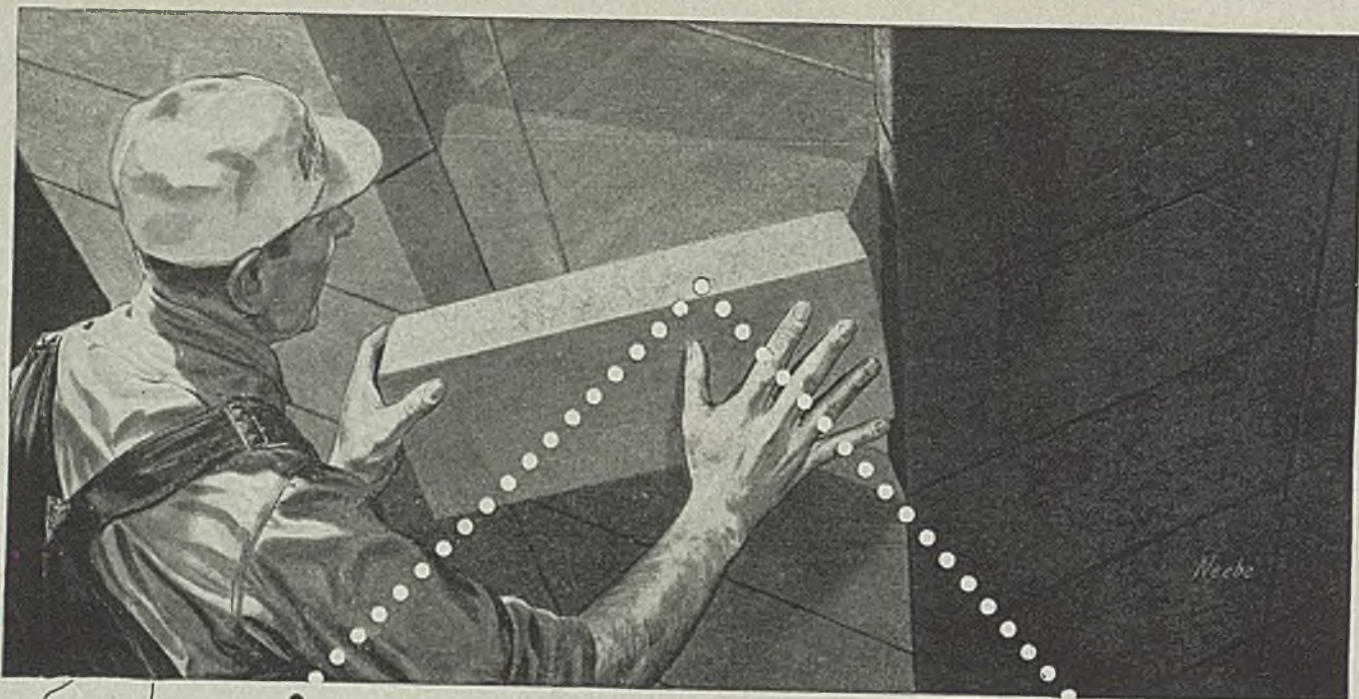
As shown in the T-square test pictured above, the flanges of Tri-Sure Closures engage perfectly *flush* with the inside of the drumhead. Any solution put into the drum for the purpose of cleansing, preparatory to re-use, drains completely out — your drum is certain to be *clean* and *free from contamination*—fully flushed, sanitary and ready

to “go” again — a *safe* container for any liquid. Tri-Sure *full drainage* is an important feature to every user of drums. It prevents waste and gives full quantity in every delivery; it assures clean drums that can be refilled with confidence. Get this protection in every drum — by specifying “Tri-Sure Closures” in every new or used drum order.



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TRI-SURE PRODUCTS LIMITED, ST. CATHARINES, ONTARIO, CANADA



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EAGLE SUPERTEMP BLOCK INSULATION is easy to apply!



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Eagle Supertemp Block is lightweight, easy-to-handle. It cuts like cheese with a knife or saw to fit odd-shaped areas. Fits snugly over minor irregularities, such as rivet heads.

Cuts heat losses to the bone!

Because it's basically Mineral Wool, Supertemp Block is literally honeycombed with dead air cells. From these highly effective heat barriers, it derives extremely low thermal conductivity... and becomes one of the most efficient insulations you can install!

Other Supertemp Block advantages



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All-purpose—only one type block needed.



High Refractory Value. Withstands a full range of temperatures up to 1700° F.

Water-Repellent. Actually floats on water. Absorption is negligible.



Permanent. Physically and chemically stable. Will not deteriorate. Data sheets with complete technical information are available on request.

To speed application of Eagle Supertemp Block, we recommend Eagle Insulstic, a strong, paste-like adhesive that holds insulation in place during application.

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EAGLE SWETCHEK (black). A prepared, asphaltic base, rust-inhibitive anti-condensation compound.

EAGLE "43" FINISHING CEMENT. A hard white finish coating for all types of indoor insulation within a range from 70° F. to 800° F.

EAGLE-PICHER INSULATIONS

High and Low Temperature



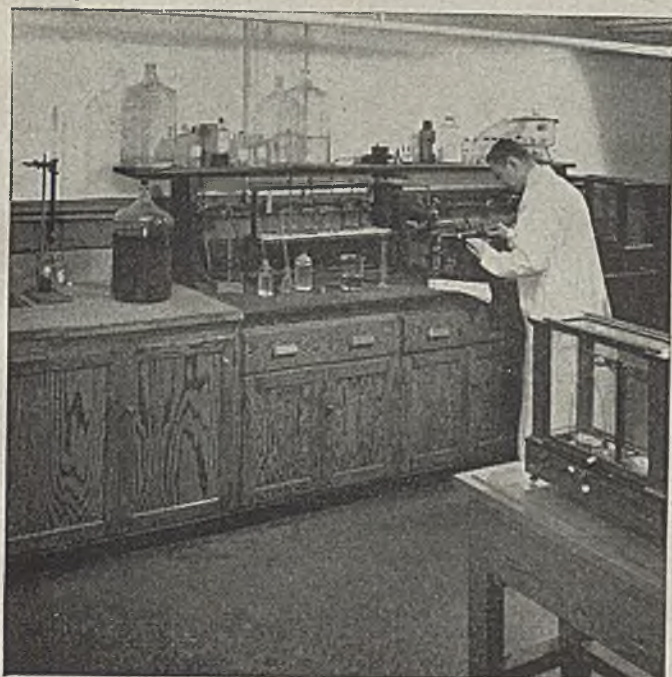
Made by THE EAGLE-PICHER COMPANY • CINCINNATI (1), OHIO

Eagle Super "66" Insulating Cement • Eagle L-T and M-2 Felt • Eagle Supertemp Block • Eagle Blankets • Eagle Pipe Covering
Eagle Insulseal • Eagle Loose Wool • Eagle Insulstic • Eagle Swetчек



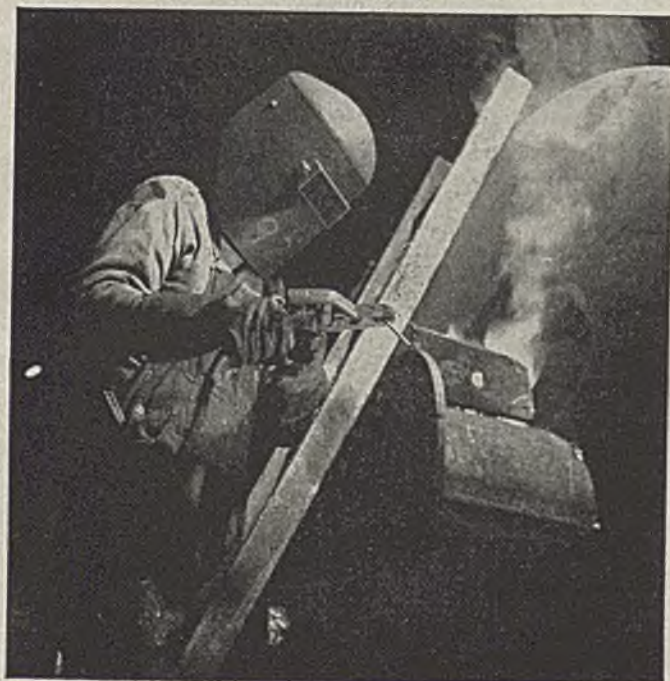
No. 7 in a series

Structural Design



View of Graver's modern chemical laboratory

Welding by skilled and experienced welders



OF WATER TREATING EQUIPMENT

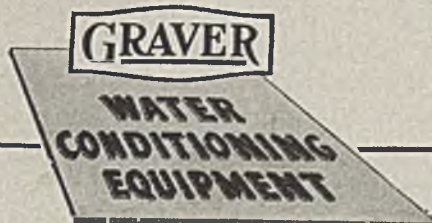
The structural design of a water treating plant must meet exacting specifications in order to insure safe and efficient operation of the equipment. For example: in a hot process water softener it is imperative that the tanks employed be of suitable structural design to withstand the relatively high temperatures and pressures involved. In most cases these treating tanks must meet the stringent requirements of the ASME Code for unfired pressure vessels.

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Graver is the only firm in the water conditioning field manufacturing its own tanks and other major elements. This important work is handled in Graver's large, completely equipped steel plate shop. All of the welding on Graver tanks is handled by ASME qualified welders. The tank safety factor is insured by the use of modern X-raying and stress-relieving facilities.

YOU CAN BENEFIT FROM GRAVER'S COMPLETE SERVICE

Graver's complete service starts with laboratory analysis of the raw water and carries through to the design, fabrication and erection of the water treating plant. You are invited to submit your water conditioning problems to Graver. You will receive expert advice and an unbiased recommendation as to the equipment required to meet your specific needs. Write, wire or phone for immediate attention.

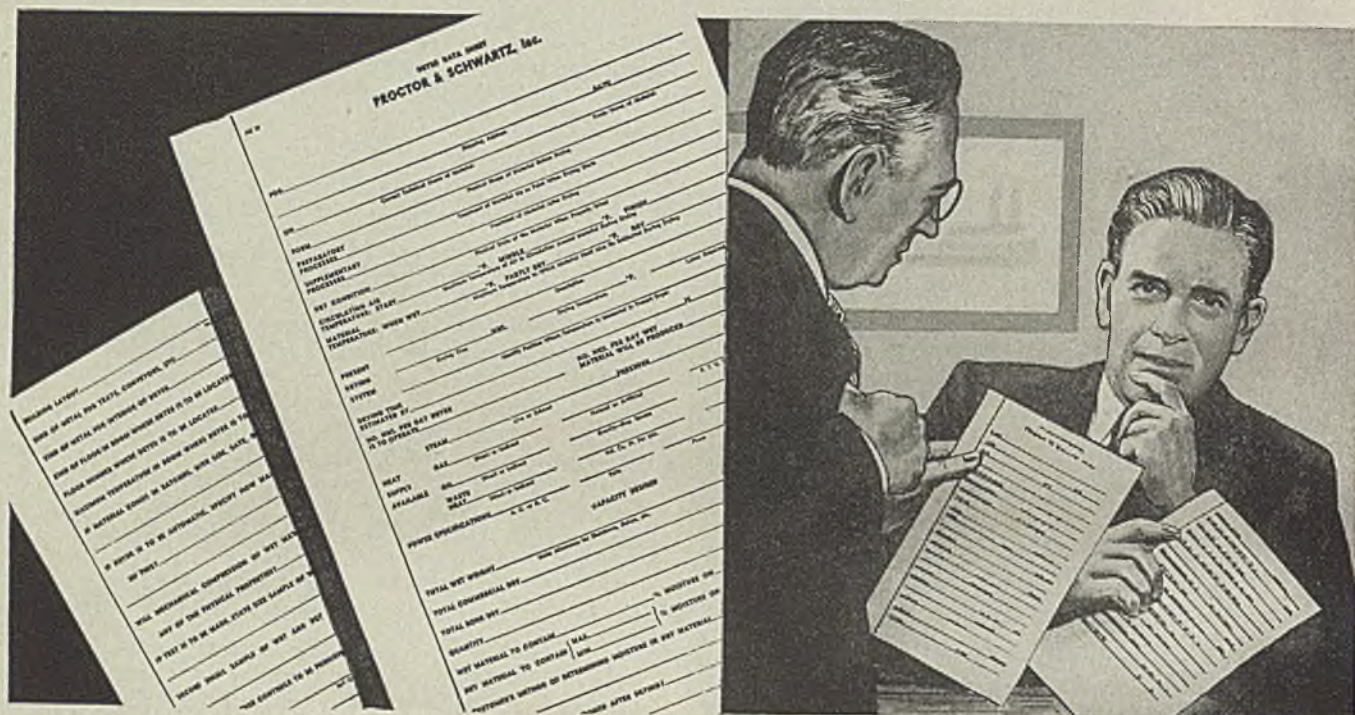


Process Equipment Division of

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General Offices: 4809-51 Tod Ave., East Chicago, Ind.
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INTELLIGENT RECOMMENDATIONS ON YOUR DRYING PROBLEM
MUST BE BASED ON *Complete Information*



If you are seeking help in the solution of a drying problem, a good thing to keep in mind is that the more complete information Proctor engineers receive from you, the more intelligent can be their recommendations. Often, some detail about your operation, which on the surface may not seem to affect the type of drying equipment you should be using, may have a most important bearing on the problem. When writing about your drying problem, it is well to include details on preliminary and subsequent processing, physical characteristics of the product, present equipment and capacities, capacity desired, building layout and every other detail about your production process that can be put down in black and white. To guide you in the

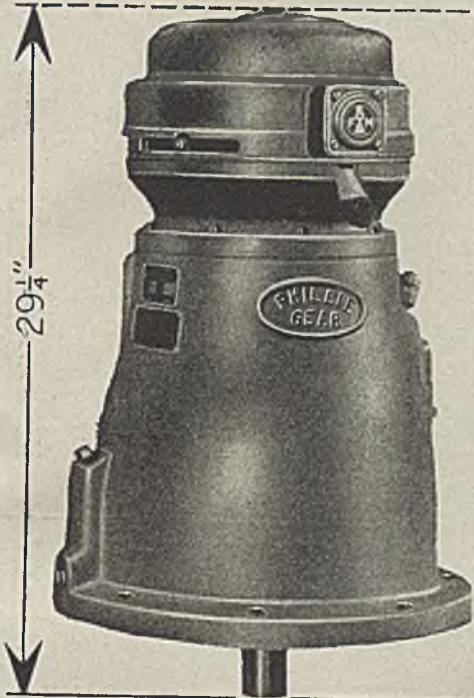
matter of supplying information, Proctor engineers have worked out "Dryer Data Sheets". These sheets, when completely filled out, provide our research engineers with vital information, which directs them to the proper course of action in their studies. In approaching anything so vitally important to you as the changing of your drying system, you will find it well worth the extra effort to gather all the facts. Once you have taken time to do this, the solution to your problem can usually be reached in surprisingly short time. If you have a drying problem—write for "Dryer Data Sheets", fill them in completely, return them, with a sample of your product, to us, if that is possible, and your problem is well on the way to an intelligent solution.

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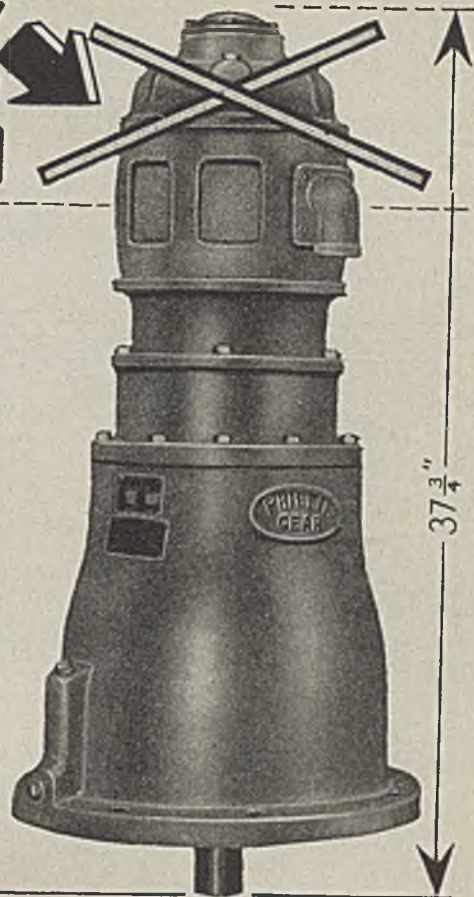
New... SAVES 23% HEADROOM



AT LEFT: Showing assembly with 5 HP @ 1750 RPM, Fairbanks, Morse Drip-Proof Axial Air Gap Motor, overall height from mounting flange to top of motor only 29 1/4".

AT RIGHT: Showing assembly with Conventional NEMA FLANGE mounted 5 HP, 1750 RPM, open type motor. Overall height from mounting flange to top of motor 37 3/4".

The resultant saving in headroom—8 1/2".



Yes, once again "Phillie Gear" brings out an improvement,—an innovation, if you like on their well known and very widely used Vertical **MotoReduceR**: . . . a saving in overall height of almost 23%. This permits installations in many places heretofore impossible or impracticable on overhead drives for Agitators, Mixers, Impellers, etc. All the other *exclusive and accepted features* of the Philadelphia **MotoReduceR** are still present, such as wide bearing span, which in the majority of cases, eliminates the need for objectionable "step-bearings"; the *ring-type base* which greatly simplifies mounting on tanks or other machinery; the *total absence of stuffing boxes* (which prevents oil leaks); *complete lubrication* to all parts; the "last word" in *compactness* of housings, etc.

The Vertical **MotoReduceR** can be supplied with output speeds from 11 to 420 RPM; in sizes from 1 to 10 HP with Fairbanks, Morse Axial Air Gap Motors—1 to 75 HP with NEMA Frame Motor. Write for our new **MotoReduceR** Catalog MR-45—and please use your "business letterhead" when doing so.

Philadelphia

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Industrial Gears and Speed Reducers
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LaMOTTE BLOCK COMPARATOR



This compact LaMotte Outfit greatly facilitates simple, accurate Hydrogen Ion Measurements.

Complete with any one set of LaMotte Permanent Color Standards, together with a supply of the corresponding indicator solution and marked test tubes. Even with highly colored or turbid solutions determinations can be made with accuracy. Full instructions accompany each unit. Complete, f.o.b. Towson 4, Md., \$12.50.

If you do not have the LaMotte ABC of pH Control, a complimentary copy will be sent upon request without obligation.

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to check this page—
EACH ISSUE

THIS WHERE TO BUY SECTION supplements other advertising in this issue with these additional announcements of products and services essential to efficient and economical operation in the process industries.

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Do you need competent men for your staff? Men experienced in the chemical engineering and other process industries operating under or with chemical engineering control? Men to fill executive, sales or technical positions?

Or are you one of the readers of Chemical & Metallurgical Engineering seeking employment in any of these capacities?

Or are you looking for—or offering—a business opportunity of special interest to men in the industry served by this publication?

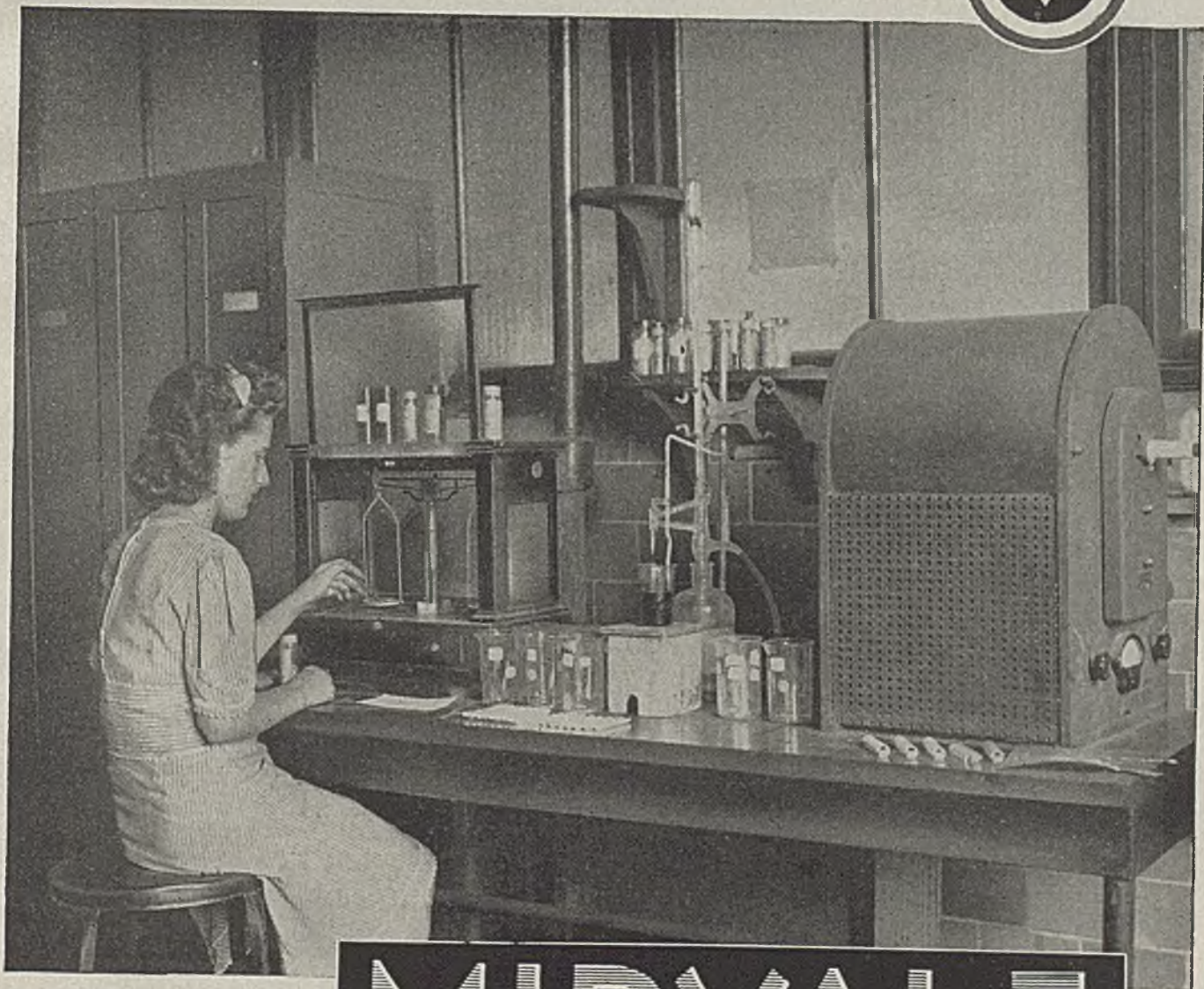
Or are you seeking buyers for surplus used equipment from your plant—or to buy such equipment from other plants?

The solution of any of these problems can logically be found first among other readers of Chemical & Metallurgical Engineering. You can get their attention—at small cost—through an advertisement in the Searchlight Section of Chemical & Metallurgical Engineering.

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Midvale straight carbon tool steels are produced under the most rigid control during all phases of manufacture. Their uniform hardenability, finish and performance from lot to lot are unexcelled. That's why you can be sure of consistently good results. They are available from stock in a wide variety of carbon ranges and in all usual sizes and shapes. Prompt mill delivery can be made on items not regularly carried in stock.

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One of eight plants to retain original Navy "E"

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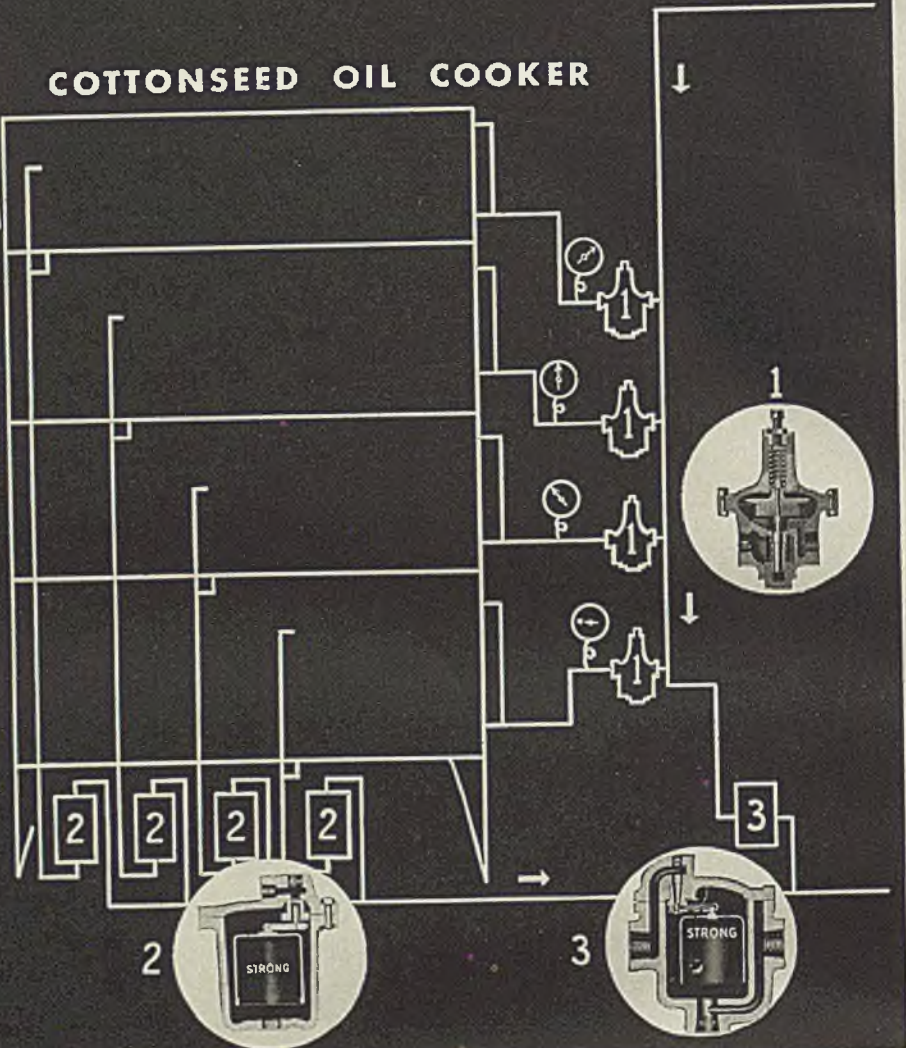
Custom Steel Makers to Industry

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- 1 Control and variation of temperatures in four steam sections.
- 2 Correct drainage to insure maintenance of cooking temperatures.

HERE'S STRONG'S Suggestion:

- 1 Since temperature varies directly with steam pressure install Strong's variable pressure reducing valves (Type K with Anum-Metl disc and seat and integral strainer) on inlets of each section. Pressure gauges in reduced side of line provide easy visual control, eliminating maintenance of temperature regulator bulbs.
- 2 Use Strong's Series 80 inverted bucket traps with Anum-Metl valves and seats to drain each section. Insure positive drainage and uniform cooking of meats.
- 3 Small Strong series 70 inverted bucket trap with Anum-Metl valve and seat drains main header, insuring a constant supply of live steam at each reducing valve.



Time-temperature processes depend on both!

Cottonseed cookers, in common with all time-temperature steam processes, require both accurate pressure control and complete, automatic condensate removal. In this case, bright, high-quality oils depend upon how accurately equipment operates.

Knowing the problems involved, and having the steam specialties needed to solve them, Strong steam engineers can give unbiased, practical recommendations that insure satisfactory operation of your time-

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For any trap need, open or inverted bucket, float, float and thermostatic—in cast or semi-steel, forged or welded construction—call on

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TCC can process stocks of any boiling range; they need not be vaporizable. In pilot plant operation, TCC has produced

56% of 10# 400 end point RVP motor gasoline in a once-through operation, from stocks having mid points of greater than 1000° F. This ability of the TCC Process to handle heaviest charging stocks becomes even more important now that automobile rather than aviation fuel is in principal demand. With TCC, you get optimum yields of high quality motor gasoline, with minimum coke—plus additional substantial volumes of readily salable heating oil. Interested refiners can submit samples of heavy stocks to Houdry Laboratories for pilot plant evaluation.

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- 45 Colloids From Kelp Give Rise to a Unique Process Industry. By C. K. Tseng. (4 pages, June 1945.)
- 46 Capacity Control for Atmospheric Cooling Towers. By Edward Simons. (1 page, June 1945.)
- 48 Alcohol Economics Will Determine Future Production Processes. By Rayburn D. Tausley. (1 page, Oct. 1945.)
- 49 Vapor Pressures Above 1 Atmosphere. By Ernst Berl. (8 pages, Jan. & March 1946.)
- 50 How Chemical Engineers Can Use Statistical Methods. By E. I. Stearns. (4 pages, May 1946.)
- 51 How to Apply More Know-How to Writing Operations. By B. H. Hopkins. (2 pages, June 1946.)

Indexes. Editorial indexes for the years 1943, 1944 and 1945 are available and will be supplied on request.

Editorial Department

Chemical Engineering

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tion produces an important lateral fourth mixing action. The result, a perfect blend with *no* substances floating to remain unmixed.



tion produces an important lateral fourth mixing action. The result, a perfect blend with *no* substances floating to remain unmixed.

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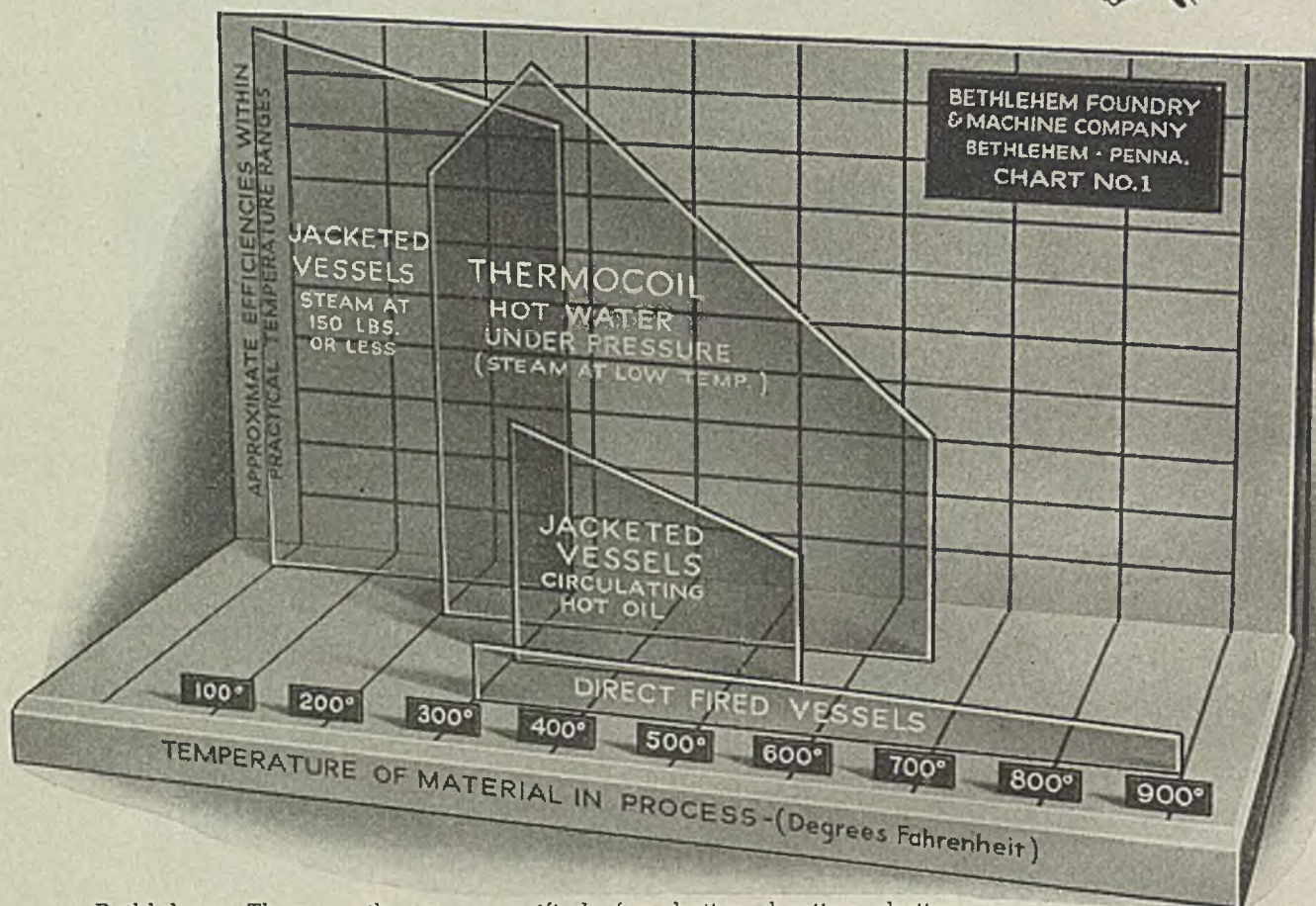
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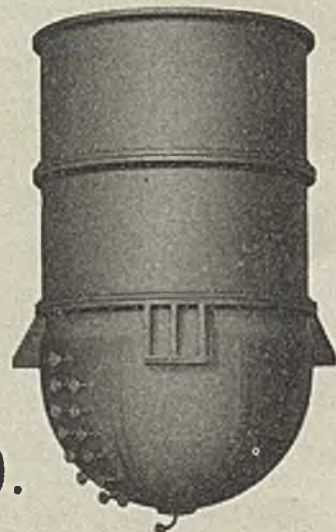
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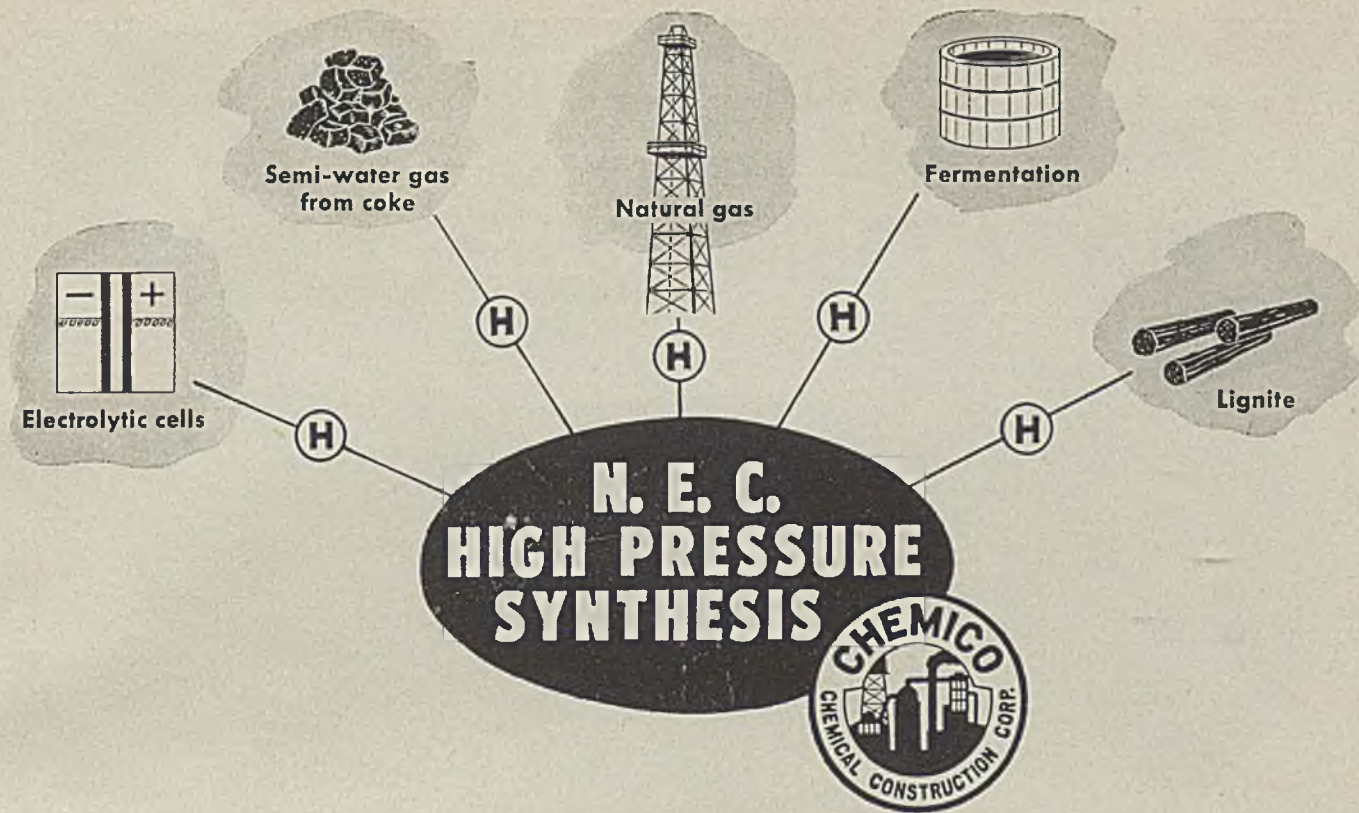
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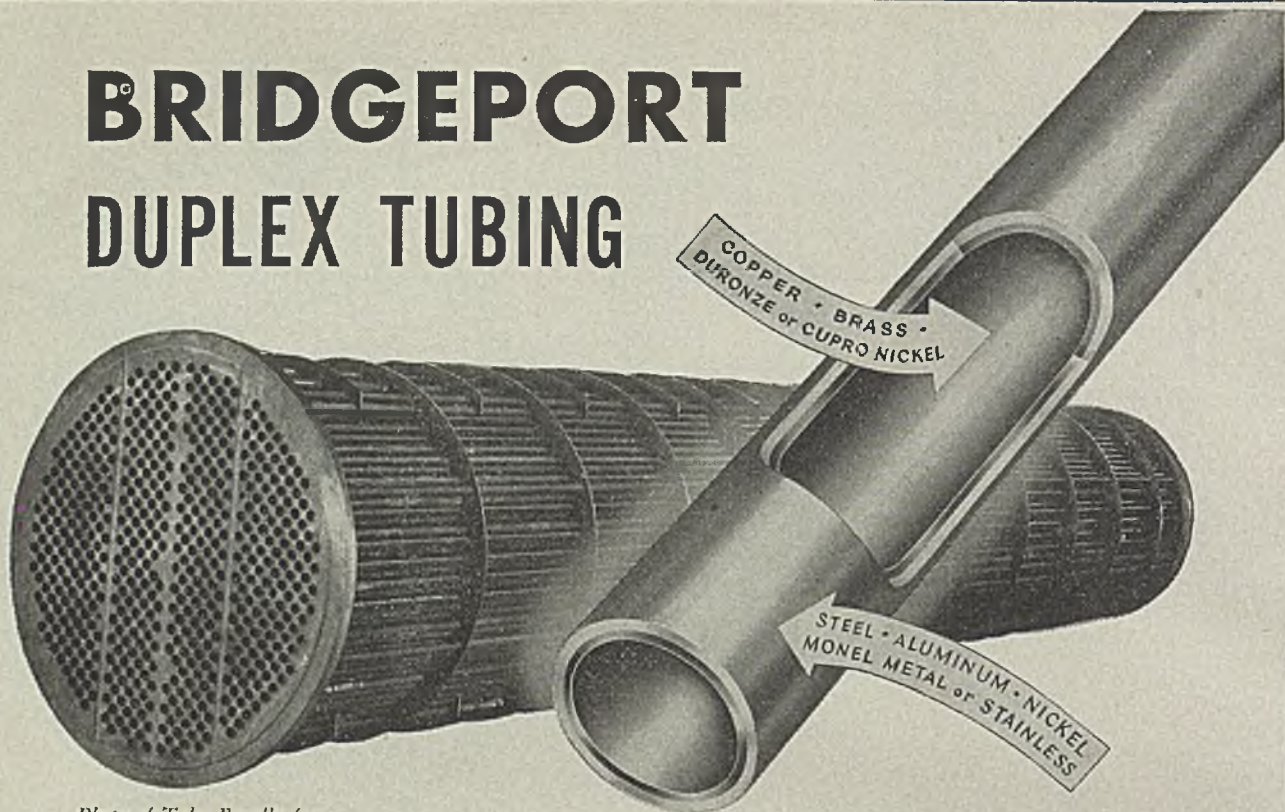


Photo of Tube Bundle for Type FST Cooler. Courtesy Griscom-Russell Company.

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- **Prevents Taste and Color Contamination**
- **Improves Heat Transfer In Some Cases**

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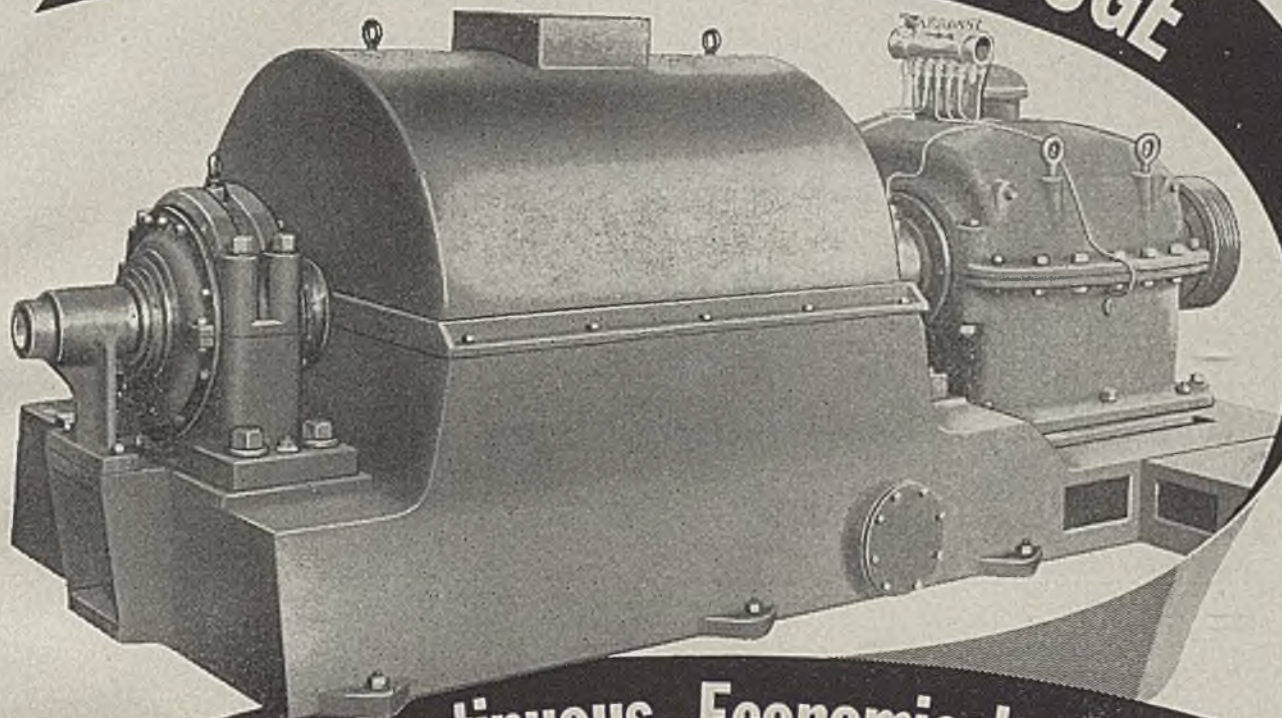
Contact our Technical Service Department giving nature of corrosion problem, outside diameter, wall thickness of both inner and outer tubes and other pertinent information. We shall be glad to help recommend suitable alloys. Write for Duplex Tubing Technical Bulletin.



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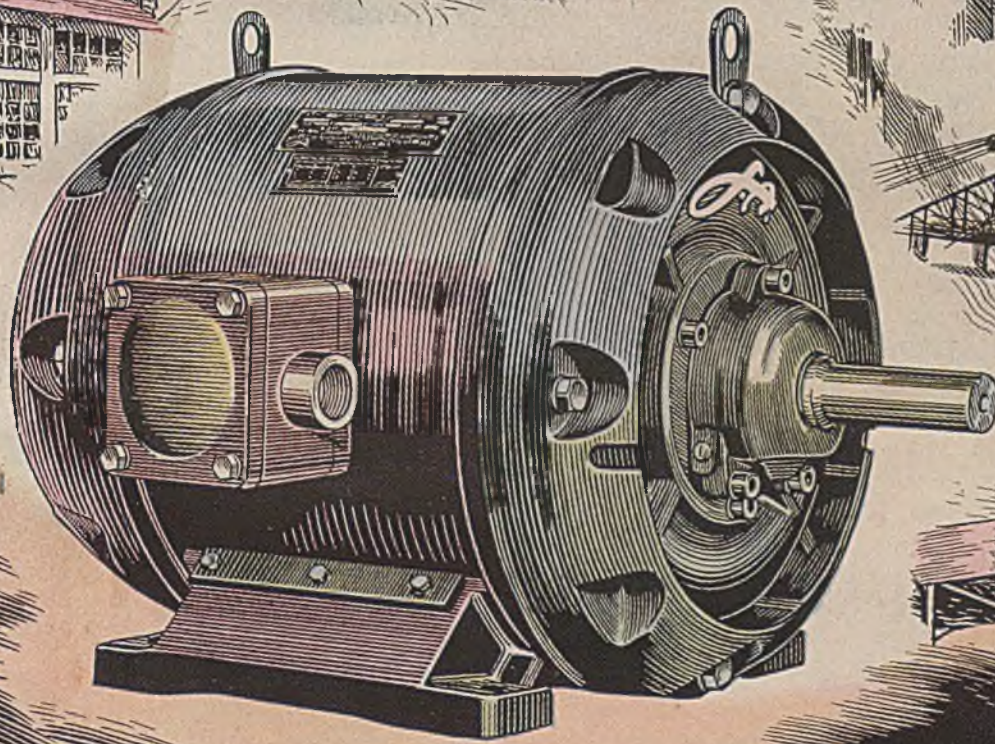
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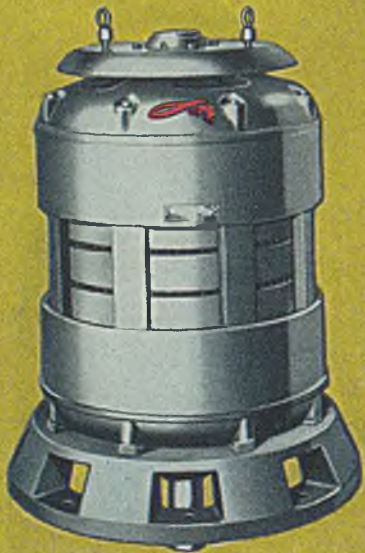
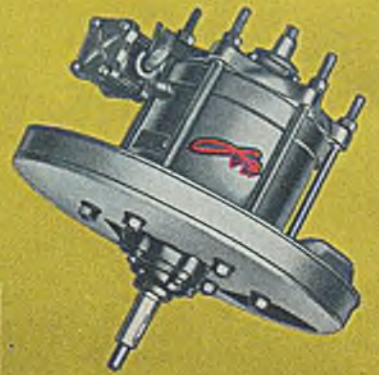
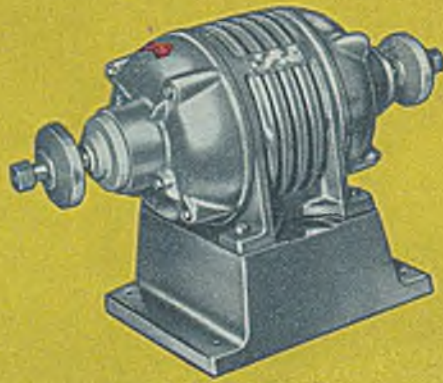
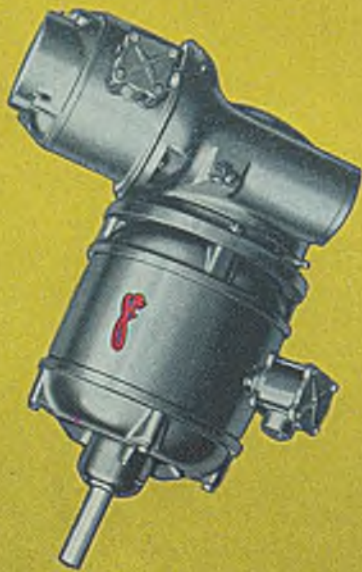
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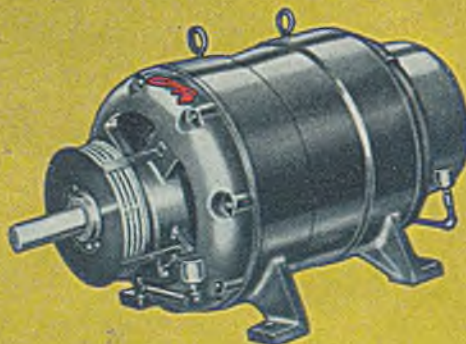
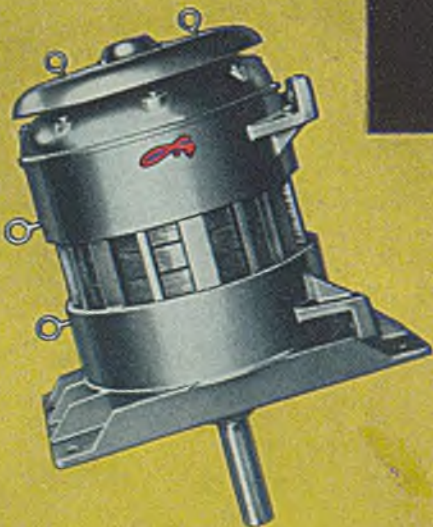
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AUTOCLAVES

- 1—42" dia. x 24'4" Vertical Forge Welded Steel 600 lbs. Pressure—1300 gals.
- 1—4' x 6' Vertical Iron Body, Steel Jacketed 200 lbs. Pressure—600 gals.
- 1—6' x 15' Vertical Steel Jacketed 125 lbs. Pressure—3400 gals.
- 1—10' x 25' Vertical or Horizontal Forge Welded Steel Jacketed, 100 lbs. Pressure.

BLENDERS

- 1—3'6" x 5 ft. Cylindrical Blender with Stands and Drive.

BUILDING

- 1—Blaw-Knox Steel Frame Building, size 60' wide x 98' long—12' to bottom of trusses, metal covering.

CONDENSERS

- 1—Elliott Ehrhart Iron Body Surface Condenser—two pass 245 sq. ft. Surface—½" brass tubing & Tube sheet.
- 2—30" x 7" All Copper Condensers with 1¼" Tubes—300 sq. ft. Surface.
- 1—Goubert Condenser with 1¼" Brass Tubing—Iron Body 330 sq. ft. Surface.
- 1—12" x 9 ft. Steel Condenser with 172 5/8" O.D. Copper Tubes, 250 sq. ft. surface.

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- 1—Allis-Chalmers 15"x9" Type "B" Blake Jaw Crusher. Capacity 1" Material 3 tons per hour—2" Material 8 tons per hour.
- 1—Eli W. Blake 15"x9" Eccentric Jaw Crusher. Belt Driven.

DRYERS

- 3—Bartlett & Snow, Vertical Steel Jacketed 10' dia. x 4' high. Agitators, Reducers, 2 H.P. Motors.

EXTRACTORS

- 1—40" dia. Burkhardt with Rubber Covered Basket and Lead Lined Curb—Under-driven.
- 1—38" dia. King & Gerber with Bronze Basket and Iron Curb—Overdriven

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- 1—12" dia. International Pressure Filter with Nickel Body and Cover—Single plate.
- 1—24" dia. No. 5 International Pressure Filter with Nickel Body and Cover—Single Plate.

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- 1—18" dia. Cast Iron with Depnigmator—15 sections each 6" high—2 top and bottom sections each 18½" high.

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- 1—Dispatch Electric Furnace Type C.F. 17-20 K.W. 220 volt—maximum temperature 1250 degrees F.—with circulating fan and ¾-H.P. Motor and controls—18" x 13" hearth.

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- 1—15" Style D Schultz O'Neil Pulverizing Mill.
- 1—24" Kent Pulverizing Mill, Belt Driven.
- 1—Raymond-Impact Mill—Direct Drive.
- 1—54" Brown Ball Mill—Mushroom Type.
- 4—40" Burkhardt Ball Mill—Mushroom Type.
- 1—No. 21 Quaker City Hammer Mill.
- 1—15" x 8" Jeffrey Rigid Hammer Pulverizer.

PRESSURE TANKS

- 1—5' dia. 23'4½" Forge Welded Steel 300 lbs. W.P. 3300 gals. suitable for storage of compressed gases.
- 1—6'x8' dia. x 6' deep, steel, riveted 125 lbs. W.P. 1750 gals.
- 1—3'6" x 10' high, steel riveted, 100 lbs. W.P. 750 gals.

REFRIGERATION UNIT

- 1—American Carbonic Model V5-2 Refrigeration Unit Type Co2—capacity 5 ton.
- 1—Cascade Deep Freeze Unit, complete with compressors, motors, control, etc. Minimum temperature 130 degrees F.

ROLLER MILLS

- 1—J. H. Day Three Roller Mill, Size 16' x 40 water cooled, Gear Driven.
- 1—Kent Three Roller Mill, Size 3' x 8" Gear Driven with 1/3 H.P. Motor—110/220 Volt Single Phase.

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- 1—No. 1002 Gayco Separator—Size 30—Model 38.

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- 1—Lewis Shepard Master Stacker—Type C.B.—Capacity 1000 lbs. 42" x 42" platform—Lift 9'10"—Motor 1½ H.P.—220 volts 3 phase—60 cycle—1685 r.p.m.
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- 4—Stokes Side Valve Type, size 8" x 6", Pulley Drive.
- 3—Devine Rotary Valve Type, Size 8" x 6", 52 cu. ft. Displacement. Pulley Drive.
- 2—Devine Rotary Valve Type, Size 10" x 10", 113 cu. ft. Displacement. Pulley Drive.

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- 1—Deister 3' x 6' Concentrator, Type C, Single Surface Leahy Heavy Duty Vibrating Screen with 1 h.p. motor—440 Volt—3 Phase—60 Cycle.
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- 1—55 gal. Blaw-Knox Stainless Steel. Rotating Jacketed, 750 lbs. Working Pressure, Reducer and Motor.

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- 1—No. 7—Sweetland Pressure Filter, equipped with 20 Monel metal covered bottom Drainage leaves on 4" centers—Capacity 15 cu. ft.

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- 1—Impregnating Units, 800 gal. capacity, Quick opening doors, surface condensers, vacuum pumps, circulating tanks, pumps and motors.

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- 1—4½" x 16" Hardinge Conical Ball Mill Complete with 25 H.P. Motor—220 Volt—3 Phase—60 Cycle—and Charge of Forged Steel Balls.

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- 1—8' dia. x 10' deep, iron body with heating coil, agitator and drive, 3000 gal.
- 1—4' dia. x 4' deep iron body, agitator and drive, 400 gals.
- 1—3'6" dia. x 5' deep, steel jacketed, lead lined with agitator, 350 gals.
- 1—3'6" dia. x 5' deep cast steel, jacketed, no drive or agitator, 350 gals.
- 1—4'6" dia. x 3' deep, steel jacketed, with agitator and drive, 350 gals.
- 1—19" dia. x 36" deep Vertical Pressure Kettle—Rubber lined.
- 1—100 Gal. Jacketed Copper with Bottom Outlet & Stands.
- 1—6'9" x 8'6" deep, Iron Body, Sulphonator, Propeller Agitator, Drive, Tight and Loose Pulley. Capacity 2000 gallons.
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- 6—Wood Filter Presses, 18", 24", 30", 36"
- 1—American 6' Two Disc Rotary Continuous Filter
- 1—No. 49 Vallez Rotary Continuous Filter
- 1—Vallez Lab. Filter

KETTLES—CRYSTALIZERS

- 4—Bullovak 375 gal. Jacketed Impregnating Kettles
- 1—Pfaudler 275 gal. Nickel Lined Kettle
- 1—Walters 5' dia. Copper Jacketed, Agitated Pressure Kettle, 700 gal.
- 4—Monel Metal Jacketed Kettles, 5 gal.
- 1—Autoclave, 50 gal. agitated

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- 5—Aluminum Jkted. Kettles, 5, 30, 60 gal.
- 22—Copper Kettles, Jacketed, some with Agitators, 10 to 200 gal.
- 1—Lead Lined Jacketed Kettle, 175 gal.
- New Stainless Steel Kettles, up to 500 gal.
- 2—300 Gal. Stainless Steel, Closed, Jacketed Kettles
- 2—Open Top Stainless Steel Kettles, 100, 150 gal.

KILNS—DRYERS

- 1—Rotary Kiln, 7 1/2' x 135'
- 2—Allis Chalmers Rotary Kilns, 7 1/2' x 70'
- 1—Christie 6' x 40' Rotary Dryer
- 1—10' x 90' Rotary Dryer
- 1—Traylor 7 1/2' x 51' Rotary Cooler
- 10—Rotary Dryers, from 4' x 20' to 6' x 60'
- 1—Copper Shell Rotary Dryer 6' x 17'
- 4—Rotary Vacuum Dryers, 18" x 3 1/2', 4' x 10', 4' x 15', 5' x 33'
- 3—Buffalo Vacuum Drum Dryers, 25" x 20", 48" x 40", 5' x 6'
- 1—Rotary Steam Tube Dryer, 6' x 27' 6", with 42—4 1/2" x 25' tubes
- 1—Steiner and Hudson Gas Fired Dryer
- 1—Gehrich Gas Fired Truck Dryer
- 1—22" x 60" Atmos. Drum Dryer

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- 1—Set of Allis Chalmers Type "B" 36" x 16" Crushing Rolls
- 1—Day 5' x 12" Three Roll Mill
- 2—Lehmann 5 Roll Refiners, 20" x 48"
- 1—Ross 12" x 30" Three Roll High Speed Mill
- 1—Fitzpatrick Model "D" Comminuter
- 1—Williams No. 1 Hammer Mill
- 2—Rubber Lined Pebble Mills, 3' x 3'
- 1—Robinson 30" Attrition Mill, with 2—40 HP motors
- 1—Krupp Beater Mill, with 40 HP motor
- 4—Raymond Mills No. 0000, 000, 00, 1
- 1—Sturtevant 30" x 16" Balanced Crushing Rolls

JUST PURCHASED!

- 3—Model ISH Mikro Pulverizers, 5 HP motors
- 2—Knapp Automatic Labelers
- 3—New Auger Type Powder Fillers
- 10—New 1000 lb. Powder Mixers
- 17—Bucket Elevators, 12' to 50' high, steel housing, motor driven
- 1—Pfaudler Nickel Jacketed Kettle
- 1—Stokes Rotary Vacuum Dryer, 18" x 3 1/2' long dia.
- 1—Devine Rotary Vacuum Dryer, 4' dia. x 15' long
- 1—Devine Lab. Vacuum Shelf Dryer, with condenser
- 2—Bullovak 6' Vacuum Crystalizers
- 1—Fitzpatrick Model "D" Comminuting Machines
- 3—New Stainless Steel Jacketed Kettles, 100, 150, 300 gal.
- 10—New Stainless Steel Tanks, 100, 200, 300, 500 gal.
- 8—Tyler Ro-Tap Sieve Shakers
- 1—Abbe Porcelain Lined Pebble Mill, 150 gal.
- 1—Abbe 10 Jar Mill, motor driven
- 1—Day 5" x 12" Three Roller Mill
- 2—American 16" x 40" Three Roller Mills, 20 HP motors
- 1—Ross 12" x 30" High Speed Three Roller Mill
- 2—Lehmann 5 Roll Mills, 20" x 48"
- 1—W. & P. 20 gal. Stainless Steel Mixer
- 1—Readco 100 gal. Jacketed Heavy Duty Mixer, double arm
- 1—Anderson No. 3 Moisture Expeller
- 2—Kiefer 72 spout Rotary Bottle Washers

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BRILL EQUIPMENT CO.

225 WEST 34th ST.

NEW YORK 1, N.Y.

Your Production Program

FROM **BRILL**



LIQUIDATION!
ALUMINUM, INC.
MARYSVALE, UTAH

- 1—Allis Chalmers Rotary Kiln, 7'6" x 135'
- 1—Allis Chalmers Rotary Kiln, 7'6" x 65'
- 1—Allis Chalmers Rotary Kiln, 7'6" x 70'
- 1—Rotary Kiln 40" x 20'
- 1—Allis Chalmers No. 5 McCully Crusher, 10" opening
- 1—Set of Allis Chalmers Type "B" 36" x 16" Crushing Rolls
- 2—150 HP Erie City H.R.T. Boilers
- 6—Bucket Elevators, 20' to 40' high
- 1—Swenson Single Effect Evaporator, having 492—2" x 5' vertical steel tubes
- 1—Swenson Triple Effect Evaporator, each body having 492—2" x 5' vertical steel tubes
- 2—Tolhurst 48" Centrifugals

MISCELLANEOUS: 15 Motors, 1 to 40 HP; 125 KVA Generator; Electric Transformers; Pumps; Tanks; Lumber; Piping; Shafting; etc.

Send for
Complete Detailed Bulletin

- 1—Allis Chalmers 9" x 18" Jaw Crusher
- 3—Model ISH Mikro Pulverizers
- 1—Williams Infant Hammer Mill
- 2—American 16" x 40" Three Roll, Water Cooled Mills, 20 H.P. Motors
- 1—Allis-Chalmers No. 5 Superior McCully Crusher 10" Opening

MIXERS

- 8—Stainless Steel 175 gal. Mixing Tanks
- 12—Agitator Drives, for tanks from 10' to 24' dia.
- New and Used Portable Agitators, from 1/4 to 2 HP, 440 and 1750 RPM
- 2—New Era Jacketed Double Arm Mixers, 100 and 200 gal.
- 1—Readco 100 gal. Double Arm Mixer, steam jacketed
- 1—Fowler & Rockwell 5 bbl. Mixer
- 5—Brand New 1000 lb. Dry Powder Mixers, motor driven
- 5—Day, Ross Double Arm Mixers, 10 to 100 gal.
- 2—W. & P. Mixers, 9 and 20 gal.
- 4—Steel Mixing Tanks, with side entering agitators, 650 to 1500 gal.
- 2—Scott 1250 gal. Jacketed Horizontal Closed Mixers

EVAPORATORS—PANS

- 1—Scott Quadruple Effect Evaporator, each body 8'3" dia. calandria type, approx. 2500 sq. ft. each effect
- 1—Quadruple Effect Evaporator, designed to evaporate 60,000 lb. water per hour
- 1—Zarembo Double Effect Evaporator, all copper, 5' dia., 500 sq. ft. per effect
- 1—Lillie All Copper Double Effect Evaporator 100 sq. ft. per effect
- 1—Swenson Single Effect Aluminum Evaporator, 100 gal. per hour
- 1—Bullovak Stainless Steel Single Effect Evaporator, 900 sq. ft. 7' dia.
- 6—Copper Vacuum Pans, 42", 5' and 7' dia., 50 to 750 gal.
- 1—Stokes Steel Vacuum Pan, 100 gal.
- 3—Cast Iron Vacuum Pan, 7', 8', 12' dia.
- 1—7' dia. Double Effect Evaporator, 1500 per effect.

CENTRIFUGALS

- 1—Tolhurst 40" Solid Basket Centrifugal, motor driven, 15 HP motor
- 7—Tolhurst 32", 40", 48" Self-Balancing Centrifugals, steel and copper baskets top and bottom discharge
- 5—12" to 30" Belt Under Driven Centrifugals
- 1—A. T. & M. 40" Centrifugal, 30 HP motor, 1800 RPM, bottom discharge
- 2—Sharples No. 8 Presuritized Centrifuges
- 2—Sharples No. 6 Super Centrifuges
- 4—De Laval No. 300, 600, 700 Clarifiers

MISCELLANEOUS

- 4—Devine, Marsh Horizontal Piston Vacuum Pumps, from 50 to 200 cfm.
- 4—Tubular Condensers, 25 to 260 sq. ft.
- 10—12" Belt Conveyors, built for any length, motor driven
- 1—16" Troughing Idler Belt Conveyor, 175' centers
- 10—Liquid, Paste and Powder Filling Machines
- 6—Can and Bottle Labelers
- 16—Copper, Glass Lined and Aluminum Tanks, 25 to 1000 gal.
- 25—Centrifugal, Piston and Rotary Pumps, 1" to 5" discharge
- 6—Tyler, Rotex, Leahy Screens

TABLET MACHINES

- 1—Stokes Rotary DDS2, 1 3/16"
- 10—Stokes Rotary, D3 and D4, 31/32"
- 10—Colton, Stokes Single Punch, up to 3/4"
- 1—Mulford Single Punch, 1 1/4"
- 1—Stokes R Single Punch, 2 1/2"

PLANT LIQUIDATIONS OUR SPECIALTY. WIRE—WRITE

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AUTOCLAVES

- 4—Horizontal Autoclaves—double door 5'x11' with 2 roll-in trucks.
- 4—Vertical Jacketed Autoclaves 4'x6'.
- 2—Forged-Welded Autoclaves 300 PSI 6'x21'.
- 1—Blaw Knox 125 Gal. Welded Steel Autoclave 3'x3' Jacketed and Agitated.
- 1—Devine Autoclave or Impregnator, Jacketed 31'x36'.
- 1—Seamless Steel Autoclave 1200 PSI 29'x9' agitated.
- 1—Blaw Knox Autoclave 30'x60', Bolted cover—1000 PSI.

CENTRIFUGALS

- 1—Tollherst 40" with Plow, Unloader & 15 H.P. Motor.
- 1—Bird 40" Suspended Type Extractor with 2 Speed, 25 H.P. motor.
- 4—Troy, American, Tolhurst Laundry Type Centrifugal Extractors, 20" to 30"—Bronze and Iron Baskets.
- 1—Sharples No. 6 Centrifuge tinned contact parts—clarifier type.

COLLOID MILLS

- 3—Premier Colloid Mills from 3 to 40 H.P. motors.
- 2—Chemi-Colloid Mills 3 and 10 H.P.
- 3—U. S. Horizontal Colloid Mills—1/2 to 15 H.P. double motored units.
- 4—Eppenbach Colloid Mills 1/2 to 5 H.P.
- 1—Bartlett & Snow No. 1 Triple Action Colloid Mill—7 1/2 H.P.

COLUMNS

- 1—Copper Alcohol Distillation Unit, 36" Diameter—23' high—bubble cap, Sectional type.
- 1—Steel Alcohol Concentrating Column 62" Dia. having 24 sections 14" high—cap, 400 gal. 190 proof.
- 1—Steel Fractionating or Bubble Cap Column—30" Dia. x 32' high.

COMPRESSION BELTS OR SEALERS

- 4—Standard Knapp Units, 10' and 20'.

CONDENSERS

- 1—Copper Single Pass Condenser 18"x8' long with 1 1/4" Copper Tinned Tubes—103 sq. ft.
- 1—Devine Iron Surface Condenser 8'x57" with receiving tank.
- 1—Aluminum Condenser 9'6" long having 64 tubes 3/4" or 150 sq. ft.
- 2—Surface Condensers or Heat Exchangers—each unit has 5256 tubes—17' and 17' long 2800 sq. ft.
- 1—Surface Condenser having 1100 tubes 3/4"x18' long.

DRYERS

- 2—Buffalo Double Door Vacuum Shelf Dryers, 20 shelves, size 60"x160" with Vacuum Pump and Condenser.
- 3—Buffalo & Devine—Vac. Shelf Dryers, 40"x40"—5 Shelf & 13 Shelf.
- 1—Ross 4 Pass Continuous Conveyor Dryer, 60' ong. with accessories.
- 2—Proctor & Schwartz 80 Tray Dryers, 34"x7 x6'10".
- 1—Black & Clawson Double Drum Dryer, 28"x60" with accessories.
- 3—Double Drum Atmospheric Dryers, 27 1/2"x63".
- 1—Devine Double Bronze Drum Dryer, 3'x9', with 25 H.P. motor.
- 1—Buffalo Single Drum Chrome plated Dryer, 5'x6' with auxiliaries.
- 1—Buffalo Double Drum Dryer, 32"x72".
- 1—Buffalo 5'x12' Rotary Drum Dryer.
- 2—Vacuum Drum Dryers, 48"x40" (1 Iron, other bronze, chromed).
- 1—Buffalo Vacuum Drum Dryer, 5'x20'.
- 1—Rotary Vacuum Dryer, 3'x18' with auxiliaries.
- 2—Galland & Henning Steam Tube Dryers, 6'x30'.
- 1—Gehrich Gas Dryer 41"x58"x30 1/2".
- 2—Stokes Laboratory Size Vacuum Shelf Dryers.

EVAPORATORS

- 1—Swenson Single Effect Aluminum Evaporator 3'2"x5'6" with 200 Aluminum tubes 3/4"x4"—with Vacuum Pump and Aluminum receiver.
- 2—Lillie Evaporators 5'x10' all Copper with 140—3" copper tubes.
- 1—Buffalo Single Effect Stainless Steel Evaporator, rapid circulating type with pump and condenser.

FILLERS (DRY POWDERS)

- 1—Stokes & Smith Model G1 Universal Semi-Automatic.
- 1—Triangle Model SN Auger type, Semi-Automatic.
- 1—National Packaging F2 Free Flowing Filler.
- 2—National Packaging Two Station, Automatic Auger Filler.
- 3—Scott Scales and Hoepner Weigh Type Fillers.
- 1—Triangle Elec-Tri-Pack Filler, Free Flowing 3 oz. to 3 lbs.
- 8—Day, Spout-Waldron, Jeffrey and Howe, Lock and Barrel Packers.

HEAT EXCHANGERS

- 1—Griscomb-Russel 7 Pass Stainless Steel Heat Exchanger.—(See Condensers)

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See the **FIRST** PAGE
on **PAGE 278** of the
DISPLAY ADVERTISING

FIRST

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OFFERS THE COUNTRY'S
MACHINERY INDEX**

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at the
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Several of our top executives will man our space at the Chemical Show prepared to give you full information on the spot on the equipment you are seeking or wish to dispose of.

An ample stock of literature will be there for your edification. A few of our machines will be on display but naturally, limited space will allow only a minimum number.

Regardless of whether you are seeking an individual unit or a complete plant consult our representative in Booth N6. A courteous reception will greet you. Constant contact with our New York offices will be maintained.

Copies of our newly issued Bulletin, now on the press will be ready for distribution and the New FMC 96 Page Catalog will be yours for the asking. See FMC in Chicago.



- FILTERS**
- 1—Shriver 18" Wood Pl. & Fr. Filter Press.
- 1—Shriver Cast Iron 24" Pl. & Frame, Filter Press with pump and motor.
- 1—Shriver 30" C.I. Pl. & Fr. Filter Press.
- 1—Industrial all Iron Rotary Filter Drum 6'x3'.
- 2—Oliver Filters 5'x6"—Steel construction.

KETTLES

- 75—Jacketed Kettles in stock, Stainless, Copper, Iron etc. up to 1000 gal. capacity.

LABELERS

- 6—Semi-Automatic Bottle Labelers World, Ermold, National.
- 2—Burt & Standard Knapp Can Labelers.
- 2—Pneumatic and Weeks Straight Line Automatic.

MILLS (Roller)

- 2—Kent 16"x40"—Three Roll Mills.
- 1—Houchin—Alken 20"x48"—Three Roll Mill.
- 1—Lehman 5 Roll Water Cooled Mill, 20"x48"—arranged for M.D.
- 1—J. H. Day 3 Roll Water Cooled Mill 9"x33"—B.D.
- 1—Lehman 4 Roll Water Cooled Mill, 12 1/2"x32"—arranged for B.D.
- 1—Buhler 5 Roll Water Cooled Mill, 13 1/2"x31 1/2"—V belt drive to 20 H.P. motor.

MILLS (Ball & Tube)

- 4—Hardinge Conical; 5'x22"; 6'x48";—(2)—8'x30".
- 1—Abbe Ball Mill, 40"x58"—arranged for M.D.
- 3—Stearns Rogers Tube Mills, 5'x22".
- 3—Allis Chalmers 7'x24" Tube Mills.
- 1—Allis Chalmers 6'x22" Tube Mill.

MILLS (General)

- 2—Raymond No. 45 1mm Mills complete with accessories.
- 3—Raymond #0 and #0000 Mills.
- 2—Raymond #1 Mills—P.D.
- 1—Stedman Cape Mill arranged for (2) 75 H.P. motors (not included).

MIXERS (Heavy Duty - Semi-Solids)

- 3—Simpson Intensive Mixers, 6'; 4' and 18".
- 4—W. & P. Jacketed Mixers, 2 gal., 9 gal. and 20 gal.
- 1—P. & J. Jacketed Hor. Mixer 34"x40"x50, double elliptical arms—requires 2 motors.
- 1—Abbe Double 2 arm Mixer—137 Gal. Cap.—with 7 1/2 H.P. motor.

MIXERS (Dry Powder)

- 1—Day Model G 2000 lb. Mixer.
- 1—Sprout Waldron 3000 lb. Vertical Mixer.
- 12—New FMC Dry Ribbon Mixers up to 3000 lbs.
- 1—Gedge Gray 6000 lb. Hor. Mixer.

PACKAGING EQUIPMENT

- New FMC Belt Conveyor Built to order.
- 2—Packomatic Wax Liners, Package Mch. Co.—Wax Wrapper for Cartons, Case Gluers & Sealers.
- 2—Package Mch. Co. Type AA Wrappers.
- 1—R.A. Jones Cartoning Machine.
- 2—Knapp & Burt Can Casers.

PRESSES

- 3—Hydraulic Presses 200 ton—30x60, steam heated platens—15" ram 9" daylight.
- 3—Terrelson Toggle Presses 7"x13" steam platens.
- 1—Bethlehem 42x34 Hydraulic Press 500 ton with pump.
- 1—Southwark 500 ton Curb Press; 40" bed; 18" ram.

STILLS

- 12—Vacuum Stills in Copper, Steel, Aluminum—Jacketed—Colled—all sizes.
- 1—Glass Lined 3000 Gal.—Sectional Still.
- 3—Bubble Cap Stills (see Columns).
- 1—Copper Gin Still 300 gal. 5' dia.
- 1—Bulovac Nitric Still 80 Bbl. capacity.—96"x108" with oil burner.
- 1—New Stainless Barnstead Stills, No. SS 100.
- 9 Other Water Stills—gas or steam operated in all capacities.

TABLET MACHINES

- 75—Stokes & Colton, Single Punch and Rotary Tablet Presses for practically every requirement.

MISCELLANEOUS

- 1—Fitzpatrick Stainless Steel Comminuting Machine Model D.
- 1—Rennoburg 5 ton Screw Press with Dryer (Oil Burner), 50 H.P. motor and accessories.
- 1—Bartlett Snow Horizontal Digester 6'x18' with 3/4" steel shell.
- 1—Dapp 1500 lb. Crutcher; 42"x40".
- 3—Crystallizers or Vacuum Drying Pans 5' and 7'5" Dia. complete with accessories.
- 2—Allis-Chalmers Rotary Coolers 8'x83' arranged for M.D.
- 2—Heavy Copper Tanks, Horizontal 4'4"x12' dished heads.

or Individual Items

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157 HUDSON ST., NEW YORK 13, N. Y.
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UNION STANDARD EQUIPMENT

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Vacuum Pans with and without heavy duty agitators, sizes 20", 3', 4', 5', 6' Glass-Lined Vacuum Pfaudler 150 gallon and 125 gallon Pan with heavy duty agitator.

Mixers—F. J. Stokes, J. H. Day, New Era, Holtman, etc. From 2 gallons to 450 gallons, with and without jackets, single and double arm agitators

SPECIAL:—3 Ton Spiral Mixer, 3 Ton Paddle Blade Pigment Mixers
Grinders & Pulverizers—Three NEW Mikros, One SH, Two Mikros, 4TH, 24" Schutz O'Neill, Prater, Mead—Gauge Mills or Disintegrators.

Mullers & Sizers—4', 6' and 9' sizes

Roller Mills—Day, Lehman 12"x30" Kent 9"x24", Soap Mills—N. E. Heavy Duty types.

Sifters—Rotex 20"x48", Gayco 4' Air Separator and Sifter; Allis-Chalmers Low Head

Centrifuges—Tolhurst 26", Crescent-Morris 40" Basket Centrifuge

Jacketed Kettles—With and without agitators, Copper, Aluminum and Stainless Steel. Give full requirements. Vertical Mixers, Hobart, Read, Century.

Filter Presses—Shriver, Oliver, Sweetland, Johnson, 12", 24", 30" sizes. Write detailed requirements.

Wrapping Machinery—Package Machinery, American Machine & Foundry, Hayssen, Gellman and others. Send samples with requirements. World Fully Automatic.

Labelers—Ermold Semi-Automatic World Fully Automatic

Fillers—Karl Keifer Rotary Visco—U. S. Bottlers—Acme C-10—N. E. High Speed Viscous and Semi-Viscous Filler—Filler Mch. Co. Stainless Steel Piston—Karl Keifer #10 Piston Filler

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MODERN
MACHINES
IN STOCK

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Rogers 6 ft. Copper Evaporating Pan complete with Vacuum Pump, Traps and all connections, steam jacketed and with steam coils.

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CASH FOR
SINGLE
MACHINES
OR
ENTIRE PLANT

FOR SALE NOW!

- 1—STOKES Rotary "D" Table Machine MD
- 1—STOKES Atmospheric Double Drum Dryer, 24" x 48"
- 1—DEVINE #9 Vacuum Shelf Dryer 13 Shelves, 40" x 48"
- 1—BUFFALO Foundry Bronze Drum Dryer 24" x 20"
- 1—W & P Jacketed Mixer 20 gal. MD
- 1—W & P Jacketed Mixer 1/2 gal. MD
- 2—SHARPLES "Pressureite" Super Centrifuges MD
- 1—ROSS 8 gal. Pony Mixer MD
- 1—J H DAY 20 gal. "Brighton" Mixer
- 1—J H DAY 30 gal. GIANT Jacketed Mixer
- 6—S.S. Jacketed Kettles—80 gal.
- 27—Aluminum Jacketed Kettles, 80 gal.
- 1—PFAUDLER Jacketed Glass Lined Reactor—500 gal.

WHAT HAVE YOU FOR SALE?

Send for Bulletin A-6

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GRamercy 5-6680

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500 Gallons and larger—storage and Pressure types. Kettles — mixing tanks — miscellaneous tanks for all types of liquids.

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FOR SALE

75 gal. S.S. Jkt. Kettle, with Stand.
100 & 150 gal. S.S. Mix Tank, Water Jkt.
150 gal. Pfaudler Tilling Tank, Jkt., 44"x24".
300 gal. Pfaudler Tank Jkt., 42"x48".
1. H. Day Pony Mixer, 15 gal.
Williams Lab. Pebble Mill, two 1 gal. Jars.
100 and 150 gal. S. S. Mix Tank, Water Jkt.
2 1/2 gal. W. & P. Lab. Mixer.
1/3 H.P. Portable Mixers, S.S. Shatt.
2" Ingersoll-Rand Pump, 5 H.P.
2—York Gear Pumps, 1/2 H.P.
50 to 450 gal. Homogenizers or Viscollizers.
42"x34" Glass Lined Vacuum Pan.
New 1 gal. Laboratory Autoclaves.

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Hardings Ball & Pebble Rotary Mills—3' x 8"—

5' x 22"—8' x 22"—6' x 22"

Rotary Dryer 30" x 40', 5' x 30', 5'6" x 86' lined, 7' x 85"

Centrifugal Pumps 100 gpm 120' head with A.C. motor, other sizes in stock.

Duplex steam pumps, 7 1/2 x 3 x 8—4 1/2 x 2 3/4 x 4

42" and 48" International Clay Feeders
5'—9' dry and wet pans, pug mills, disintegrators. Brick cutters

#1 1/2 Sturtevant Rotary Crusher

Ross 72 gal. Lead Mixer

Hammer Mills—Screens vibrating, rotary

Air Compressors—Blowers—Exhausters

24" Mikro Pulverizer

Motor Generators 6 1/2 HP, AC-DC with Panel

Speed Reducer—New 5 H.P. 20-1 reduction 20 H.P. new GE gear motor

Send us your inquiries

LAWLER COMPANY

METUCHEN, N. J.

SPECIAL

30—High Pressure Water Tube Boilers, from 250 H. P. to 600 H. P.
8—Turbo Generators, from 400 K. W. to 2750 K. W.

LIQUIDATING

1—500 gallon Devine High Pressure Autoclave
1—Dopp Steam Jacketed Mixing Kettle
5—Copper Steam Jacketed Mixing Kettles
3—Paterson Silox-lined Pebble Mills
1—5000 gal. Steel Storage Tank
1—8000 Steel Pressure Tanks
75—Ton Cast Iron Pigs 8" to 18"
4—Permutit Water Softeners
4—H & P Water Filters, 8' x 20'

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40 Worth Street, New York 13, N. Y.
Phone: COrtlandt 7-1591



IT PAYS TO TRADE with LOEB

CENTRIFUGALS AND CLARIFIERS

- 2—#600 De Laval Clarifiers.
- 1—Lacta Clarifier.
- 1—Sharples Clarifier #6.
- 1—Sharples type M75 Clarifier.
- 1—26" Tolhurst copper basket Centrifugal.
- 2—10" Tolhurst suspended type Centrifugals.
- 1—International 10 cup Centrifuge, 2 hp.
- 1—International size 1 Centrifuge.

CONDENSERS

- 1—60 sq.ft. steel shell copper tube surface.
- 1—10 sq.ft. steel.
- 1—14 sq.ft. copper surface.
- 1—15"x4" copper horizontal Jet.

ELEVATORS

- 1—Economy 1000 lb. portable, 5' lift, hand operated.
- 1—Revolver 1000 lb. portable, 5' lift, hand operated.
- 1—2000 lb. portable, 20' lift, motor driven.

FILLERS

- 1—U.S. hard rubber 10 spout Liquid Filler, 12 oz maximum.
- 1—Packomatic 4-spout Net Welgher and Filler.
- 2—Edtbauer duplex Net Welghers.
- 1—American Bond Scale Net weight Filler.
- 1—J. H. Day Lightnin Packer.
- 1—Stokes tube Filler, Closer and Crimper.
- 1—Stokes tube or Jar Filler.

FILTERS

- 1—13" International bronze single plate Filter.
- 1—12" 8-disc asbestos Seltz bronze disc Filter.
- 1—10" 12-plate Klefer bronze Filter.
- 1—10x10" Sperry C.I. 6-plate and frame Filter Press.
- 1—12x12" 11-recessed plate C.I. Filter Press.

KETTLES—Steam Jacketed

- (New) Stainless steel steam jacketed Kettles.
- 10—Copper Kettles—5 to 150 gallon.
- 3—Copper Kettles with agitators: 20, 40 and 60 gal.
- 6—C.I. steam jacketed Kettles: 25 to 150 gal.

MILLS

- 1—Austin-Western Gyrotory Crusher.
- 1—Raymond 5-roll high side Mill.
- 1—Raymond 0000 Imp. Mill.
- 2—3-roll water cooled Mills: 16x40 and 12x30".
- 5—Stokes and Day Drug and Hance Mills.
- 1—30x54" Steel Ball Mill with 3 hp. motor.
- 1—Porter Iron cone Jar Mill.
- 1—Patterson 30 gal. pore. lined Pebble Mill.
- 1—Abbe 18 gal. Steel Ball Mill.
- 1—Abbe 2-Jar 4-gal. each Pebble Mill.
- 1—Day 2-Jar 3-gal. porcelain Jar Mill.
- 1—Charlotte Colloid Mill, steel rotors, 5 hp.
- 5—Hammer Mills—various sizes.
- 3—#3 Lead Mills, belt driven.
- 1—Day 12" bronze Ointment Mill.
- 4—Day Iron Mills—12 and 18".
- 8—Day Pot Mills: 14, 16, 18 and 24".
- 2—Schutz-O'Neill Putrefiers: 16" and 20".
- 2—20" Sprout-Waldron Attrition Mills: 20 hp.

PURCHASERS of plants on a cash basis

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SUPPLIERS of rebuilt and guaranteed process machinery from our own warehouse stock

OFFERINGS of listed equipment from all parts of the country

MIXERS

- 1—8 gal. Day Pony Mixer.
- 12—Dough Mixers—single and double arm.
- 1—Day Imperial Mixer—#10 23 gal.
- 4—Westorman Jacketed Mixers: 19x26x26".
- 5—80 qt. 3-speed Mixers; Hobart and Read.

MIXERS—Dry Powder

- 1—2000 lb. Essmuller paddle type.
- 1—3000 lb. Davis, 41"x9 1/2" long.
- 2—Burton closed revolving drum type.
- 1—16 cu.ft. Broughton.
- 1—18" Simpson Intensive.

OVENS

- 1—Denver Electric Oven: 5 trays 24x36".
- 1—Drying Oven 24x24x43"—gas fired.
- 1—Revelation size 7 gas fired Kiln 18x24x26".

PRESSES

- 3—Watson-Stillman Hydraulic: 2 1/2" ram, 14" dalite, 14x14" bed, bench type, 2500 lbs. pressure.
- 4—Elmes Hydraulics: 3" and 4" rams, 10x14" platens, 9" dalite, 4000# line pressure.
- 1—Hydraulic Press: 40x40" racks, 10" plston.
- 1—Arbor Press: 6 1/2" ram, 12" stroke, 32" dalite.
- 2—Leo Fruit Presses, hand screw feed, 26x28" wood plates.
- 1—(New) 3 1/2"-R Famco Arbor Press.

PUMPS

- 1—Allis-Chalmers 6" Centrifugal Pump, 3-stage, 75 hp.
- 1—Douglas 4x6" Triplex with 5 hp. motor.
- 1—CP reciprocating vertical Pump with 1/2 hp. motor.
- 1—Gould triplex plunger Pump 5x8".
- 1—Elmes vertical 3-piston high and low Hydraulic Pump, 5 hp.
- 2—Kinney rotary Pumps, 28 GPM. at 300# pressure, 10 hp.
- 1—Viking bronze Pump with 2 hp. motor.
- 4—Steam Pumps—6x4x6 and 6x6x6 duplex.
- 1—Lammert & Mann #5 Vacuum Pump 5 hp.
- 2—Letman size F rotary Vacuum, 78 CFM. at 200 RPM.
- 1—Unlon Dry Vacuum Pump, 10x20x12", 433 CFM.
- 1—Devline 4x6" Vacuum Pump.

STILLS

- 7—Water Stills, gas and steam operated, 1, 2 1/2, 3, 10 and 25 GPH.
- 1—Blakeslee solvent recovery Still, 25 GPH.
- 1—Klemm Copper Fruit Still, 40 gal., with tank.
- 1—Rox solvent recovery Still, 30 GPH.
- 1—5 gal. Weber Copper Still with berry head and condenser.
- 2—Pot Stills with condensers.
- 1—30 gal. cast iron direct fired.

TABLET MAKING EQUIPMENT

- 4—Colton 2B single punch Tablet Machines.
- 1—Stokes F Tablet Machine.
- 1—1" Richardson Tablet Machine.
- 1—Colton #1 Oscillating Sifter.
- 1—Colton Mass Mixer.

TANKS—Aluminum

- 25—(New) 250 gallon oval shape Storage Tanks, welded, 46 1/2" and 28 1/2"x6 1/4" long, 18" dia. manhole, bottom drain.

TANKS—Steel

- 1—Steel Mesh Tub: 8' dia., 5' deep—1880 gal.
- 1—Steel Tank with cover: 8' wide, 12' long, 4' deep, 2880 gal.
- 1—Steel Tank with copper coils: 7' dia., 5' deep, 1500 gal.
- 1—Steel Tank: 8' dia., 5 1/2' deep, 2000 gal.
- 1—Steel Tank: 8' dia., 5' deep, 1880 gal.
- 1—3000 gal. closed horiz. Tank with brass tubes inside.
- 1—1600 gal. Tank, agitated, with coil, closed, vertical.
- 5—100 gal. New England steel Mixing Tanks.

TANKS—Miscellaneous

- 1—300 gal. Pfaudler Jacketed glass lined with agitator.
- 1—35 gal. Pfaudler Jacketed agitated glass lined.
- 30—20 gal. Glass lined Tanks with covers.
- 1—300 gal. low pressure stainless steel.
- 1—500 gal. oblong 2-compartment Copper Tank.
- 1—500 gal. oblong 8-section Copper Tank.
- 1—300 gal. horizontal closed Copper Tank.
- 2—1000 gal. lead lined Steel Tanks, closed.
- 1—275 gal. closed Copper Tank.
- 10—Steel steam and water jacketed Tanks.
- 1—200 gal. closed Mixing Tank, 2 hp.

VISCOLIZERS

- 1—100 #PH bronze head.
- 1—300 GPH Union with 10 hp. motor.

MISCELLANEOUS

- 1—Packomatic 16' shipping carton Compression Unit.
- 1—Packomatic 8' shipping carton Compression Unit.
- 1—Brecht 24x60" double Chilling Roll.
- 10—Troemner Scales—10# capacity.
- 3—Combs Greatwestern Sifters.
- 1—Package Mchry. Co. model AA Cellophane Wrapper.
- 1—Johnson Wax paper Wrapper.
- 1—Food Mchry. Co. 8-track Nailing Machine.
- 1—Devine horizontal jacketed Autoclave 18x24".
- 1—#60 American Blower.
- 1—Garden City fan type Blower with 5 hp. motor.
- 1—American Blower Sirocco type size 25E, 5 hp.
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- 1—Direct heat Rotary Dryer 3x15'.
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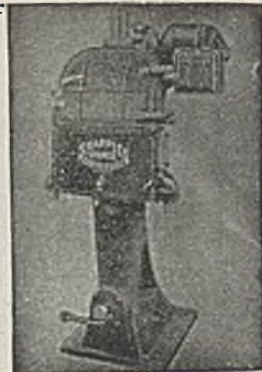
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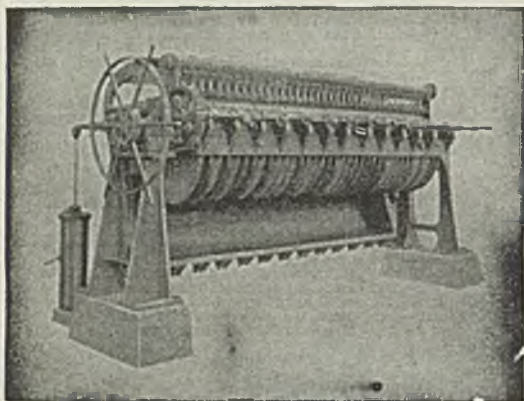
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- 1—Hardinge Conical Ball Mill, 4"x16".
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- 1—Abbe Continuous Tube Mills, 4½"x15".
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6,000 to 10,000 gallons

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272 Sq. Ft.—with Bar. Cond.
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370 Sq. Ft. per Effect, Compl. With Barometric Condenser
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1—6' x 22' Allis Chalmers #12 Tube Mill, with Link Belt Silent Chain Drive, completely reconditioned. Ready for immediate shipment.

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1/2, 3/4, 1, 1 1/2 and 2 ton Chain Hoists, standard lift
 1/2, 1, 1 1/2 and 2 ton Electric Hoists, 3 ph, 60 eye. 220/440v.

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300 Ampere

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Driven by 6 cyl. engine

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 5—Storage tanks for ammonia or other high pressure requirements, with heaters, 8' x 38'6", 200# w.p., 1" thick, mfg. by Blaw Knox. New 1943.
 300 and 400 ampere Motor Driven Welders — General Electric, Hobart, Lincoln
 5—Dings Magnetic Separators IR14, 110 V, 86 RPM with MG set
 70 tons—3/4" to 1 1/4" chilled iron grinding balls

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All steel building, 502' long, 162' wide. Center bay 60' with 51' bay on each side. Has 5 to 10 ton Shaw traveling crane, 30' high to top of rail and 40' from ground to bottom of truss. Railroad track running thru center of building; concrete floor, unlimited load.

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 1—27'-3" span, 25 ton capacity
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 17—11,500 & 20,000 Gal. Horizontal Storage.
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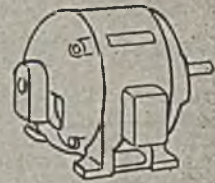
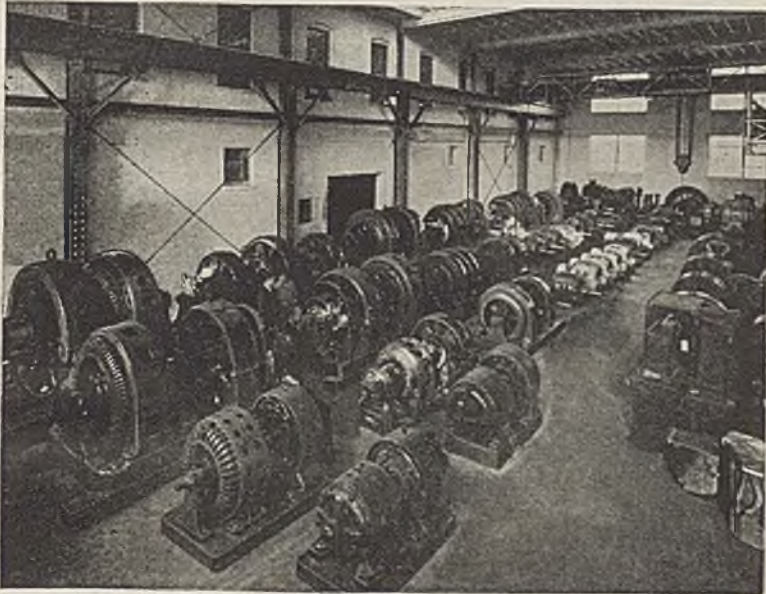
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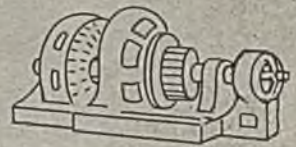
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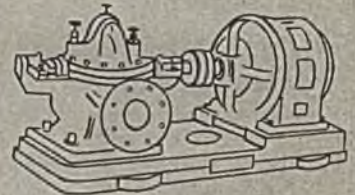
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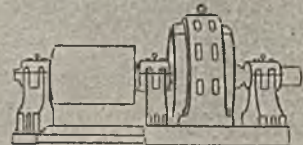
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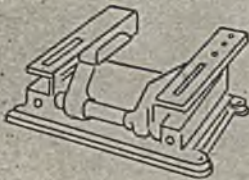
Chicago Electric specializes in the rebuilding of motor generator sets.



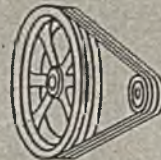
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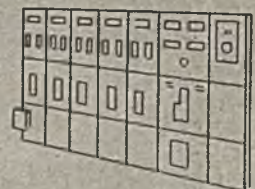
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CFM.	Pres.	Size	Make	CFM.	Pres.	Size	Make
28	150	4x 4	Ing. Rand	240	110	10x 9	Penna.
44	100	5x 4	Ingersoll Rand	335	30	12x 9	Worthington
20	200	3 1/2 x 5	Ing. Rand	348	55	12x 9	Penna.
66	100	8x 5	American—Ingersoll Rand	254	125	10x10	Ingersoll Rand—C.P.
69	125	6x 6	Ingersoll Rand	315	100	11x10	Sullivan
93	100	7x 6	Penna.—Ing. Rand—C.P.	300	80	11x10	Worthington
153	40	9x 6	Ingersoll Rand	368	100	12x10	Ing. Rand—C.P. Penna. —Amer.
136	125	8x 8	Ing. Rand—American	503	60	14x10	Ingersoll Rand
173	100	9x 8	American—Ing. Rand CP.—Pa.	577	50	15x10	C.P.
216	70	10x 8	Ingersoll Rand.—Penn.	740	30	17x10	C.P.
336	40	12x 8	Ing. Rand—C.P.—Penna. —Gardner	338	100	11x12	Worthington
424	25	14x 8	Ingersoll Rand	386	115	12x12	Ing. Rand
170	100	6 1/2 x 9	Worthington	475	60	13x12	Worthington
240	60	10x 9	Worthington	528	100	14x12	Ingersoll Rand

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1290 CFM 24x8 Penn 7A
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Steam

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Drum A.S.M.E. Built for 600# 700
degrees F. total temperature. Never op-
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superheaters, economizers, and forced
draft equipment. Set singly with steel
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1—166 K.V.A. Allis Chalmers. 3 Phase, 60
Cycle, 480 Volts (Can reconnect for 240
Volts) 225 R.P.M. direct connected to
16" x 18" AMES Uniflow engine, 150/
160 pounds pressure, condensing or non-
condensing.

PUMPS (U. S. Navy design)

4—C. H. Wheeler. Normal rating—2000
G.P.M. 60' T.D.H. 1500 R.P.M. Each
direct driven by Terry turbine 38 H.P.
200# steam pressure, absolutely new.
Gun metal casing and impellers.

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1—3000 K.W. 3750 K.V.A. General Electric.
3-60-2300/4000 Y volts. 200# 175 De-
grees. Surface condenser and pumps.
Can be seen in operation. 3600 R.P.M.
2—600 K.W. 750 K.V.A. General Electric.
3-60-600 volts. 3600 R.P.M. 200# con-
densing with hand extraction, 15#.
1—250 K.W. Allis Chalmers. 3-60-2300 volts,
3600 R.P.M. 150/200# condensing. Fit-
ted for mixed pressure with 2# low
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Locomotive. Excellent Condition.
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2—85-Ton Electric Locomotives, 600 V. D.C.,
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Complete with drive and 9' x 8' long
grates—forced draft fan—motor and
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draft fan 5 h.p.—Coal blower 2 h.p.—
220-440 V—60 Cy—3 Phase

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Used Williams Patent Comet Roller Mill
Pulverizer in first class condition with
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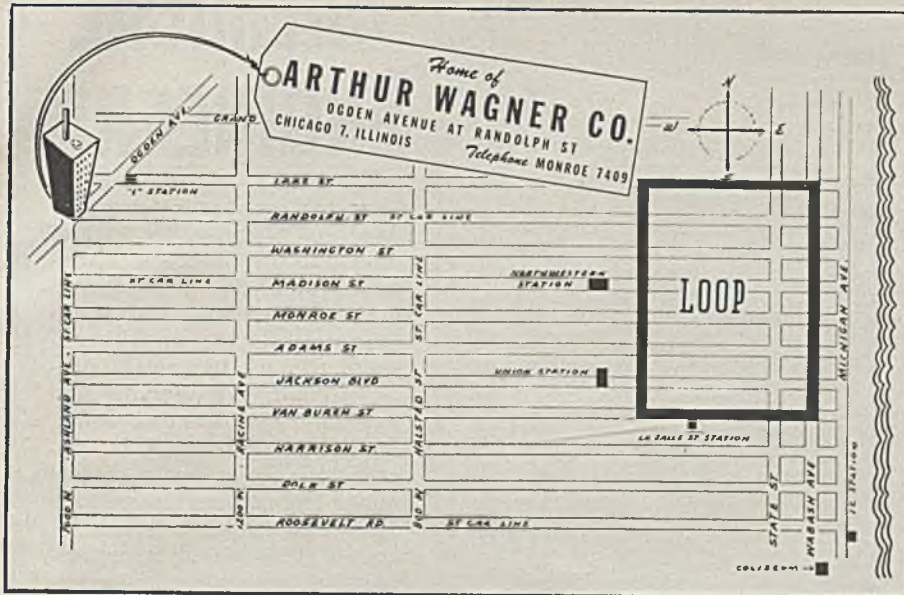
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A.C. Squirrel Cage—60 Cycle

H.P.	Mfr.	Type	Volt	Speed
200	Gen. Elec.	1-K	550	1800
155	Gen. Elec.	1-K	550	1800
150	Gen. Elec.	1-K	440	1800
150	Gen. Elec.	1-K	440	900
125	Gen. Elec.	1-K	2200	720
60	Gen. Elec.	1-K	220 440	3600
50	G. E. vertical	KT 243	220 440	1200
50	Whe. vertical	CS	2200	900
40	G. E. vertical	KT 632	220 440	1200
50	G.E. 3 speed	1-K	440	900/600/450
40	Allis Ch. 3 spd.	ARX	440	900/600/450

A.C. Slip Ring—60 Cycle

400	Gen. Elec. 3 brg.	1-P	220 440	450
200	Burke	EMV	220 440	225
250	Cr. Wheeler	127 AQ	220 440	600
200	Burke 3 brg.	EMV	220 410	514
200	Gen. Elec.	1-M	2200	360
150	G. E. vertical . . .	1-M	2200	1200
100	Whe.	HP	2200	720
60	Gen. Elec.	1-M	220 440	720
60	Whe.	CW	2200	1800
50	Whe.	MW	220 440	900
50	Gen. Elec.	1-M	220 440	600
40	Gen. Elec.	MT 536	550	900
40	Gen. Elec.	MT 516	220/440	514

Direct Current

125	Cr. Wheeler	125 H	230	500
100	Cr. Wheeler	101 H	230	550
75	Cr. Wheeler	125 H	230	350/750
75	Whe.	8-12	125	475
50	Cr. Wheeler	50 H	230	700
40	Whe.	BK 153	230	575/1150

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1-6"	Alberger	2000 gpm. @ 80 ft. head.
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1-6"	Worthington	1500 gpm. @ 230 ft. head.
1-6"	Platt	2 stage 1000 gpm. 200 ft. head.
3-5"	Fair. Morse	b.h. 1000 gpm. @ 230 ft. head.
1-4"	Worthington	600 gpm. @ 100 ft. head.
3-3"	Gardner Denver	350 gpm. @ 75 ft. head.

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GEARHEAD MOTORS

40—2 H.P. Gen. Elec. type K225, EXPLOSION PROOF gear head motors, Class 1, Group D—3 ph. 60 cy. 220v. 99 RPM output—std. horiz. mtg. immediate shipment—while they last—condition like new.

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3—Oil Gear Co. 3" x 2" type C6011
104 gpm, 1100 lbs. 850 rpm on base

- 1—18" Piqua rotary blower size 5 1/2 #1359, belt drive.
- 1—New Ingersoll Rand hi-pressure blower 835 cfm. 3 1/2 lbs. with 15 HP G.E. motor 2/40/230/440 V. 8500 R.P.M.
- 1—14x12 Ingersoll Rand air compressor type KE-1. #59109 500 cfm. 100# with tank—bargain.
- 3—Cleveland speed reducers ratio 282-1, 10/15 HP. size 37D, double worm type.

Motor Generator Sets

- 300 KW Gen. Elec. type MPC gen. DC 125/170 V. 1750 amp. coupled to 450 HP G.E. motor DC 125 V. 1150 R.P.M. Can change to AC drive.
- 150 KW Gen. Elec. type MPC gen. DC 125 V. coupled to 250 HP G.E. motor 3/60/2300 V. 1500 R.P.M.
- 100 KW Fair. Morse type TH gen. DC 250 V. coupled to 150 HP G.E. motor 3/60/440 V. 900 R.P.M.
- 75 KW Gen. Elec. type MPC gen. DC 125 V. coupled to 125 HP G.E. motor 3/60/2300/4100 V. 720 R.P.M.
- 60 KW Gen. Elec. type CD gen. DC 4060 V. 1800 amp. coupled to 80 HP G.E. motor 2/60/230 V.
- 40 KW Martin rotary converter output DC 230 V. input AC 3/60/220 V. 1200 R.P.M.

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UNUSUAL OPPORTUNITY: for chemist with lubricating grease experience to develop improved greases with established concern. Philadelphia district. Give qualifications. Application strictly confidential. Apply with full particulars to P-795, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

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SALES ENGINEER Wanted: We are interested in securing the services of a good, reliable man for the sale of metals and alloys, principally to the major steel companies, but will only consider a man of experience and good record. Address Box 636, Niagara Falls, New York.

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SALARIED POSITIONS \$2,500-\$25,000. This thoroughly organized confidential service of 36 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated, through a procedure individualized to each client's requirements. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details. R. W. Dixby Inc., 260 Dun Bldg., Buffalo 2, N. Y.

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POSITIONS WANTED

CHEMICAL ENGINEER: B.S. in Ch. E. 1941. Five years diversified experience in organic processes in control operations, development, and design. Desire responsible position with progressive concern. Location Midwest. Now employed. Age 30, family. PW-782, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

MICROBIOLOGIST: UNIVERSITY Position, Ph.D., age 33, married. One year post-doctorate fellowship; four years industrial research and development in fermentations and antibiotics. Main interest physiology and biochemistry of microorganisms. Desire university position with opportunity for teaching; and particularly for fundamental research, which is not possible in present position. West Coast preferred. Present salary \$6500. PW-771, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

CHEMICAL ENGINEER: 1940, affable personality, desires development and/or production work. Three years development experience covering manufacture of rubber and plastic printing plates and explosives. One year government service mechanical engineering, 27, veteran, family. PW-730, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

CHEMICAL ENGINEER: Degrees from Spain and England; six years experience; fluent Spanish and Portuguese; experience in sales of chemicals, raw materials and machinery; practice in market promotion; Desires position in progressive U.S. firm as export manager or foreign representative. Willing to travel. PW-796, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

CHEMICAL ENGINEER: Doctor's degree, 1942. Married, age 30. Capable man with executive ability, broad industrial experience including pilot plant design, construction, operation. Interested in research, development, in progressive, medium-size company in synthetic chemical field. Desires permanent responsible position, good future, western location. Minimum salary \$6000. PW-797, Chemical & Metallurgical Engineering, 620 N. Michigan Ave., Chicago 11, Ill.

MECH. & STRUCT. Engineer, with over 30 years experience and a good all around knowledge of copper, rayon and chemical plant design, construction, maintenance and research, in the states and South America, desires permanent responsible position as plant construction designing or research engineer. Good engineer, mechanic, and organizer with executive and inventive ability. Speak Spanish and German. Location preferred, South or foreign. At present located in South. PW-798, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

PLANT ENGINEER: Chem. Eng. 12 years experience in research and production in drug, food or cosmetic industries. PW-799, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

CHEMICAL ENGINEER: Bach, 1940. Desire employment in production, plant engineering, or development dept. in process industry. One year development, four years piping design. Residing Phila. Location anywhere. Age 27, married, one child. PW-800, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

SPECTROGRAPHER: Six years experience. Four industrial, two research. Prefer research and development. Capable of planning, installing and directing production laboratories. Familiar with metals and refractories. Specialist in automatic control. PW-801, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

PATENT CHEMIST: Ten years experience conducting literature searches, preparation and prosecution of chemical patent applications. Full time or fee basis. New York City area. PW-802, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

B.Ch.E. 1942. Captain CWS U. S. Army. 3 1/2 years. Chemical plant foreman—1 year. Desires job in Baltimore area. PW-803, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

PRODUCTION CHEMIST: with four years experience in fine or pharmaceutical chemical field. Desires administrative or technical position. 26 years old. Married with family. PW-804, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

(Continued on opposite page)

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Large eastern chemical manufacturer has openings for several outstanding Chemical Engineers, recent college graduates or graduates with industrial experience not exceeding 5 years, who are technically proficient for engineering and process development work. Must have B.S. or M.S. Degree from recognized technical school and personality suitable for varied contacts. Work involves studies and investigations of processing, materials handling, plant equipment, plant layout and cost reduction.

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Ferrous and non-ferrous metallurgists for development and application work in electrical manufacturing field. Unusual aptitude for original work required, coupled with mental alertness and high order of initiative. Prefer Ph.D. or M.S. degree, or experience equivalent. For application address **MANAGER, Technical Employment**, 306 Fourth Avenue, Pittsburgh, Pennsylvania.

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POSITIONS WANTED

CHEMICAL ENGINEER: M.S. 1941. Five years experience in Naval Ordnance inspection, machine tools, and chemical warfare. In charge of Naval Inspection Office 3 years. Southwest or West preferred, age 30, married. Now on active duty as Lieut. Comdr. USNR, as Officer in charge Naval Impregnation Plant. Available after August 20. PW-805, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

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ASSISTING INDUSTRIAL Laboratory technician, young woman over 3½ years experience. Major interest metallurgy. College reg. drafting, statistics, clerical knowledge administrative ability. PW-807, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

TECHNOLOGIST WITH Sales Ability, age 33, Ph.D. (chemistry), 7 years experience in natural rubber production methods both here and in the Far East, desires position, not necessarily in rubber, offering opportunity and where executive ability counts. Location immaterial. Health excellent. Married, both having had European as well as Far Eastern experience. Working knowledge of French. Willing to start moderate salary provided possibilities for advancement good. PW-808, Chemical & Metallurgical Engineering, 68 Post Street, San Francisco 4, Cal.

TECHNICAL ASSISTANT to executive. Ten years in organic and pigment research experience. Group leader for past six years. Age 32. M.S. All work for Ph.D. in physical chemistry completed except thesis. PW-809, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

CHEMICAL ENGINEER: B.S., M.I.T., with 25 years experience directing development of new products, processes, machinery; solving manufacturing problems; acting as consultant; obtains excellent cooperation; seeks responsible job in technical direction or production. PW-810, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

MASTER'S IN Bus. Adm. (Industrial Management) and B.S. in Ch. E. Broad industrial experience including development, production and cost. Desires responsible position with good future. Age 31, married. PW-811, Chemical & Metallurgical Engineering, 330 W. 42nd St., New York 18, N. Y.

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WANTED

WANTED: ONE Baush & Lomb Precision Oil Refractometer with sodium light also mercury lamp if available. Also one Pulfrich Refractometer. State condition, price, delivery. Address reply R. F. Lunger, Foster Wheeler Corporation, Carteret, New Jersey.

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P-785, Chemical & Metallurgical Engineering, 520 North Michigan Ave., Chicago 11, Ill.

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WANTED

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P-751, Chemical & Metallurgical Eng., 520 North Michigan Ave., Chicago 11, Ill.

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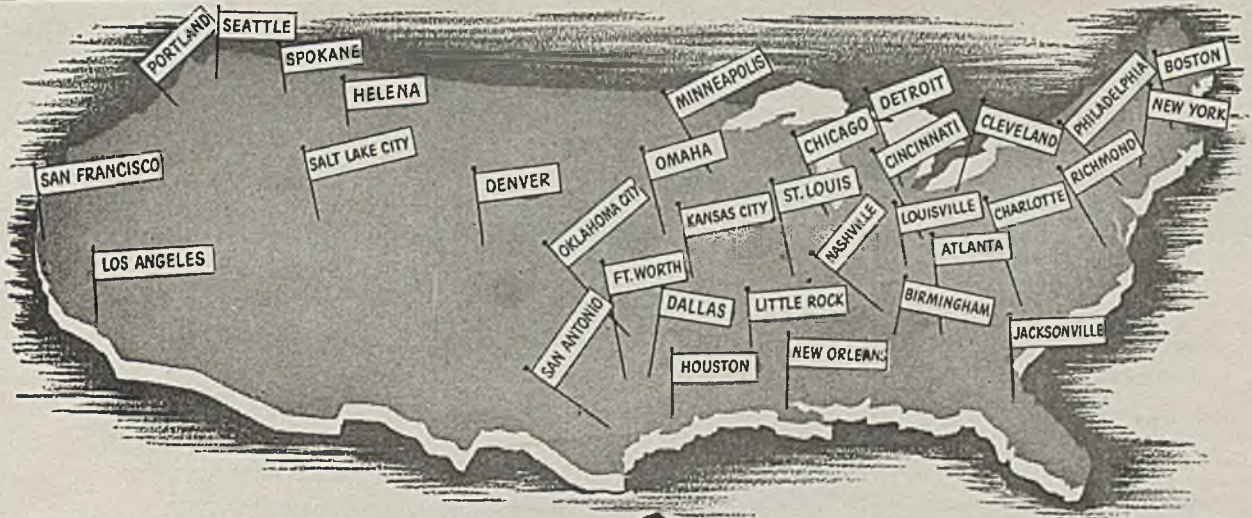
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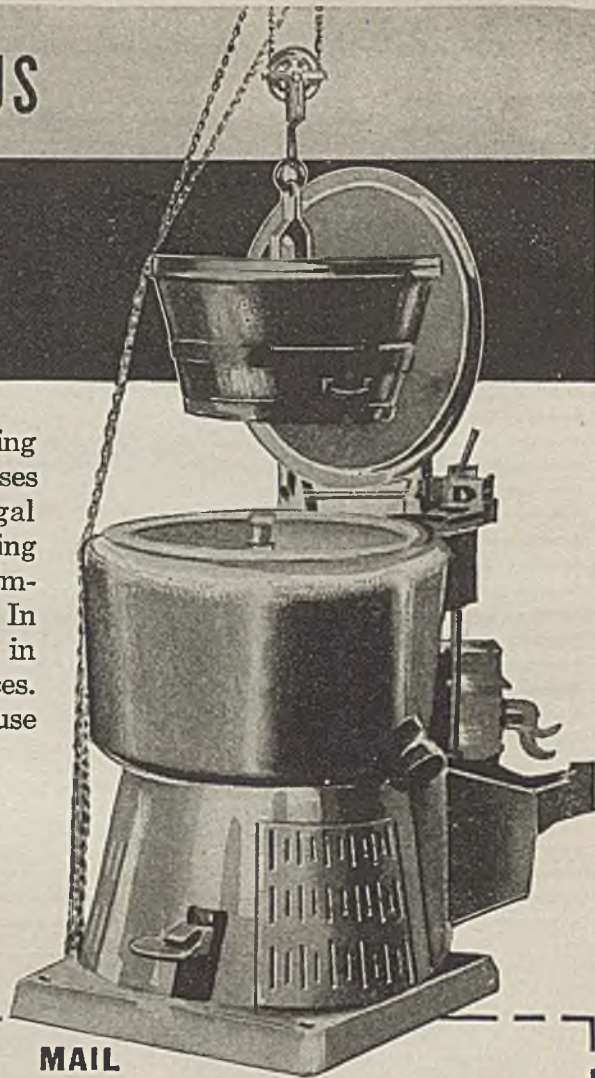
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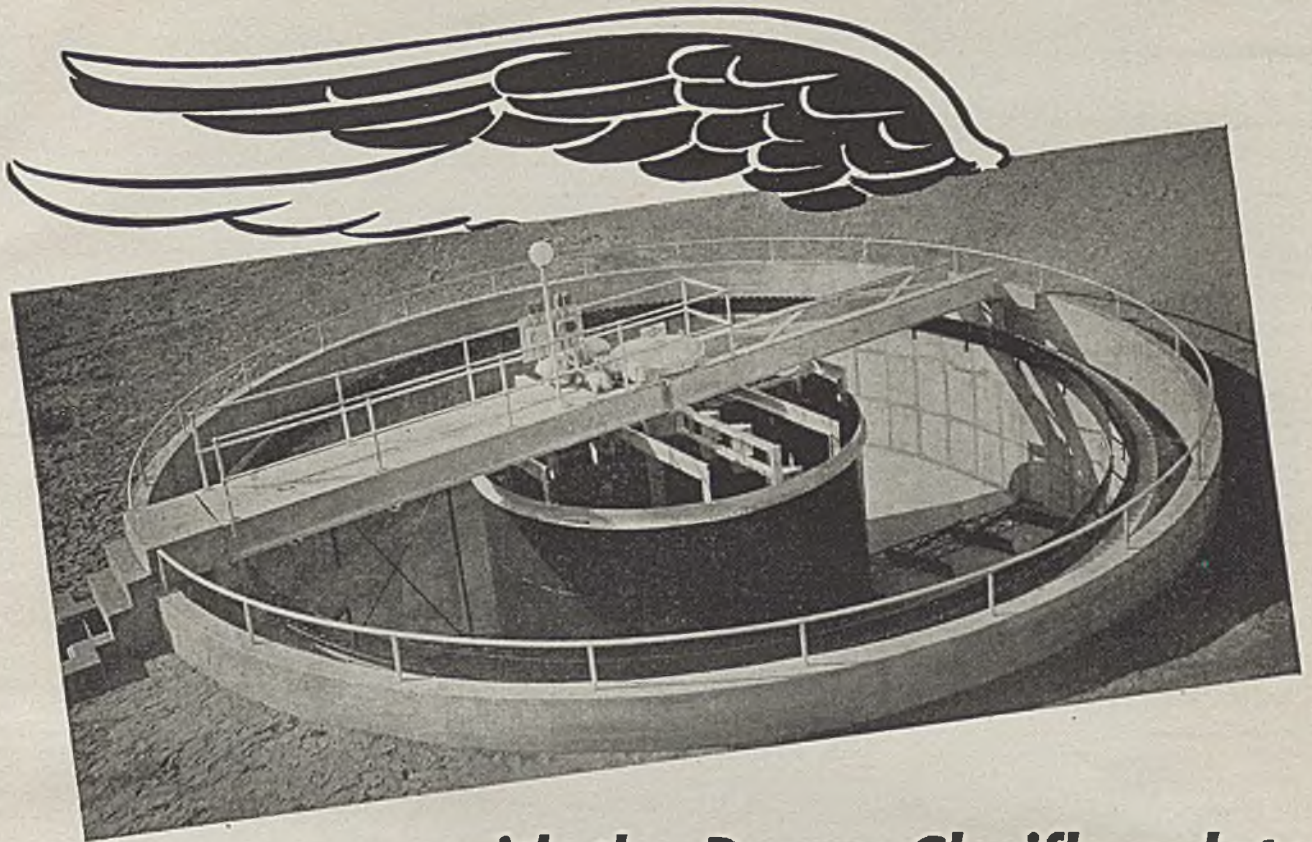
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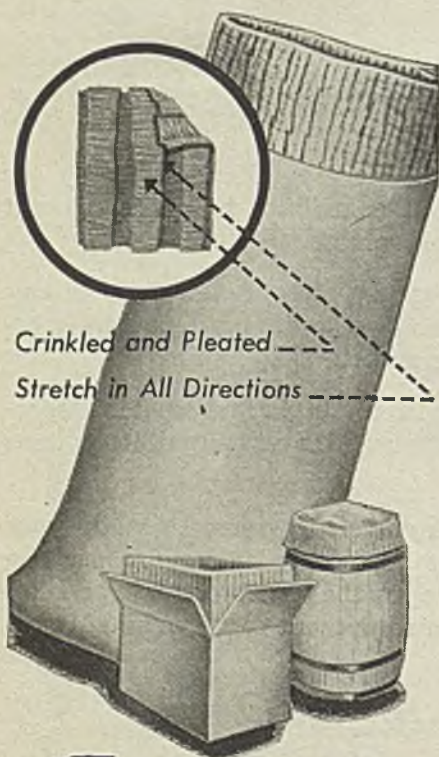
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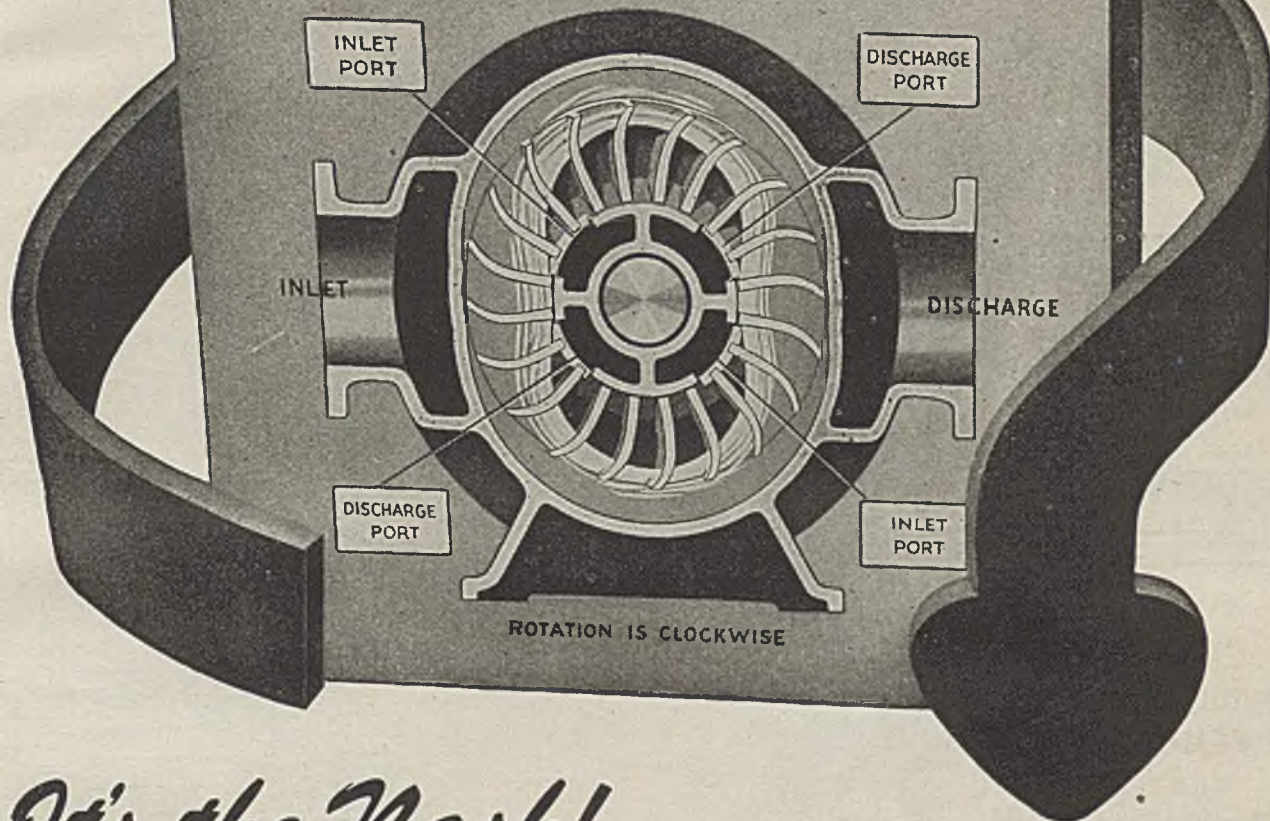
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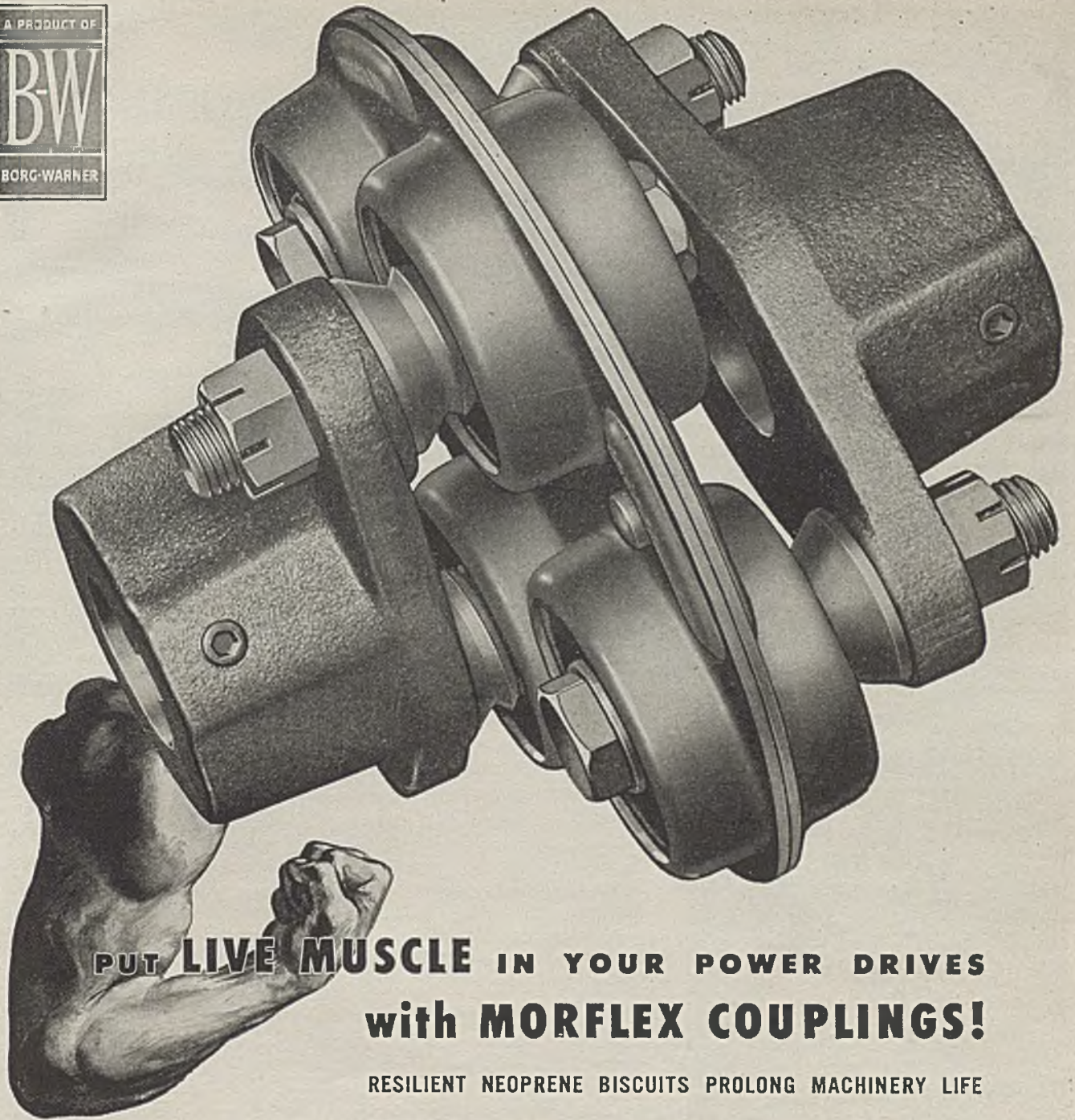
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