STEEL

The Magazine of Metalworking and Metalproducing

VOL. 117, NO. 15 OCT. 8, 1945

NEWS

TECHNICAL

FEATURES

MARKETS

NEXT WEEK...

Producing 19,000 Miles of Electric Welded Tubing

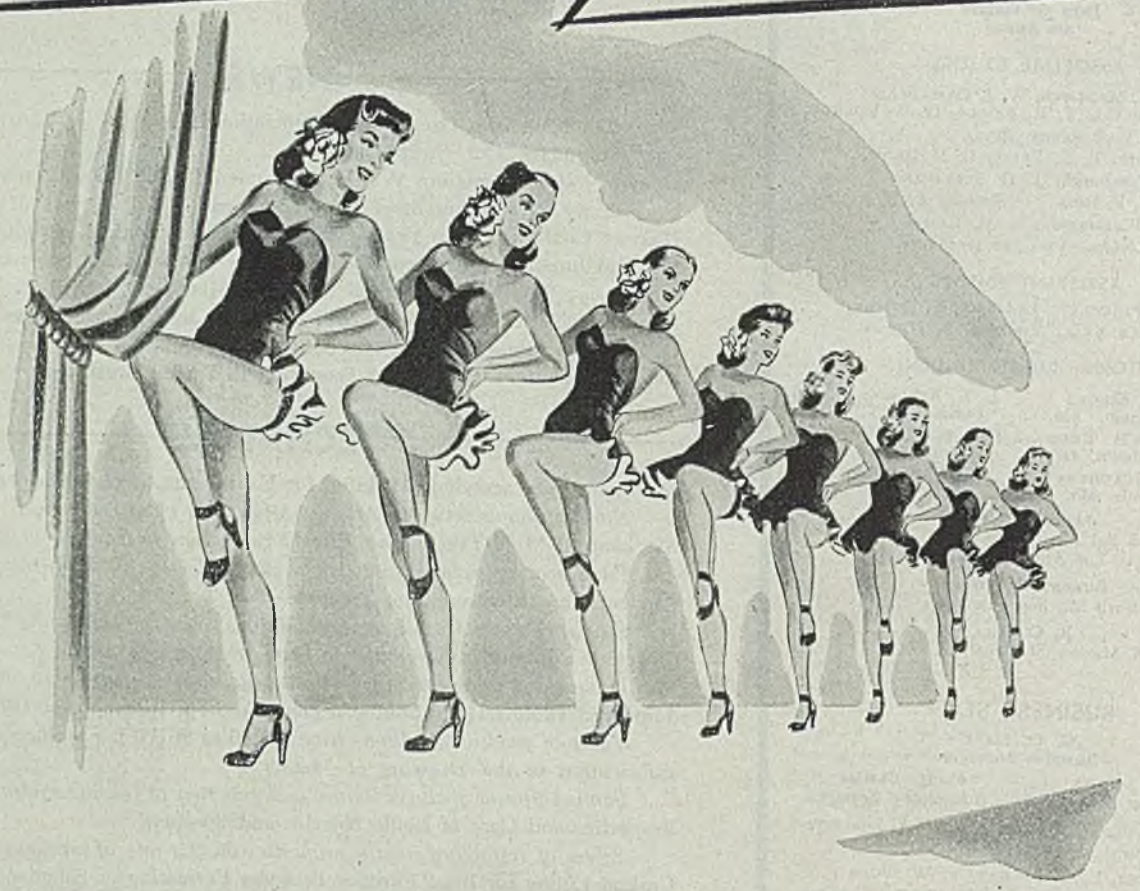
A Symposium on Modern Metal Protection

Solutions and Preparation for Zinc Electroplating

Lubrication in the Drawing of Metals—Part II

Applying Twin-Motor Drive to Tandem Sheet Mills

WHEN THE TEMPO QUICKENS



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STEEL
October 8, 1945

Don't Strait-Jacket Genius!

Chalk up to the credit of our national experience in four years of war one outstanding benefit! It is our new appreciation of the importance of scientific research.

Ever since V-J Day, industrial corporations have been announcing plans for the erection of new laboratories, "research centers" and other facilities for the expansion of research activity. Hundreds of millions of dollars are being authorized for this purpose simply because hard-boiled management has convinced directors and stockholders that liberal investments in scientific investigation not only are necessary for the survival of a going business but are definitely profitable.

However, recognition of the potency of research has not been confined to individuals identified with private enterprise. Public officials have been impressed by the miracle of research. They are concerned with the federal government's responsibility in promoting scientific investigation.

As a result, we witness the unusual spectacle of a lively competition among legislators to author bills that will place the federal government squarely in the center of the nation's research activities. Scheduled for hearings this week are no less than five proposals for government sponsorship of research: S. 1297, introduced by Senators Kilgore, Johnson and Pepper; S. 1285, introduced by Senator Magnuson; S. 1248, proposed by Senator Fulbright; S. 825, authored by Senator Byrd; and H.R. 3440, introduced by Representative May.

None of these bills will receive full endorsement. The Army favors the May bill and the Navy the Byrd bill. Both Army and Navy oppose the Fulbright bill. Newdealers do not like the Magnuson bill. While the Kilgore-Johnson-Pepper bill seems to have an edge, it too will meet with opposition from government critics. In short, the zeal of federal agencies to preserve their prerogatives will prevent a decisive endorsement of any of these proposals.

But there is a much more important factor involved than that of federal departmental rivalry. It is the question as to what kind of federal jurisdiction over scientific research will afford private enterprise the greatest opportunity to contribute to the well-being of the nation. What price an elaborate government set-up for research if it stifles or straitjackets the creative genius of a budding Edison or Steinmetz employed in private enterprise?

Free American research far outshone state-dictated research under Hitler during the late war. Our clear-cut duty is to preserve at all costs the tremendously important asset of freedom of action for scientific research conducted under the stimulating auspices of private enterprise.

THE POSTWAR SOUTH: In 1933 an enterprising young salesman in Atlanta organized the Auto-Soler Co. on a shoestring capital of $6050. It passed successfully through the pioneering stages of development during the depression years of the thirties and emerged in 1940 as a small but progressive manufacturer of two automatic machines.

One of these is an automatic soling machine for repairing shoes. It makes its own nails from a spool of wire and drives and countersinks them at the rate of three per second, eliminating most of the hand nailing in shoe repair work. The other machine is an automatic nailer, which makes its own brads or nails and drives them into light wooden or plastic materials.

The company has developed novel methods of tooling and production control, the efficiency of which is indicated by the fact that the average production per employee increased from $2985 in 1940 to $6179 in 1944.

Fortunately, progressiveness of this order has been increasing in the South in recent years. As it multi-

(OVER)

plies and flowers, as it seems likely to do in the postwar period, industry south of the Mason and Dixon line gradually will shake off the inhibitions of traditional absentee ownership and management and will write a brilliant record of achievement on its own account. —p. 112

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HOW THEY DO IT IN U. S.: International Training Administration, Inc., a non-profit, privately financed corporation with headquarters in Washington, is performing a service that is helping American industry in a novel way. Headed by Elliott S. Hanson, formerly with United States Steel Corp., it arranges for training young nationals of foreign countries in the "know how" of American industrial and commercial practice.

Trainees now in the United States under the guidance of ITA number 1369, of whom 970 are Chinese and 399 are Latin Americans. ITA takes the trainee in charge upon arrival; sends him to the company, foundation or institution best fitted to provide the training desired; watches his progress and when his training has been completed, sends him home where his recital to his countrymen of "how they do it in the United States" is effective promotion for American methods and products.

Scores of industrial corporations are participating in the training of young visitors from abroad. This is a most praiseworthy activity. —p. 87

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END THE UNCERTAINTY! Probably more important than the immediate and direct effects of the numerous strikes now prevalent throughout the nation is their intangible and indirect influence upon prospective purchases of goods and services.

Many of these work stoppages are attempts to obtain sharp increases in wages. The government administration seems to favor an increase between 10 and 15 per cent, but its position in this respect is not entirely clear. Nor is its attitude in regard to prices known definitely.

Because of uncertainty as to what wages and prices will be a few months hence, manufacturers, contractors and others are finding it increasingly difficult to proceed with plans for the future. If uncertainty regarding wages and prices continues much longer, the dampening effect upon purchasing will become a serious brake upon reconversion.

Definite policy on wages and prices is the most pressing problem now demanding Washington attention. Failure to handle it satisfactorily could break the present administration. —pp. 80, 81, 201

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POSTWAR POSTSCRIPTS: A committee of engineers representing the five major engineering societies has formulated a plan to prevent Germany from rearming for war. Approved by the State, and War Departments (p. 86), the proposal would prohibit the synthetic fixation of nitrogen, the production of synthetic liquid fuels and aluminum and the development or use of atomic energy, would limit the capacities and production of steel plants and would curb secret scientific research and government subsidies to industry. . . . Retirement of Harry H. Bennett from his post as director of administration of Ford Motor Co. (p. 91), although he continues as a director and will act in a consulting capacity, is one of the many important shifts in the executive personnel of that company. . . . United States commercial airlines have on order or on option to buy 409 new planes (p. 98) which, when in operation, will bring the airlines' fleet to 975 planes, capable of carrying 36,180 passengers. This seating capacity will be five times that available last year. . . . Rheem Mfg. Co., Washington, has commenced work on a new plant in Rio de Janeiro (p. 103) for manufacturing steel shipping containers for petroleum, alcohol, paint and vegetable oil industries in Brazil. . . . Carbon linings for blast furnaces, long employed in Europe, now are being given careful consideration in the United States. As of Aug. 1, 1945, six American stacks (p. 128) were employing carbon brick or paste in hearth construction. . . . A special lifting rig and auxiliary equipment permits National Works of National Tube Co. (p. 107) to water dip and pitch coat three big-end-down ingot molds every two minutes. . . . Sewing machine manufacturers expect to make about 40,000 machines in the fourth-quarter (p. 77), which compares with a prewar quarterly output of 200,000 units. . . . From the middle of 1940 until V-J Day, approximately 425 million tons of Lake Superior iron ore were consumed. This abnormally high rate of depletion (p. 75) is reviving interest in beneficiation, in stockpiling high grade ore for future emergencies and in the prospect of importing more ore from foreign sources. . . . In July output of finished steel in France totaled 92,000 tons—about 30 per cent of the average monthly production in 1938. Efforts of French industry to expand operations (p. 81) still are hampered seriously by the shortage of coal. . . . Heppenstall Co., Pittsburgh (p. 103) will build a windowless, air-conditioned research laboratory.

E. L. Shaner

EDITOR-IN-CHIEF

Metal-wise Men of Inland Ready to Help You

Visit any of Inland's properties and you will meet men who live and work with steel—they are the metal-wise men of Inland. They will be found at mines and quarries, using their special training and skill in assembling selected raw materials —ore, coal, and limestone.

Only metal-wise men operate the Inland blast furnaces, open hearth furnaces, and rolling mills—and staff the metallurgical and inspection departments. All are steelmakers of highest qualifications, and many of them rank high among America's foremost authorities in the production and use of steel.

Quite frequently you will meet metal-wise men of Inland helping a manufacturer solve problems of steel selection, part design, and manufacturing method. An Inland specialist, wise in the ways of making and fabricating steel, is always ready to help you.

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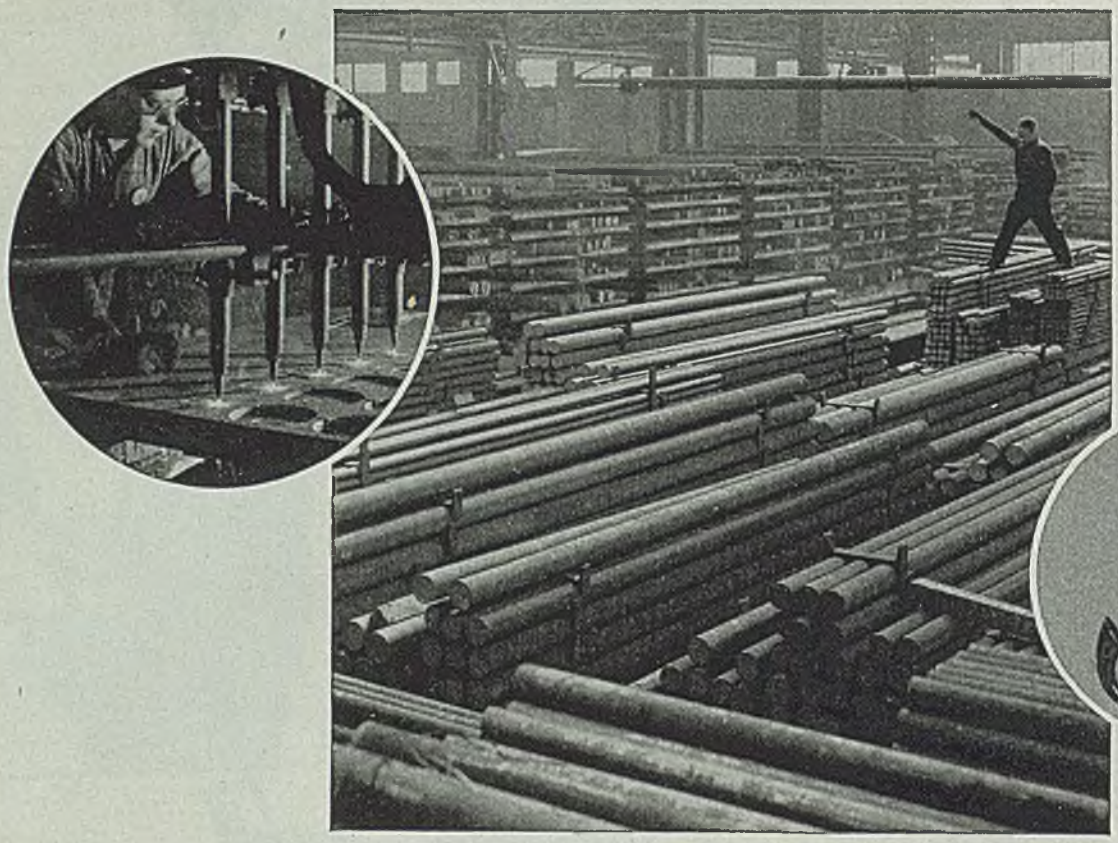

4 Things to Know About Steel

1. Where to Get the Steel You Need—The thousands of kinds, shapes and sizes of steel in eleven Ryerson Steel-Service plants are still the largest, most complete stocks available anywhere. This means that, despite shortages in some sizes, you can be more certain of getting the steel you need from Ryerson.

2. Technical Service—For more than 100 years Ryerson has supplied steel from stock. During that period Ryerson technical men have gained much practical experience on problems of steel selection and fabrication. Experience that makes Ryerson technical service of real value. It is yours for the asking.

3. Fast, Accurate Preparation—Ryerson saves you time and expense—prepares steel to your exact specifications with modern, precision equipment. Facilities include high-speed hack saws and shears, batteries of flame cutters, punches—everything needed to cut steel to the size and shape you need in the shortest possible time.

4. Prompt Delivery—Whether you need a single piece of steel or many tons you'll get prompt action from the nearest Ryerson plant. Phone, wire, or write for any steel requirement. And if you do not have a copy of our latest Stock List and Steel Data Book, we'll be pleased to send one.

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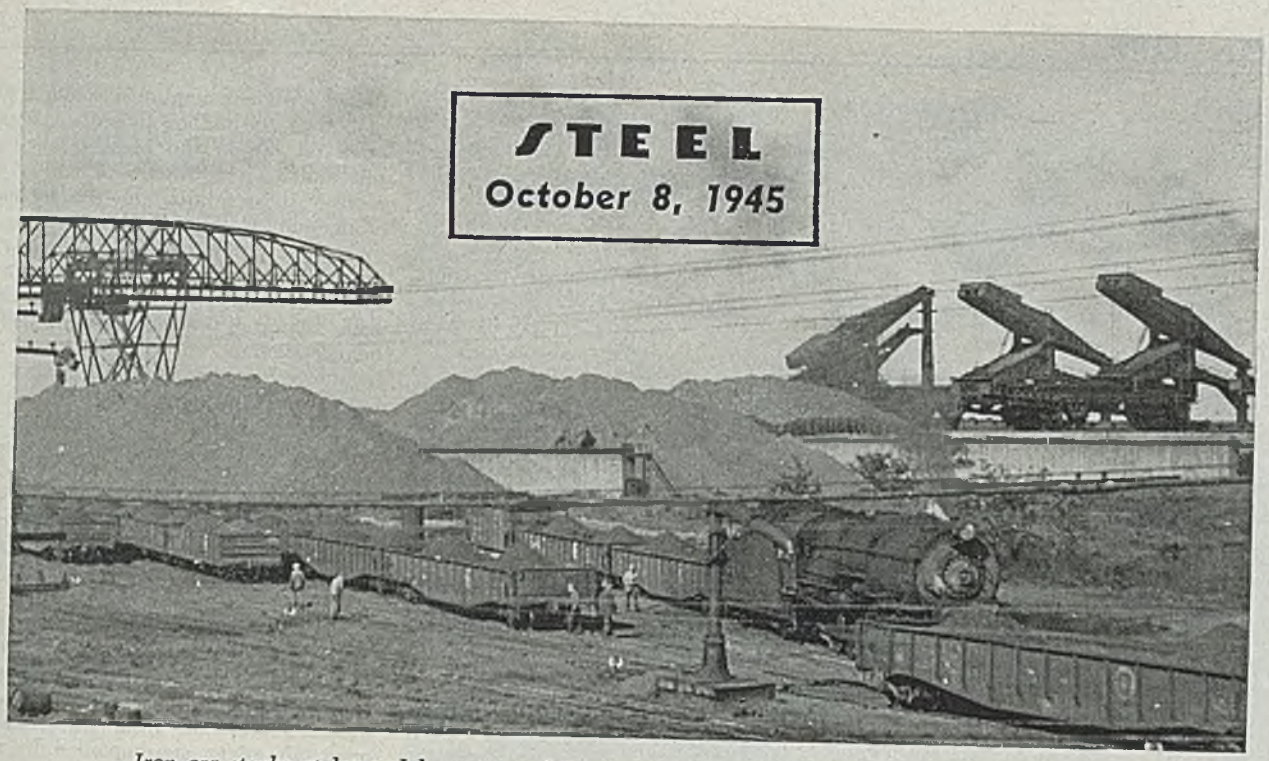
October 8, 1945



Iron ore stocks at lower lake ports and furnaces are considered comfortable, although about 2.5 million tons lower in September than a year ago. Above scene is at a Cleveland dock. NEA photo

War's Drain on Open Pit Iron Ore Spurs Beneficiation Research

Approximately 425 million tons used from mid-1940 to end of Japanese war. Approaching exhaustion of rich, open pit ores of northern ranges increases interest in treatment of taconite and further development of underground mining

WORLD WAR II with its extraordinary demands for steel and the iron ores from which it is made has advanced by several years the time when beneficiation and utilization of intermediate and low-grade Lake Superior ores will be necessary.

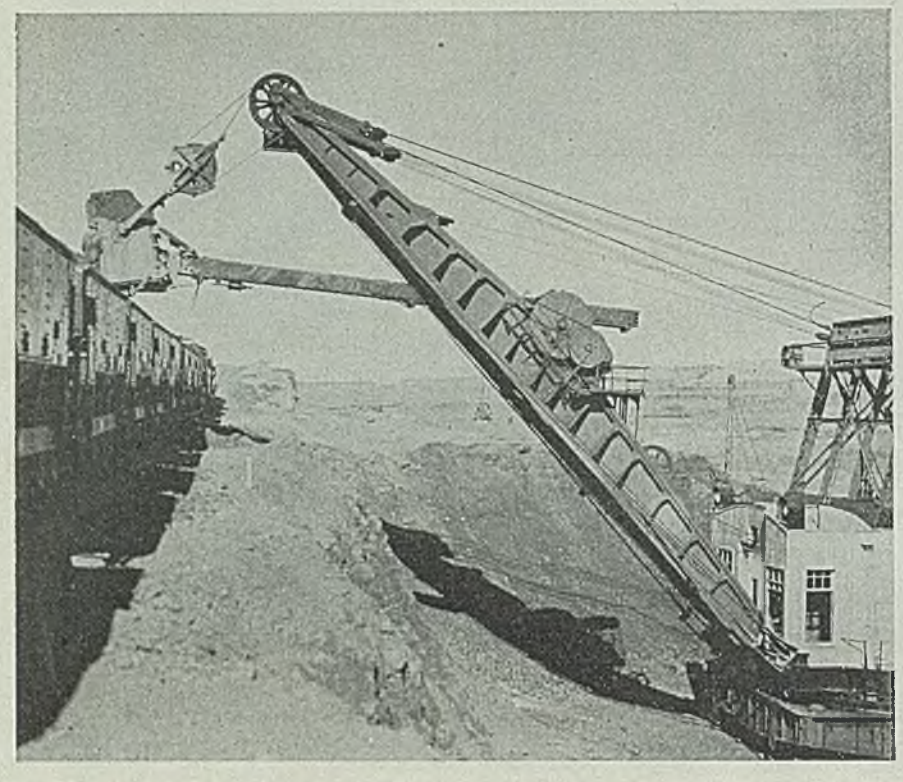
All major mining interests are anticipating this time by intensifying research on treating the lower grade ores to supplement and perhaps eventually to supplant the dwindling high grade, open pit ores. The ore interests are not talking much yet about their progress, presumably because no method of beneficiating the lower grade ores at a cost low enough to permit them to compete with the open pit ores has been discovered. Generally the beneficiation research on the lower grades has not progressed much beyond the laboratory and pilot plant stage and ore company spokesmen are not optimistic over the prospects of beneficiating the low grade material at a cost that would make it commercially competitive with direct shipping grades.

At present, slightly more than 20 per cent of the ores shipped from the Minnesota ranges are concentrates, with washing being the outstanding method of treatment although some are treated by jigging, heavy-media separation or sintering. Generally the ores treated are the intermediate ores, partially leached by nature but not good enough for direct shipping.

Long-range interest in beneficiating is directed toward the treatment of taconite, the iron-bearing rock of the Lake Superior ranges, particularly Mesabi, containing about 30 per cent iron. This is not merchantable in its natural state and generally requires crushing or grinding to 300 or more mesh before beneficiation to merchantable state.

The approaching exhaustion of the fabulous Mesabi range where merchantable ore is scooped from open pits by giant shovels and dumped directly into railway cars to be hauled to waiting ships at the head of the lakes has been constantly before ore men in recent years. Periodically, it is called to the attention of the public and causes a flurry of alarm, bringing forth proposals for government intervention to conserve a portion of the rich open pit reserves for emergencies, permit more extensive development of underground reserves and to promote beneficiation of the lesser grades. In 1942 when war consumption was rising to a peak, E. W. Davis, director of the Mines Experiment Station of the University of Minnesota, reported to the government that at the then prevailing rate of consumption the known open pit reserves in Minnesota would be exhausted by 1950 and recommended immediate action by the government to conserve these reserves and to utilize the lesser grades.

Expert opinion is not unanimous as to when the high grade ores all will have moved down the Great Lakes to their ultimate destination. The more pessimistic estimate the reserves of high grade open pit ore will be reduced to about a half billion tons at end of the current season and that exhaustion may come within a decade if consumption at present rates is continued. Others point out



Electric shovel dumps ore, 14 tons at a bite, into cars of the Duluth, Missabe & Iron Range Railway at the Hull-Rust open pit iron mine of the Oliver Mining Co. Approaching depletion of high-grade open pit ore is focusing more interest in beneficiating the intermediate ores and eventually taconite

that reserves probably are greater than shown by the official estimates as compiled from tax records and that exhaustion is farther away.

All agree, however, that the drain on ore reserves has been tremendous. From the middle of 1940 when the defense program got under way to the end of the Japanese war, approximately 425 million tons of Lake Superior ore were consumed.

Shipments increased from 45 million tons in 1939 to a peak of 92 million tons in 1942. Shipments for the current season are expected to be about 77 million tons. The movement down the lakes to the beginning of October totaled 61,671,771 tons, or 4,231,413 tons less than was shipped at the same date in 1944 (see page 215).

From 1940 through 1945 the total movement of Lake Superior ores will amount to about 480 million tons, nearly equal to estimates of the remaining reserves of high-grade open pit material.

Incidentally, while ore men are concerned over the heavy drain of the war on their natural resources they also are more than a little proud of the way in which an uninterrupted flow of ore was maintained to blast furnaces throughout the emergency. No blast furnace, they say, was ever shut down for lack of ore. And the industry was one of the few against which no directives were issued. Extraordinary precautions were taken to protect the lines over which the ore moved from mines to furnaces. The Soo locks, through which passes practically all Lake Superior ore, was the most heavily guarded inland area in America. At one time, more than 50 barrage balloons floated over the city, dozens of anti-aircraft guns searched the skies, several thousand troops were on guard and an airplane spotting system extended from Hudson Bay to Tennessee. In case the enemy should surmount these precautions and damage the locks, a new railway and loading facilities were ordered at Escanaba to haul at least a portion of the ore needed.

Although no enemy action was attempted against the ore mining industry, the job of getting out the tremendous tonnages of ore needed left its mark in the mining fields. At times it was difficult to obtain machinery or even replacement and repair parts needed. Development work was curtailed by lack of materials and also by the urgency for moving as much material as possible. Even beneficiation research was retarded by the difficulty in obtaining materials.

While the ore and shipping industry delivered all the ore that was needed during the war, realization of the possible consequences to the war effort that might have occurred had there been any interruption in shipments has given rise to agitation in some quarters for government stockpiling of large quantities of ore for use in possible future emergencies.

One of the latest expresssions of this was the recommendation to the War Production Board by W. R. Van Slyke, mining engineer of Eveleth, Minn., that the government acquire absolute control of 300 to 400 million tons of high grade open pit ore in the Mesabi range and put and keep a third to a half of this reserve in condition for instantaneous production. He also suggested the government raise present iron ore values at the mines by a least a dollar a ton so as to make economically possible the large scale mining of underground ores and the beneficiation of various low grade ores, including taconite, as offsets against curtailed open pit operation. This could be done, he said, either by a flat increase in the Lake Erie price of iron ore or by combining a reduction to be effected in the tax burdens on iron ore and a reduction to be effected in upper lake rail freights on iron ore with an increase in Lake Erie iron ore prices.

"If we take these steps," Mr. Van Slyke says, "we would be prepared for any emergency. Under a peacetime economy, moreover, we would never need to fear an iron ore famine. Domestic production from the remaining open pit mines, accompanied by a resuscitation of underground mining, the development of techniques for the utilization of our vast reserves of low grade ores, and the importation of foreign ores, could be made to provide indefinitely for the peacetime wants of our blast furnaces and steel mills."

No action was taken on Mr. Van Slyke's proposal to the WPB, made only a few weeks before that group began to fade out of existence. The WPB believed it was not the proper agency to act upon the suggestion and that if any action were to be taken it should be by some permanent government agency, possibly by Congress itself.

Suggests Different Method

E. W. Davis of the Mines Experiment Station agrees with Mr. Van Slyke that the government should take prompt steps to avail itself of the high grade ore necessary for national defense but differs in the means of accomplishing this objective. He believes that direct shipping ores or concentrates should be stockpiled at smelter points without disturbing the present tax and economic structure of the industry.

Professor Davis suggest that periods of slack in the steel industry would make ideal conditions under which federal stockpiling of ores at furnace points might proceed. He advises building and maintaining the stockpiles at maximum tonnage totals, with withdrawals to be permitted only during emergencies.

Utilization of taconite concentrates and underground ores for the custodial ores would encourage and stabilize beneficiation operations and underground mining, he believes.

The latter proposal is favored by some mining interests. It would make the emergency stockpile available at the points where needed should an emergency arise. Should the stockpile include a large percentage of beneficiated

low grade ores, for which the government would have to pay a premium to cover the added expense of beneficiating, progress of such methods of treatment would be accelerated.

Should the beneficiation of the lower grade Lake Superior ores lag and the reserves of the high grade open pit ores become exhausted, it is possible blast furnace operators may turn to foreign ores, from South America and possibly the new discoveries in Labrador. While it is possible that these ores might be imported at a cost lower than that for beneficiated ores from the Lake Superior district, it would cause a trend of iron-making toward the seaboard and might leave the United States largely dependent on foreign ores. This, ore men agree, would be unthinkable in the light of possible future wars.

Reconversion Progressing In Sewing Machine Field

Sewing machines are now emerging in small quantities from the industry's plants which were completely converted to the making of military equipment during the war years.

About 40,000 machines may be made in the last three months of this year, though only some 10,000 were expected from parts on hand, in the quarter ending Sept. 30. The estimated 40,000 fourth quarter output would amount to around 20 per cent of the prewar quarterly manufacturing rate of 200,000 machines.

Production in the spring should rise sharply as the industry completes physical reconversion and secures more raw materials.

Manufacture in 1945 probably will show a disproportionately large number of portable models. Models made this year generally will be of the prewar types.

Manufacture of domestic sewing machines was restricted on April 25, 1942, then prohibited on June 15, 1942, through limitation order L-98.

In 1941 the industry consumed, for new machines and attachments, 24,689 tons of iron and steel, 225 tons of copper, 12,870 pounds of lead, 10,400 pounds of nickel, 175 tons of aluminum, 20 tons of zinc, 225 tons of phenolic resin, 2200 pounds of stainless steel, 12 tons of alloy steel, 560 tons of cadmium and some rubber.

During the war the industry turned out such varied military supplies as B-29 computors, depth charge pistols, M-5 directors, aircraft parts, fuses, 37 mm shot and antiaircraft equipment. Peak production was reached in the first quarter of 1943, when shipments amounted to $27 million. Annual shipment of sewing machines in 1941 totaled $18 million.

Reconversion began in the industry after July 16, this year, when the order prohibiting production of machines was revoked. However, most plants were so heavily occupied with war contracts until the surrender of Japan that it was impossible for them to take much advantage of their release from WPB control.

Recent survey of four of the larger companies indicated they would manufacture 25,000 in December.

WPB Gets Few Requests for Bottleneck Assistance

Chicago regional office of WPB so far received only 675 requests from manufacturers or jobbers asking for assistance in obtaining "bottleneck" items under the CC ratings provided for in the new Priority Regulation 28 which went into effect Aug. 21. Of this number, 295 requests came from the Chicago metropolitan area. Most of the items on which WPB was asked to grant priority assistance were sheet and strip steel, structural steel, electric switches, transformers, motors, steel sash, work gloves and machine tools.

From now on it is believed many manufacturers will begin to realize that their former AA ratings which entitled them to receive scarce materials are no longer valid and they will then apply to their WPB district office for the new CC rating on materials that are holding up civilian production.

OPA To Issue Ceiling Prices for Metal Lath

Metal lath is one of many building materials for which dollar-and-cent ceiling prices are to be provided by the Office of Price Administration in connection with that agency's broad program to forestall any inflationary upswing in building costs.

Present, Past and Pending

TWO STEEL FIRMS SETTLE ALL CANCELED CONTRACTS
WASHINGTON—Wheeling Steel Corp., Wheeling, W. Va., and Colorado Fuel & Iron Corp., Denver, have settled all their terminated war contracts with the Army and are back on a peace basis, because of pretermination agreements which facilitated the shift, War Department announced last week.

BETHLEHEM IS STAINLESS STEEL BAR BASING POINT
BETHLEHEM, PA.—Bethlehem Steel Co. has named this city as a basing point on stainless steel bars.

HAYES EXPECTED TO TAKE OVER STEEL POST
WASHINGTON—Harry Hayes, now deputy administrator of the Metals & Minerals Division, WPB, is expected to head the division in the new Civilian Production Administration which takes over the functions of the WPB Steel Division. William Todd, chief of the latter, has resigned effective Nov. 1.

POOR & CO. BUYS KENSINGTON STEEL CO.
CHICAGO—Poor & Co. has acquired control of Kensington Steel Co., both of this city. Founded in 1926 as a producer of manganese steel castings, the Kensington company will be operated as a subsidiary of Poor & Co.

CONTNENTAL TO BUILD NEW CAN PLANT AT PITTSBURGH
PITTSBURGH—Continental Can Co. will build a new general line plant near the Irvin Works of Carnegie-Illinois Steel Corp.

ROSE ELECTED CHAIRMAN OF FIRTH-STERLING STEEL
PITTSBURGH—Floyd Rose, former president of Vanadium Alloys Steel Co., has been elected chairman, Firth-Sterling Steel Co., McKeesport, Pa.

STEEL WAREHOUSE REPLACEMENT PLAN ELIMINATED
WASHINGTON—Stock replacement plan under which steel warehouses obtained their supplies from steel mills during the war period has been eliminated.

SCRAP ALLOCATIONS REMAIN VALID TO EXPIRATION DATE
WASHINGTON—Allocations of iron and steel scrap to mills and foundries which have been issued will remain in full force until date of their expiration, War Production Board has ruled.

CONSTRUCTION MACHINERY CEILINGS RAISED 5 PER CENT
WASHINGTON—Interim increase of 5 per cent in ceiling prices for basic construction machinery and equipment has been authorized by the Office of Price Administration.

HILLMAN GROUP ACQUIRES STRUTHERS IRON & STEEL
STRUTHERS, O.—Struthers Iron & Steel Co. has been sold to the J. H. Hillman interests of Pittsburgh which controls Pittsburgh Steel Co. and Pittsburgh Coke & Chemical Co. President W. C. Holzworth of Struthers said ceiling prices of pig iron and high labor and material costs made it impossible for the plant to continue as a "merchant furnace." The Struthers firm will retain its name and will be headed by R. M. Marshall and T. R. Kirkpatrick of Pittsburgh Coke.

Coal Stoppages Cut Steel Output

Thirty per cent of solid fuel output being lost as more than 100,000 miners are idle. Government seizes strike-bound oil refineries. General Motors refuses union's demand for 30 per cent wage increase

SPREADING strikes in the bituminous coal fields, over the issue of unionizing foremen, last week had cut off more than 30 per cent of national production, made more than 100,000 coal miners idle, caused a reduction in iron and steelmaking operations and threatened a sharper reduction this week.

Work stoppages in other fields, generally over the issue of increased wages to offset the shorter work-week, boosted the total of idle workers to about 450,000.

Coal stocks at steel mills are abnormally low. At the beginning of September, the national average of steel mills stocks was enough for 13 days' normal operations. This has been reduced by the interruption of shipments during the current stoppage and many mills now are down to only a few days. In the Pittsburgh district, steel mill stocks at week's end were only 5 to 6 days' supply.

As the coal supply situation approached a critical point the Solid Fuels Administration restricted shipments by producers. Mines in Appalachian area were prohibited from shipping available coal to any users except the following: Hospitals, water, gas and electric utility plants, railroads and city transit systems, vessels, mine power plants, the Great Lakes docks and river and tidewater docks.

The producers also were ordered to hold at railroad mine sidings for later allocation as many loaded cars as could be held without impeding mine operations.

Shipments of coal for export from the districts affected by the strikes were suspended. The coal which has been going abroad will be diverted to American users authorized to buy it.

The mining interruption springs from a demand of supervisory mine workers for recognition as a collective bargaining agency of the United Clerical, Technical and Supervisory Workers, an affiliate of the United Mines Workers.

The stoppage came at a time when coal production already was lagging 7½ per cent behind last year's production.

In Cleveland Republic Steel Corp. reported that six of its seven mines were affected by the strike, cutting its iron and steel production by 25 per cent. Six of its 22 blast furnaces were idle late last week and a seventh was scheduled to go down over the week end.

In the Pittsburgh district, operations dropped off a half point last week with sharper curtailments scheduled to start Friday. Clairton Works of Carnegie-Illinois Steel Corp., which normally consumes 30,000 tons of coal daily in supplying the coke needs for U. S. Steel subsidiaries, was scheduled to taper operations Friday night, and National Tube Co. on Saturday. Carnegie-Illinois planned to shut down 10 more blast furnaces over the week end. Operations at practically all plants in the district will show adverse effects by early this week.

Nearly all beehive coke ovens in the district have been banked and by-product ovens are in process of being curtailed.

Chicago district steel mills, depending on eastern mines for coking coal, were facing a critical situation at week's end. Reduction in coke oven and blast furnace operations appeared inevitable if the tieup continues. Inventories of coal are low and interruptions to shipments are being felt almost immediately.

Carnegie-Illinois Steel Corp. and Inland Steel Co. find their position critical. Inland began to curtail blast furnace operations Oct. 5, three out of seven stacks being idle by Oct. 7. Wisconsin Steel Co., which was obliged to bank its No. 1 blast furnace Aug. 12 because of coal shortage, had improved its stacks in succeeding weeks and was preparing for the stack to resume, when the strike occurred. Resumption now is held in abeyance.

Interlake Iron Corp., which took its Federal B stack off Aug. 1 for relining, finished the work several days ago but now is holding the stack idle to await developments. Republic Steel Corp. already had been running its blast furnace

Some of the 2900 production workers who struck at the SKF plants in Philadelphia. Walkout started with a sitdown by employees objecting to a transfer of a worker from one plant to another. NEA photo

THE REAL ISSUE

"The time is near when Congress must decide whether the unions are to run the country, or the country is to run the unions. Even if current strikes against the public interest are abated, worse ones are indicated for the near future.

"Our greatest problem is not one of wage rates, at all. No matter what wage levels are, a fair day's work must be exchanged for a fair day's pay. Management must have that understood and agreed to, and further must have adherence by its employees and their representatives to recognized rules of shop conduct and to standards of common decency."—Frank Rising, Automotive & Aviation Parts Manufacturers Inc.

on slack wind and coke ovens on a reduced basis for some time for operational reasons, and will be able to weather the coal strike unless a prolonged one. Youngstown Sheet & Tube Co. will suffer seriously only from a protracted mine shutdown.

Of the district's 41 blast furnaces, 35 are operating currently.

Two weeks ago, steelmakers were fearing curtailment of open-hearth operations because of fuel oil shortage resulting from the oil workers' strike. In the meantime, however, supplies for at least two weeks have been acquired, to make this threat less serious.

Meanwhile negotiations for settlement of the oil workers' strike collapsed and the government moved to take over all refineries affected, the first government seizure since V-J Day.

In Detroit, General Motors Corp. rejected the United Automobile Workers' demand for a 30 per cent rise in wage rates as "unreasonable". The company termed the union's demand inflationary and said it would necessitate increasing the prices of new cars by an equal amount.

Reconversion Activities Affected

In other fields, strikes affected many reconversion activities. Among these were:

Aluminum Co. of America, New Kensington, Pa.—6500 CIO production workers walked out closing three plants.

Thomas A. Edison Inc. and Monroe Calculating Machine Co., New Jersey, 2500 and 1500 workers, respectively, closed a total of four plants.

Carnegie-Illinois Steel Corp., South Works, Chicago—800 rolling mill workers out, walkout starting Sept. 29.

Electro-Motive Division, General Motors Corp., La Grange, Ill.—8000 workers out, unexplained walkout starting Sept. 28.

Taylor Forge & Pipe Works, Cicero, Ill.—2100 workers out, strike started Oct. 1.

David Bradley Mfg. Co., Kankakee, Ill., subsidiary of Sears, Roebuck & Co. Farm implements and stokers—900 workers out.

Diamond T Motor Car Co., Chicago—900 workers refuse to cross a union picket line.

Cribben & Sexton Co., Chicago, stoves —500 workers out, strike started Aug. 27.

Morden Frog & Crossing Works, Chicago—Production halted by strike of 110 union workers.

Other plants affected by strikes include: A. Finkl & Sons Co., three plants in Chicago; Revere Copper & Brass Inc., Chicago; General Electric X-Ray Corp., Chicago; American Forge Division, American Brake Shoe Co., Chicago; Central Screw Co., Chicago; and Bucyrus-Monighan Co., Chicago; Haskell & Barker Division, Pullman-Standard Car Mfg. Co.

New Agency To Continue Some WPB Functions When Latter Dissolves

WASHINGTON

PRESIDENT Truman anounced late last week acceptance of the resignation of War Production Board Chairman J. A. Krug effective Nov. 3, and dissolution of WPB on that date.

J. D. Small, now chief of staff for WPB, was named administrator of the Civilian Production Administration, a new agency which will succeed WPB and carry out those functions of the latter deemed essential to promote industrial reconversion.

Mr. Small said the CPA would use its powers to further a swift orderly transition from wartime production to maximum peacetime production in industry free from wartime government controls with due regard for the stability of prices and costs.

At the same time, Mr. Small said, the CPA would expand the production of materials which are in short supply, limit the use of materials which are still scarce, restrict the accumulation of inventories so as to avoid speculation, hoarding and unbalanced distribution which would curtail total production.

It would also grant priority assistance to break bottlenecks which would impede the reconversion process, facilitate the fulfillment of relief and other essential export programs and allocate scarce materials or facilities necessary for the production of low priced items essential to the continued success of the stabilization program.

Five Main Operations Bureaus

Individual CPA controls will be lifted as soon as each is no longer needed for orderly reconversion, Mr. Small said.

Five main bureaus of CPA will handle industrial operations, priorities, field operations, international supply, and the orderly demobilization of former WPB functions that will now either be closed out or transferred to other agencies.

Instructions have been sent to the Compliance Division to continue its expanded investigations and other compliance activities during the next few months.

In the main the War Production Board's job is finished.

The Controlled Materials Plan for distribution of steel, copper and aluminum expired Sept. 30. However, a simplified priorities rating system is being retained for the relatively few materials and components still in short supply. Under this new system a rating may be assigned for certain military purposes and, sparingly, to break production bottlenecks or to meet other unusual circumstances. Inventory controls also are retained.

Since the war ended in August, WPB controls have been amended or revoked as fast as military cutbacks and the material supply situation permitted. Today it is said only between 55 and 60 out of several hundred regulations remain in force.

The WPB announced revision of its general inventory control regulation, Priorities Regulation 32. This establishes many changes necessitated by revocation of CMP and other orders and regulations. It lifts controls from some items and tightens it on others. It continues, for instance, the 60-day limitation on copper and copper base alloys. Steel and iron listings now include a 60-day limitation on gray iron castings, including soil pipe, and a 30-day limitation on pig iron, and continue the 45-day limitation on malleable iron castings.

In the case of steel, the following shapes and forms are subject to the 60-day limitation: Carbon steel bars, sheet and strip, structural shapes and piling, tin plate, terne plate and tin mill black plate, and silicon electrical sheet and strip alloy steel. All other shapes and forms of carbon and alloy steel remain subject to the minimum practicable working inventory limitations.

Liquidation of WPB Begins In the Chicago District

CHICAGO

Eight divisions of WPB Region VI were closed last week in the first phase of the liquidation process of this war agency which is credited in the four-state region of Illinois, Indiana, Iowa and Michigan, with having sparked the production of $37,200,000,000 of weapons and supplies out of the nation's total output of $186 billion in munitions and civilian goods that overwhelmed the Axis.

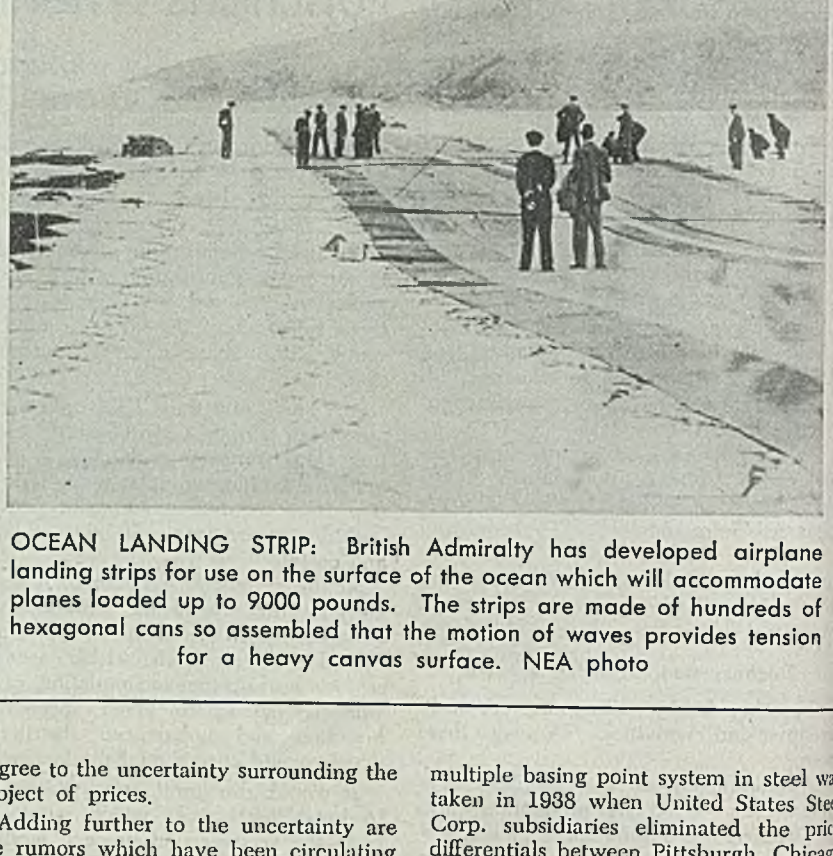
The Chicago WPB district, which was given the status of a sub-region, has now been merged with the regional organization and will continue to function on a diminishing scale from the War Agencies Bldg., 226 West Jackson boulevard, Chicago. All district offices will be kept open until WPB is finally terminated.

WPB divisions which have been discontinued are WPB Production Drive, which stimulated factory output; Salvage, which rallied public efforts to conserve iron and steel scrap, paper and tin; Management Consultant, which devised incentive plans for industry; Office of Civilian Requirements; and three industrial divisions—Automobile, Farm Machinery, and Radio and Radar.

The Chicago industrial area almost trebled its output of goods which rose from $4,300,000,000 in 1939 to $11,900,000,000 in 1944.

Uncertainty Reigns on Steel Trend

Government reconversion and price officials fail to reach agreement on price advance. Wage factor complicates problem



OCEAN LANDING STRIP: British Admiralty has developed airplane landing strips for use on the surface of the ocean which will accommodate planes loaded up to 9000 pounds. The strips are made of hundreds of hexagonal cans so assembled that the motion of waves provides tension for a heavy canvas surface. NEA photo

WHETHER steelmakers will be permitted to up their prices in the near future was uncertain last week. In authoritative circles it was reported the government's position will not be made known for at least another week, if then, for the simple reason John W. Snyder, reconversion chief, and Chester Bowles, head of the Office of Price Administration, have not been able to come to an agreement on the matter.

Complicating the situation is the demand of the steelworkers for an increase of $2 per day in wages. OPA, it is said, favors granting at least part of the price increase sought, but decision at the top in government policy making is made difficult by the uncertainties kicked into the picture by strikes and unsettled economic conditions generally.

The steelmakers asked for an increase up to $7 per ton shortly after the end of the war. However, since their request was entered the steelworkers have come along with their wage demands. Consequently if an increase in prices were to be granted now it would not take into consideration any wage boost which may come out of the wage negotiations scheduled to get under way Oct. 10, beginning with subsidiaries of the United States Steel Corp.

At the moment the whole question of steel prices is clothed in an atmosphere of uncertainty, both for the immediate future and beyond. For months past the OPA has been looking into the matter of price extras. Committees have been going over extra cards with a view to bringing them into line with existing conditions. How far along this study of extras has progressed is difficult to determine. To date action has been taken only on cold-finished bars and the changes in this category were not extensive. In the main, however, it is believed fairly broad adjustments in extra cards can be expected, resulting in increases in some directions and decreases in others. But when action will be taken appears to be anyone's guess, a fact which contributes in no small degree to the uncertainty surrounding the subject of prices.

Adding further to the uncertainty are the rumors which have been circulating lately to the effect important changes in the multiple basing point system of pricing are imminent. So far as can be learned no major change in the basing point method of quoting has been under consideration lately in the steel industry. However, recent action of the steelmakers in establishing multiple basing points on stainless steel products has served to intensify the rumors that further action along this line is contemplated in that bases would be set up on certain products at producing points for those products now not recognized as bases. These rumors have been kicking around ever since last spring when the United States Supreme Court ruled in a corn products refining industry case that the basing point method of pricing goods was in violation of the antitrust laws.

More Basing Points Foreseen

In view of the Supreme Court's opinion it would not be surprising if additional basing points were established on steel products some time in the future. However, such action, if taken, could hardly be described as a basic or fundamental change in policy since it simply would be continuing a trend which has been under way in the industry for the past quarter century, it is said. Since 1920 the number of basing points on steel products has increased from one, Pittsburgh, to 82, and the number of price quotations from one for each of 38 products to a total of 430. Major move toward establishing the multiple basing point system in steel was taken in 1938 when United States Steel Corp. subsidiaries eliminated the price differentials between Pittsburgh, Chicago and Birmingham on most major products. At that time other producers countered the Steel corporation's move by setting up basing points at their own mills thus tending to protect their home markets from outside encroachment.

Under the multiple basing point system in steel no single center is the basing point for all products. For instance, Pittsburgh is the base for 34 products; Chicago for 31; Birmingham for 18; Cleveland for 17; Buffalo for 15; Youngstown for 11; Gary for 9; Duluth and Sparrows Point for 7, and so on. As a general thing, production centers are basing points for the products produced at those points. There are a few exceptions to this, some production points not being listed as bases for specific products produced at those centers. Such exceptions, however, are relatively few in the case of the major products which make up the bulk of the tonnage produced.

Possibly Federal Trade Commission action may be taken in the future to force the steel industry to refine its pricing system further than at present in view of the Supreme Court decision of last spring. However, no intimation has been given by the FTC that such action was in immediate prospect. Should the steel industry set up additional basing points voluntarily such action would be in the direction of satisfying FTC desire to place steel pricing on an fob mill basis. However, any move by the steel industry in this respect would be subject to review

by government price control authorities, so long as control continues, especially in event such action resulted in a net increase in prices at any point of consumption.

Ceiling Prices Readjusted On Reconversion Products

Adjustments in ceiling prices of reconversion products are provided in amendments to supplementary orders 118 and 119, issued by the Office of Price Administration.

A number of building materials, machinery and metal items have been added to the list of reconversion products for which large and small manufacturers may obtain ceiling price increases on an individual basis. These items include: Prefabricated garages, farm buildings, commercial and industrial buildings (made predominantly of metal); confectionery and sugar processing machinery and equipment; steel sheet pipe culverts, condensation pumps.

Manufacturers of these products with annual sales of more than $200,000 are authorized to apply to OPA for price increases to cover their 1941 costs, adjusted for legal increases in their labor and material costs. To this, OPA will add an industry profit factor.

Manufacturers with annual sales of less than $200,000 may figure their own ceiling prices for products on the lists. These prices will be based on the manufacturer's current costs, or on legal increases in his material and labor costs since 1941, plus his peacetime profit margin, or half the industry's average peacetime margin.

Reconverting manufacturers of commercial mechanical refrigerators, air conditioning units and equipment, and food products machinery have been given profit factors of 4.9 and 4.5, respectively, for the first time by OPA. The following more specific factors than those previously announced have been given for automatic electrical control equipment, 11.2; commercial and domestic stokers, having a capacity of less than 1200 pounds per hour, 5.5; elevators and escalators, 6.1; hand-operated petroleum dispensing pumps, 2.2; plated, solid and hollow silverware, 3.4; stock millwork, 3.2; and leather luggage, 3.5.

Reconverting manufacturers of these products may figure their new ceiling prices by adjusting their 1941 total costs for increases, since that time, in materials prices and basic wage rates of factory workers. The appropriate profit factor then is applied to that adjusted figure. However, manufacturers with annual sales of less than $200,000 may use either the profit factors provided in the regulation, as amended, or their own average 1936-1939 margins over cost. Concerns with annual sales of less than $50,000 may base their reconversion ceilings on total current costs instead of on adjusted 1941 costs.

Increased Coal Production in France Gives Promise of Rise in Industrial Activity

PARIS, FRANCE

INDUSTRIAL activities in France depend upon the output of coal. Production of coal actually decreased immediately after the liberation of the country but the trend is now definitely upward, due largely to the efforts of the government that has taken measures to insure higher wages for the miners and more substantial rations for them.

During the last week of July output of coal was 680,000 tons for all French mines. This corresponds to a daily output of 113,000 tons as against 95,000 in May. Imports of coal in the last week of July amounted to 111,000 tons, of which 47,000 tons came from Great Britain, 34,000 tons from the United States and 30,000 tons from the Ruhr basin and the Saar.

Owing to the shortage of coal only four blast furnaces out of 30 are operating in the Moselle district, and only three basic bessemer converters have been restarted.

In the Moselle district the output of pig iron and steel, January to May, was as follows:

	Metric Tons	
	Pig Iron	Steel
January	10,000	nil
February	9,000	nil
March	15,000	2,000
April	18,000	9,000
May	20,000	14,000

The May output represents about 10 per cent of 1938 output in that region.

For the whole of France the output for July has been: Pig iron, 101,000 tons or 20 per cent of the average monthly production of 1938; raw steel, 177,000 tons or 23 per cent of average monthly production of 1938; finished steel, 92,000 tons or 30 per cent.

These figures compare with 97,000 tons for pig iron, 126,000 tons for raw steel and 78,000 tons for finished steel in June. The lower figures for pig iron indicate the considerable use of scrap for the manufacture of steel with a resulting increase of quality but also an increase in production cost. A consequence of these low production figures is that order books for finished steel products are full and deliveries are extended to well over a year.

Steel prices, in French francs, on May 1, were as follows, with comparative prices for 1940:

	1940	May 1, 1945
Billets	1,556	3,580
Rails	2,591	5,789
Structural steel	2,025	4,499
Merchant steel	2,084	4,700
Plates	2,656	5,789
Medium sheets	2,656	6,353
Light sheets	3,125	7,012

The 1940 prices include tax, whereas the May, 1945, prices are exclusive of the 9 per cent tax on production.

Mexican Import Duties Reported Increased On Steel Products in Certain Categories

WASHINGTON

IMPORT duties on iron and steel products into Mexico have been increased in a number of categories under a recent governmental decree.

Items on which import duties were increased include; iron of first-smelting in ingots, 5 pesos per 100 gross kilograms, over 2.50 pesos former rate; steel ingots, rectangular (billets) measuring more than 6 centimeters each side, and up to 120 centimeters long, 5 pesos per 100 gross kilograms over 3.50 pesos; same of forged iron, 5.50 pesos over 3.50; solder, iron or steel, for use in oxyacetylene process including wire forms, 0.45 pesos over 0.30; solder, tin or lead, except wire forms, 0.60 pesos over 0.40; same including wire forms, 0.60 over 0.40; iron or steel in bars of all shapes and cross sections, 0.15 over 0.09; iron or steel, expanded, in framework, columns with seat plates, brackets, etc., with or without nuts, other parts not specified, for construction, 0.25 pesos over 0.09; iron or steel beams and stainless iron, weighing up to 5 kilograms, per linear meter, without punches or special cuttings, 0.20 over 0.10; with punches or special cuttings, 0.25 pesos over 0.15; same weighing over 5 kilograms, without special cuttings or punches, 0.20 over 0.07; with punches or special cuttings, 0.25 over 0.09; iron or steel sheets, untinned or ungalvanized, more than 15 centimeters wide, 0.10 over 0.03, pesos.

New dutiable items were announced as follows: Cast iron pipes or tubes, up to 75 mm inner diameter, 0.06; same, up to 305 mm, 0.10; same, more than 305 mm, 0.02; iron or steel pipes or tubes, rolled or centrifugal, galvanized, up to 7 centimeters 0.12; same, over 7 centimeters up to 20, 0.10; more than 20, 0.18; molded or cast pieces of iron or steel, any kind, up to 1 kilogram weight, 1 peso; up to 10 kilograms, 0.80; up to 50 kilograms, 0.40; more than 50 kilograms, 0.25 peso.

More Than 30 Papers Presented At 16 Sessions at ASME Meeting

Metalworking, machinery, machining and tooling covered in 11 prepared addresses. Engineering trends of importance in postwar era discussed by several speakers. Meeting attracts attendance from wide area

GOVERNMENT action lifting restrictions on conventions as of Oct. 1 came just in time to allow conversion of the fall meeting of the American Society of Mechanical Engineers at Cincinnati from a purely local affair to one of national importance.

This meeting, held at Netherland-Plaza hotel, Tuesday and Wednesday, October 2-3, 1945, attracted not only the national officers of the institute but also several hundred out of town and out of state members. This was due to the quick action of the Cincinnati section in broadcasting the message "Cincinnati Invites the Universe" and through the setting up of a program of national interest.

Of the more than 30 papers presented at the 16 sessions, no less than 11 dealt with metalworking, machinery, tooling and machining. This was natural in view of the fact that the meeting was held in a state which today is the leading machine tool center of the world. These papers, one and all, were highly scientific in character, indicating that under modern conditions old-fashioned rule-of-thumb methods definitely are out in machine tools and tooling and in production and manufacturing operations.

Visited Plants

This state of affairs was further emphasized by plant visitations—especially to that of the Cincinnati Milling Machine Co. There was an exhibition of milling, boring, drilling and grinding machines. These pointed to the growing trend toward automatic and semiautomatic control and to permanency of tightened limits on fit and finish of machined parts; also, the effect of new cutting materials and new types of cutters in increasing practical speeds and distances—thereby rendering older model machines obsolete —was demonstrated beyond the shadow of a doubt.

Other subjects which came in for attention were equally significant in pointing to engineering trends of tremendous importance in this postwar era. These included: Selection and use of plastics (augmented by a visit to the Formica Insulation Co.); management, metallurgy; fuel economy; aviation; railroads; and engineering education.

In his address on "Airplanes of the Future and The Future of the Airplane," D. R. Shoults, vice president, Bell Aircraft Corp., Buffalo, gave insight into effects of such things as gas turbines, jet propulsion, helicopters and radar on postwar commercial aviation. Mr. Shoults envisioned the helicopter as a vehicle of getting to and from airports quickly rather than as a private aircraft for the average citizen. He believes that the reciprocating engine will hold its own for a long time to come on distance flights where speed is not as important as fuel economy. However, he sees in the turbine revolutionary possibilities.

Among the early arrivals of better railroad equipment, A. M. Unger, welding engineer, Pullman Standard Car Mfg. Co., Chicago, promises grill room cars and 3-tier, 42-berth sleepers—both of which will cut the cost of long distance train travel while adding to its comfort.

Dr. M. H. Trytten, director, Office of Scientific Personnel, National Research Council, Washington, emphasized th science now is the major ingredient military power. He declared that high qualified personnel represents a natio resource and should be so considered we are to remain powerful.

Citing the realistic approach of Rus on this, the speaker pointed out th German scientists and technicians are b ing encouraged to migrate to Russia a to continue their researches there. Ru sia also is going all out on a progra of selection and training of her ov best youth for scientific careers. Rig now she has in operation 1500 technic institutes, with enrollment approachi 500,000.

Metal Congress Scheduled For Cleveland Feb. 4-8

Postponed twenty-seventh Nation Metal Congress and Exposition of th American Society for Metals will be he in Public Auditorium, Cleveland, Feb. 4 8. The Society headquarters announc full details and floor plans will be se to exhibitors shortly along with detai of the technical papers to be delivere at the congress which is normally he in October but was postponed this ye due to congestion in transportation, hou ing and facilitiies.

Producers of Magnesium Told Much Can Be Done To Develop Its Peacetime Use

WHILE magnesium demand experienced a sharp drop with the ending of the war, much can be done in developing the peacetime use of this metal, speakers declared at the second annual meeting of the Magnesium Association in New York, Oct. 2-3.

President Edwin S. Christiansen referred to many applications now either on the drawing boards or in actual production.

"Commercially", he said "power will be conserved through such applications as elevator cages; the pay loads of trucks, buses, airplanes and railroad cars will be greatly increased; the efficiency of machines with rapid motion, such as weaving machines, adding machines and typewriters will be materially stepped up." He referred also to the application of magnesium to household appliances, office equipment, sporting goods and various other products.

Declaring that much good technical data have been developed, E. H. Perkins, president, Brooks & Perkins, Detroit, expressed confidence that they could be applied effectively to peacetime requirements. However, he suggested that producers of magnesium stampings and castings first seek out business where their products were really applicable.

He thought that magnesium fabricator and casting producers should look ove the present applications of aluminum declaring he was confident that magnesi um would prove competitive in many cases. He also referred to the cost ad vantage which he said that magnesium had in competing with brass and copper in many instances.

He regarded the matter of prices as highly important to magnesium sellers During the war, he said, the emphasis was on production regardless of cost; to day in the highly competitive commercial field the emphasis is on prices.

Prices also were stressed by D. W Moll, vice president, Hills-McCanna Co. Chicago, in his report as chairman of the casting division. He said that whil competition among magnesium produ ers was generally good competition, var ous methods for calculating foundry cos were still being used and that still mor attention could be given to the subject from the standpoint not only of competition among the magnesium casting pro ducers themselves but among manufac turers of other types of castings.

Mr. Moll also pointed to the desirabil ity of closer appraisal of the civilian field for magnesium castings. "It is high time," he asserted "that we get out o

the laboratory and production departments and find out what we can actually do with our products."

Along this same theme, J. C. Hartley, director of research, Heppenstall Co., Pittsburgh, spoke on the desirability of getting prices on a soundly competitive price basis to the end that the application of magnesium can be more rapidly broadened.

Edwin S. Christiansen, Magnesium Co. of America Inc., was re-elected president. A. Cristello, Eclipse-Pioneer Division, Bendix Aviation Corp., Teterboro, N. J., vice president, and Clayton E. Larson, White Metal Rolling & Stamping Corp., New York, treasurer. Directors elected: J. D. Barrington, Dominion Magnesium Ltd.; Irving T. Bennett, Revere Copper & Brass Inc.; Arthur Bidwell, Superior Bearing Bronze Co.; C. A. Brantingham, Ebaloy Foundries Inc.; Wiser Brown, American Magnesium Corp.; Edwin S. Christiansen, Magnesium Co. of America Inc.; A. Cristello, Bendix Aviation Corp., Eclipse-Pioneer Division; Leo B. Grant, Dow Chemical Co.; Clayton E. Larson, White Metal Rolling & Stamping Corp.; D. W. Moll, Hills-McCanna Co.; T. I. Mosley, Dalmo Victor Inc.; W. H. Osborne, Acme Aluminum Foundry Co.; E. H. Perkins, Brooks & Perkins Corp.; D. A. Rhoades, Permanente Metals Corp.; H. E. Shepard, Rupert Die Casting Co.; V. P. Sweeney, National Smelting Co.; R. D. Taylor, American Smelting & Refining Co., Federated Metals Division; F. S. Wellman, Wellman Bronze & Aluminum Co.

MEETINGS . . .

Oct. 16, Metal Powder Association: Annual meeting, Netherland-Plaza Hotel, Cincinnati. Association offices, 420 Lexington Ave., New York.

Oct. 19-20, Foundry Equipment Manufacturers' Association: Annual meeting, Homestead Hotel, Hot Springs, Va. Arthur J. Tuscany, Engineers Bldg., Cleveland, executive secretary.

Oct. 23-24, Gray Iron Founders' Society: Annual meeting, Chicago. W. W. Rose, 1010 Public Square Bldg., Cleveland, executive vice president.

Oct. 24, Porcelain Enamel Institute: Annual meeting, William Penn Hotel, Pittsburgh.

Oct. 24-25, Machinery Dealers National Association: Annual convention, Congress Hotel, Chicago. R. K. Vinson, 20 North Wacker Drive, Chicago, is executive director.

Scrap Convention Planned For Chicago, Jan. 21-23

Annual meeting of the Institute of Scrap Iron & Steel Inc. will be held at the Congress Hotel, Chicago, Jan. 21-23, instead of the Jefferson Hotel, St. Louis, Jan. 8-10, as previously announced.

Better Living Not Achieved Merely By Boosting Wages, Steel Men Told

President of American Steel & Wire Co., in address to iron and steel engineers, says labor leaders should be more concerned with economic wage than with just higher wages. Says under present conditions steel price relief necessary

PRINCIPALLY through the development and research activities of our engineers are we going to realize that better way of life which we all can see in the future, Clifford F. Hood, president, American Steel & Wire Co., Cleveland, declared in an address, Oct. 3 at the fall meeting of the Cleveland section of the Association of Iron & Steel Engineers held at the Hollenden Hotel, Cleveland.

Mr. Hood said that it is through hard work, scientific research and engineering development, rather than merely through raising wages that the "better way of life" will be achieved. He referred to the current demands being made by the steelworkers for a $2 per day increase in wages, pointing out that it is the economic wage which labor leaders should be concerned with.

"Merely adding $2 per day to each steelworker's pay envelope is not going to increase his purchasing power," said Mr. Hood. "But if that $2 addition daily reflects increased production and lower unit costs, it is a real rather than an illusory gain because the selling price of steel can remain unchanged, or possibly be lowered, and the things the steelworker buys will stay at a level which will not absorb all his higher earnings.

"Under present methods of production, however, it just isn't possible sharply to increase costs without passing the bill on to the consumer.

Other speakers on the meeting program included: Newell Hamilton, superintendent, steel plant, the Babcock & Wilcox Tube Co., Beaver Falls, Pa., speaking on "Seamless Tube Piercing and the Problem of Making Steel Satisfactory for the Process"; W. A. Leech Jr., Koppers Co. Inc., and F. D. Schreiber, Pittsburgh Coke & Chemical Co., Pittsburgh, who presented a paper, "The Manufacture of By-product Sulphuric Acid from Hydrogen Sulphide in Coke Oven Gas"; P. L. Walters, Republic Steel Corp., Canton, O., on "Conservation of Utilities in Republic's Canton Plant"; L. W. Long and J. F. Chipman, Allis-Chalmers Mfg. Co., Milwaukee, on "Arc Furnace Switching"; and J. William Barker, and Earl R. Cole, Industrial Furnace Division, Loftus Engineering Corp., Pittsburgh, on "An Examination of Slow Cooling Methods."

TRANSITION TOPICS

STRIKES—Work stoppages in bituminous coal fields reducing steel mill operations, and threatening more severe winter fuel shortage. Nearly half million idle, slowing reconversion progress. See page 78.

CONTROL OF GERMANY—Engineers committee offers five-point program to prevent rearmament, control reich's war potential. See page 86.

TRAINING FOREIGN NATIONALS—United States may expand program to offer training in American "know-how" to young nationals of foreign countries. See page 87.

AVIATION—Airlines' passenger-carrying capacity will be increased five-fold when planes on order are delivered. More communities will be served by air transportation. See page 98.

WELDING—Until recently, mechanical oxyacetylene welding was limited to making of continuous butt-welded tubing, but noncontinuous gas welding of steel containers and other assemblies has advantages which can make it an important factor in the welding picture. See page 104.

SOUTHERN PLANT—Typical of the awakening industrial South is the alert, aggressive management of Auto-Solar Co., Atlanta. Facilities, methods and skills are up to highest northern standards. See page 112.

Three Senate Groups Primed for Scientific Research Hearings

Thorough airing of controversial features of various proposed measures expected at series of hearings beginning Oct. 8. Five pending bills to be studied. Omnibus bill sponsored by Senators Kilgore, Johnson and Pepper appears to have edge on others

CONTROVERSIAL features of proposed legislation to place scientific research facilities and activities under government sponsorship are due for a thorough going over at a series of hearings to be opened Oct. 8 and slated to last three to four weeks.

Actively participating in the hearings will be no less than three Senate groups, the War Mobilization Subcommittee of the Senate Military Affairs Committee, headed by Sen. H. M. Kilgore (Dem., W. Va.) and two Senate Commerce subcommittees headed by Senator Warren G. Magnuson (Dem., Wash.) and Claude Pepper (Dem., Fla.). Another novelty is that the series will be presided over by two joint chairmen, Senators Kilgore and Magnuson.

Five pending bills will be studied: S. 1297, introduced by Senators Kilgore, Johnson (Colorado) and Pepper; S. 1285, introduced by Senator Magnuson; S. 1248, introduced by Senator Fulbright; S. 825, introduced by Senator Byrd; and H. R. 3440, introduced by Representative May.

One of the sharpest controversies is that between the Army and the Navy. The Army favors the May bill and the Navy the Byrd bill. The May bill is sure to run into trouble because it would put scientific research under the direction of the National Academy of Sciences, which organization is not accountable to Congress or the President. The Byrd bill is more acceptable to Congress because the Research Board for National Security which it would create would be accountable both to Congress and the President. But both bills will encounter the objection that they are concerned chiefly with scientific research work for military purposes, whereas the majority of senators want a setup that will encourage full use of scientific research to develop new products and create more jobs in industry.

Also, both bills would place scientific research under groups of individuals rather than individuals—and both Congress and the President of late have shown a disposition to place responsibility in the hands of individuals who cannot pass the buck when accused negligence.

The bill that now appears to have edge over the others is that introduc by Senators Kilgore, Johnson and Pe per. It is an omnibus bill which wo take care of research work for milit and civilian purposes and would pl the whole program under a single dir tor who would spend federal funds carrying on research projects in all s of institutions, both public and priva The bill stipulates, however, that th categories of research would absorb per cent of his total expenditures— tional defense, national health and b scientific research. Each would get per cent of the total.

The Fulbright bill has won consid able support in Congress but is sure encounter objections from the Army Navy because it would place the gove ment's authority over scientific resea work under the direction of a new bur in the Department of Commerce. Fulbright bill stresses the need for search work which will provide n stimuli to private industry.

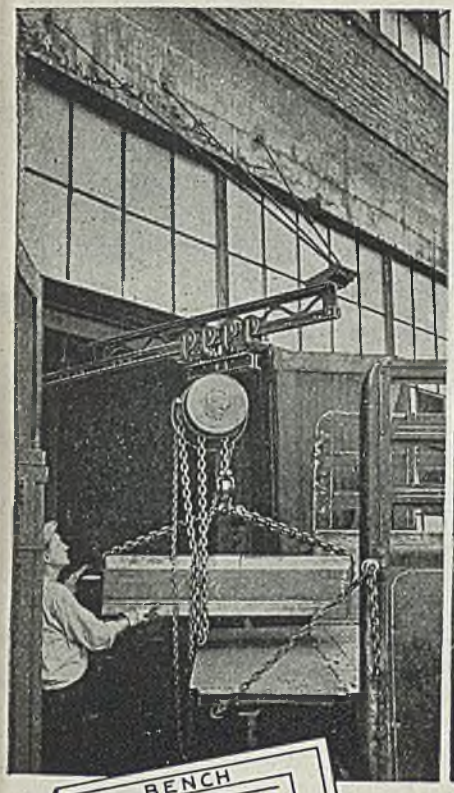
Follows Bush's Proposals

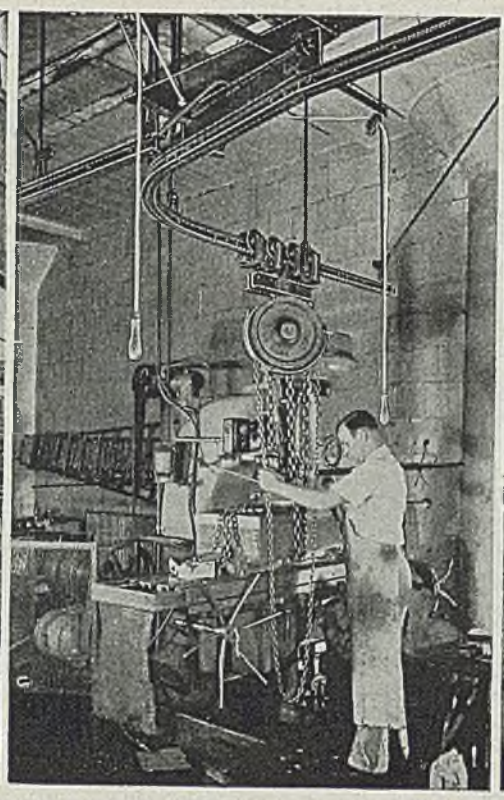
The Magnuson bill would implem a program patterned after recommen tions in a report to the President Dr. Vannevar Bush, director of the fice of Scientific Research & Devel ment. Dr. Bush's program is due violent criticism from some of the nesses who will appear at the hearin particularly his recommendation any private research institution sho be permitted to obtain patent rights discoveries conducted at the gove ment's expense. Dr. Bush has reco mended that in such instances the g ernment should receive royalty-free p ileges. But this does not go far enou in the "liberal" direction to suit ma government people who take the attitu that patents resulting from governme financed studies, aside from milit secrets, should be made freely availab to any business concerns—preferab small business—desiring to operate u der them.

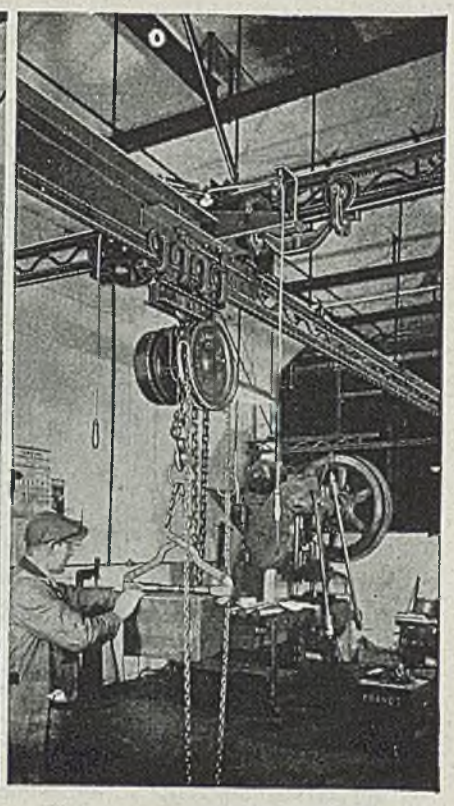
One of the questions that will figu in the scientific research hearings is t fate of the wartime National Invent Council. In the five years of its istence it has received 350,000 commu cations from inventors, and more t 200,000 disclosures of inventions. the latter disclosures its two custom the Army and Navy, investigated, tes and developed 1000 and put about of them into production for the w These included the "frying pan" m locator which permitted our troops advance with a rapidity which demor ized the Germans. Another was the s naling mirror with sighting device wh facilitated rescue of aviators at sea in t Pacific.

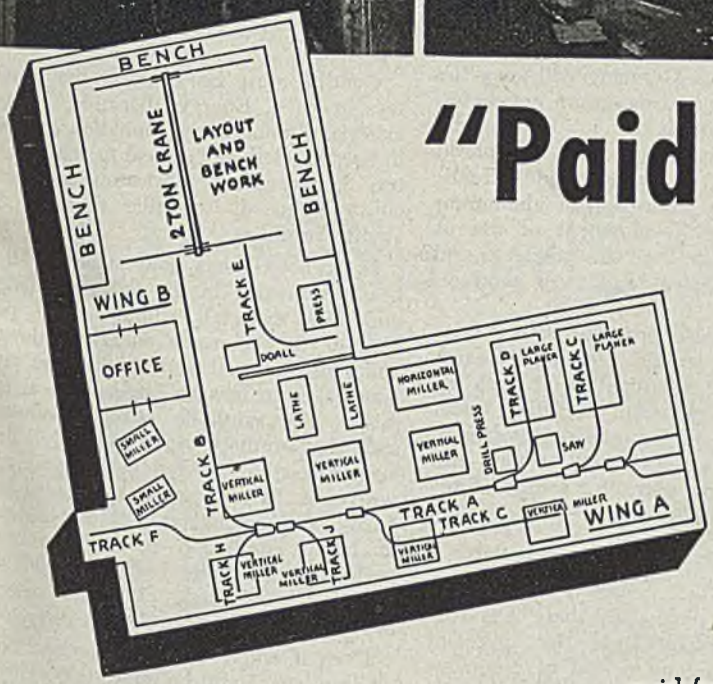
The National Inventors Council serv

PROPOSES TAX RELIEF: Secretary of Treasury Fred Vinson, left, and Chairman Robert L. Doughton of the House Ways and Means Committee, confer on the administration's emergency tax relief program. Warning the committee that the financial burdens of war do not end quickly or easily, Mr. Vinson proposed tax reductions of approximately $4 billion a year. NEA photo



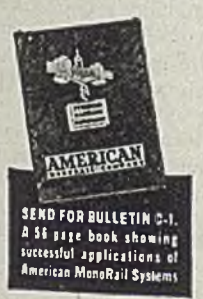






"Paid for Itself... Time and Again..."

"THIS system", says the owner, "has paid for itself time and again. Skilled die-sinkers and tool makers now work at their trade and spend little time lifting and straining to get blocks into the machines". Two ton die blocks in this small shop are handled overhead by American MonoRail. When this system was first installed it represented only a small part of the present track. Now, practically all manual handling has been entirely eliminated and every move from one machine to the other is done by American MonoRail.



An American MonoRail engineer will show you how to handle your products in less time and for less money.

THE AMERICAN MONORAIL COMPANY

13102 ATHENS AVE. CLEVELAND 7, OHIO

one purpose which, it is widely believed, should be perpetuated. It was one place in Washington where an inventor could get a friendly welcome and any help he required to safeguard his interests. The council's chairman, Dr. C. F. Kettering, president of General Motors Research Corp., has gone on record that this function of the council should be continued—that in the peacetime period ahead there should always be "an open door to inventors in Washington." Now in process of liquidation, the council must have a directive from Congress if it is to be continued.

Farm Bloc Support Is Seen For Minimum Wage Increase

Farm bloc support for the Fair Labor Standards Act revision which would move the legal minimum wage from 40 cents to 65 cents an hour, with a further increase to 70 cents in the second year and a final increase to 75 cents in the third year following enactment, is assured as a result of support by Secretary of Agriculture Clinton P. Anderson.

Testifying before a subcommittee of the Senate Education & Labor Committee, Mr. Anderson admitted that raising of the minimum wage may create problems for certain industries and firms that have low wage scales. But only some 4 to 4.5 million workers would be affected which, he said, was "a small percentage of the total." Experience during the war demonstrated that for each increase of one billion dollars in the annual earnings of low-income workers there is a corresponding increase in food expenditures of at least $200 million, with additional gains in purchases of cotton and tobacco.

A modest increase in the earnings of low-paid workers, he said, will be highly desirable insurance against a substantial decline in the demand for farm products resulting from decreased purchases by the armed services plus the decline in lend-lease shipments. Maintaining the farmers' buying power, he said, will be beneficial to the economy generally.

"We may expect," he said, "that more and more farmers will turn to the use of tractors and other power machinery; that more milking machines, self-feeders, and automatic watering devices will be installed; that more 4-row cultivators will be in use, and that many types of machines will be used to cut down the heavy labor requirements at harvest time."

Sellers of American Goods In Cuba Must Be Licensed

Drastic new licensing and registration regulations are being imposed by the Cuban government on salesmen of American goods in Cuba, whether the salesman is Cuban or foreign, it is reported.

Under this law, any salesman of American goods in Cuba must pay a tax and register.

Engineers' Committee Offers Plan To Prevent German Rearmament

Would place lid on nitrogen fixation, synthetic liquid fuels production of aluminum, atomic energy, and limit capacities and production of steel. Secret scientific research and subsidies to industry from government would be curbed

TO PREVENT German rearmament, a five-point program for strict control of the Reich's industry, from raw materials to processing and scientific research, has been formulated by the National Engineers Committee on the basis of studies made by 35 leading engineers and technological specialists. The study, which was requested by the Engineers Joint Council, representing the five major engineering societies, and supplemented by approval of the State and War Departments has been submitted to the appropriate government agencies.

To insure that Germany will keep the peace, the engineering group concludes, will require controls to: 1. Prohibit the synthetic fixation of nitrogen; 2. prohibit the production of synthetic liquid fuels; 3. prohibit the production of aluminum; 4. prohibit the development or use of atomic energy; 5. limit the capacities and production of steel and steel products plants.

The group also proposes to eliminate danger from secret scientific research by preventing co-ordination of such effort with development facilities under German control. Economic subsidies to industry by the German government also are ruled out as a fruitful source of future war strength.

Would Eliminate War Potentials

The committee's report is built around the expressed philosophy that "it is necessary to subtract from the aggressor peoples, for a long period of recuperation, the fundamentals of their industrial war potential for armed aggression." At the same time it is held that "complete elimination of German industries, leaving agriculture as the sole occupation, would produce an economic dislocation and social chaos of destructive magnitude, not alone in Germany but throughout Europe."

Adequate enforcement of such complete elimination of industry would be practieally impossible, and such severe restrictions probably would be repudiated by world public opinion in a relatively short time, resulting in a repetition of the aftermath of World War I, the report states.

In contrast with this the framers of the engineers' report believe their recommendations would require a minimum of policing and remain effective so long as the policies of control are repeatedly adjusted, with the assistance of competent technical counsel, and adequately enforced by the policing agencies of the United Nations.

Recommended controls, the report indicates, would reduce employment of the total peacetime labor force in Germany by about 5 per cent, a displacement which should be absorbed easily by re-employment in peacetime agriculture and consumer goods industries.

The report details the industrial factors that must be controlled, supporting its finding with statistics and engineering data.

Control must be exerted, the group says, over: 1. Energy allocation; 2. raw material elimination or limitation, applied to specific elements critical to war industry; 3. processing, fabricating and new construction; 4. scientific research; 5. atomic subsidies.

It is noted that coal stands at the head of the list in the fields of energy and raw materials, supplying 85 per cent of the country's energy in power and light, as well as providing the raw material base for the huge chemical industry, the synthetic nitrogen industry and the synthetic fuel industry. But because coal is needed in Germany for peacetime as well as war potential industry, the engineers hold that instead of being eliminated it must be controlled by the same body that controls other raw materials. Electric power, likewise, must be controlled at its source.

Even if ample energy were available, modern war would be impossible without a number of products required in large quantities, the report states, listing the following: Nitrogen for explosives; aluminum for air power; steel and steel alloys for land and sea warfare; liquid fuels and lubricants to insure mobility of the instruments of war.

War Department Releases $1 Billion of Surplus

Nearly $1 billion of surplus property, the largest monthly total on record, was released by the War Department to disposal agencies during August, bringing to $4 billion the Army property reported to the agencies since the war began. Included in the surplus items released last week were the following: 1292 bodies for Mack trucks, 13 steam locomotives, 31 marine diesel engines, and 209 tractors

Elliott S. Hanson, president, International Training Administration Inc., seated at left, confers with Capt. Manuel Nieto, former naval attache of the Peruvian embassy, center, and George N. Butler, vice president of ITA. Standing are 11 young men who have received awards under the Peruvian Navy Training Program

U.S. May Expand Scholarship Program

American companies sponsor youths from other countries studying United States techniques. Program designed to promote greater acceptance of our products abroad as well as to aid foreigners develop industry and raise standards of living

TRAINING of young nationals of foreign countries in United States "know-how" under the program launched four years ago appears to be due for early expansion. More than a thousand young Latin Americans already have been trained in this country and returned to their homelands to put their knowledge into effect.

The program was launched in August, 1941, when Nelson Rockefeller as coordinator of Inter-American Affairs, instituted an Inter-American scholarship plan under the good neighbor policy. At that time, the United States was anxious to obtain help for its national defense program from the other American republics and to help these countries maintain sound economies.

The scholarship plan was intended to help this objective by equipping these countries with more competent technicians of many different types to enable them to get along with a minimum of outside aid during the war period.

The plan proved to be popular from the start. It was realized that young men from foreign countries, adequately trained in the United States, could be expected to show a preference for United States products and methods after they returned home. It was popular in the other American countries which seized upon the plan as a means of advancing their long-cherished ambition to develop their industries and thus elevate their standards of living.

Originally there were to be 40 scholarships, two for each Latin American republic, and the men were to be brought here for a period of one to two years, depending on the range of subject matter in which they were to be given training. Actually, in these four years, 1006 Latin Americans have been trained in the United States and have gone back home to put their newly acquired knowledge and skills to work.

In the meantime, other countries became interested in the program. Six young Turks came here and successfully completed training courses as a part of Turkey's aviation program. As far back as 1943, as a part of the plan for industrializing China for the purposes of fighting the war, there was talk of sending large numbers of young Chinese here for such training. Inquiries were coming from many directions. Those responsible for the program concluded that it was headed for international scope and that it should be set up on a permanent basis, to operate with government recognition and assistance, but to be run along the lines of private enterprise.

To take care of the growing load, the International Training Administration Inc., with headquarters at 1419 H. St. N. W., Washington, was formed in June of 1944. It is a Delaware nonprofit membership corporation financed on a cost basis by the sponsors of the young men who come to the United States for their training. The corporation does not finance the training program, nor does it provide any training. It serves as a sort of middleman for receiving trainees from their sponsors and seeing to it that they accomplish the object of their visits to the United States.

President of the ITA is Elliott S. Hanson, formerly connected in sales and public relations capacities with the United States Steel Corp. and its subsidiaries, United States Steel Export Co., Carnegie-Illinois Steel Corp. and Universal Atlas Portland Cement Co. Mr. Han-

son was loaned "for six months" by the Steel corporation to the Co-ordinator of Inter-American Affairs back in 1941 to get the scholarship program started. He has been with the movement ever since.

"We serve the people in the training program in much the same capacity as a customhouse broker serves those engaged in foreign trade," says Mr. Hanson. "When the young men arrive here we give them an orientation course, providing them opportunities to become familiar with our customs, how to handle our money and how to get along smoothly in the United States. We help them to brush up on their English, especially on the technical nomenclature which they will use subsequently in their training courses. We make arrangements with the private company, government agency or foundation or institution which is to do the actual training and we buy their transportation, attend to their visas, their housing and board and many other details. We see to it that they will receive their living expenses from the sponsor or the company furnishing the training—usually $150 to $200 a month. We get necessary rulings from government agencies, so that there will be no deductions from these payments for living expenses—as for income taxes or social security. We get approval from labor unions when the trainees are to go into union shops. We take the trainee by the hand when he arrives and stay with him until he has completed his course and is on the plane or boat that will take him back to the country from which he came.

"Being a nonprofit corporation, we simply bill the sponsor or sponsors for out-of-pocket expenses plus a fee for services rendered."

Courses Tailored To Fit Needs

The training courses are not standardized like the average college curricula; rather, they are tailored to fit the needs as indicated by the trainee and his sponsor. It all depends on the kind of business or occupation in which the trainee is to engage when he gets back home. The boys come up here for training in many activities. To mention just a few, they include various phases of agricultural production, all sorts of construction, manufacture and use of agricultural equipment, communications, roadbuilding and roadbuilding machinery, machine tools and other metalworking equipment, food canning and preservation, automobile construction and maintenance, petroleum production and refining, aviation, railroading, welding, office management, banking, textile production, etc.

Trainees now in the United States number 1369, of whom 970 are Chinese and 399 Latin Americans. Later on several hundreds of additional young Chinese will arrive, under the program arranged by our Foreign Economic Administration and the Chinese government's National Resources Commission. Later on delegations of trainees are expected from other countries.

"Every country in the world wants to send its young people here for training," says Mr. Hanson. "Russia is interested, India is interested—and there is every reason to expect the program to grow. In fact the only limit would appear to be the ability of our economic system to support a program of training people from all over the world."

So far, says Mr. Hanson, there has been no difficulty on this score. American industrial leaders, sharing fully in the viewpoint of government officials, feel it is essential for the country's postwar prosperity that they try to engage on a large scale in foreign trade; and they realize that attainment of this objective will be facilitated by training the men who will have a voice in determining where the various countries will buy their goods and services in the years to come. They are willing, as a rule, to accept all trainees assigned to them, and thus help industrialize the various foreign countries and make them better customers for a vast range of highly developed industrial equipment and materials made in the United States.

As Mr. Hanson puts it, "We must export our industrial experience, and for that purpose I do not believe you can beat the human container. Bring a man from another country to live with us, pack into him a couple of years of on-the-job training in one of our plants, ship him back home with our 'know-how;' when the young man gets back home his tales of 'how they do it in the United States' are more convincing than any of our other attempts, however sincere, to explain the advantages of our equipment and our methods. American manufacturers are fully aware of these facts."

The Chinese training program is significant because that country appears to be on the verge of a vast program of industrialization to be financed largely in the United States. This combination of financing the program in large part, as well as training the engineers and others who will have a large hand in planning and executing it, is regarded in informed quarters as paving the way for a great deal of business between China and the United States in the years to come.

Chinese Industrialization Plans

China's plans embrace large-scale port development, construction of roads and communications, expansion of railroads, construction of plants for producing cement and other raw materials, as well as plants for producing a large variety of consumer goods. One plan, for example, calls for construction of bicycle manufacturing plants at various locations in China. Another calls for construction of iron and steel plants and it is significant that 40 of the Chinese visitors desire training in operation of blast furnaces, open-hearth and electric furnaces and rolling mills.

The directors of the organization in which this training program is centered, the International Training Administration Inc., were chosen because of their connections with government, labor and private business management. They are:

Chairman, Harrison Jones, trustee Committee for Economic Development and chairman, the Coca Cola Co.; William L. Batt, vice chairman of the War Production Board, and president, SKF Industries Inc., Philadelphia; William A. M. Burden, assistant secretary of com-

merce; James B. Carey, secretary-treasurer, Congress of Industrial Organizations; James S. Carson, chairman, education committee, National Foreign Trade Council Inc., and vice president, American & Foreign Power Co. Inc., New York; Julius G. Luhrsen, member, Railroad Retirement Board; Robert J. Lynch, special assistant to United States representative, United Nations Preparatory Commission; Clark H. Minor, chairman, Reconstruction Committee of the National Foreign Trade Council Inc., and president, International General Electric Co. Inc., New York; John C. McClintock, formerly assistant to Nelson A. Rockefeller; Charles P. McCormick, member, board of directors, Chamber of Commerce of the United States, and president, McCormick & Co. Inc., Baltimore; Joseph C. Rovensky, member, executive committee, National Foreign Trade Council Inc., and vice president, the Chase National Bank, New York; Robert J. Watt, international representative, American Federation of Labor; John L. Collyer, vice chairman, Department of Commerce Business Advisory Committee and president, B. F. Goodrich Co.; William P. Witherow, National Association of Manufacturers and president, Blaw-Knox Co.: Elliott S. Hanson.

Among firms and agencies which have participated in the program by training the young visitors from abroad are:

Adams-Millis Corp.; Aeronca Aircraft Corp.; Department of Agriculture; Aircooled Motors Corp.; Albion Malleable Iron Co.; All American Aviation Inc.; Allis-Chalmers Mfg. Co.; American Airlines Inc.; American Cyanamid Co.; American Export Airlines Inc.; American Flyers; American & Foreign Power Co. Inc.; American Gas & Electric Service Corp.; American Locomotive Co.; American Metal Co. Ltd.; American President Lines; American Smelting & Refining Co.; American Sugar Refining Co.; American Telephone & Telegraph Co.; American Tool Works Co.; American Viscose Corp.; American Zinc Co. of Illinois; American Zinc, Lead & Smelting Co.; Anaconda Copper Mining Co.; Armco International Corp.; Armour & Co.; Associated Transport Inc.; Atchison, Topeka & Santa Fe Railway; Atlantic Coast Line; Atlas Imperial Diesel Engine Co.

Baldwin Locomotive Works; Baltimore & Ohio Railroad; Barry-Wehmiller Machinery Co.; Baugh Chemical Co.; Bausch & Lomb Optical Co.; Beech Aircraft Corp.; Bell Telephone Co. of Pennsylvania; Bell Telephone Co. of Ohio; Bendix Aviation Corp.; Black & Veatch; Bos-

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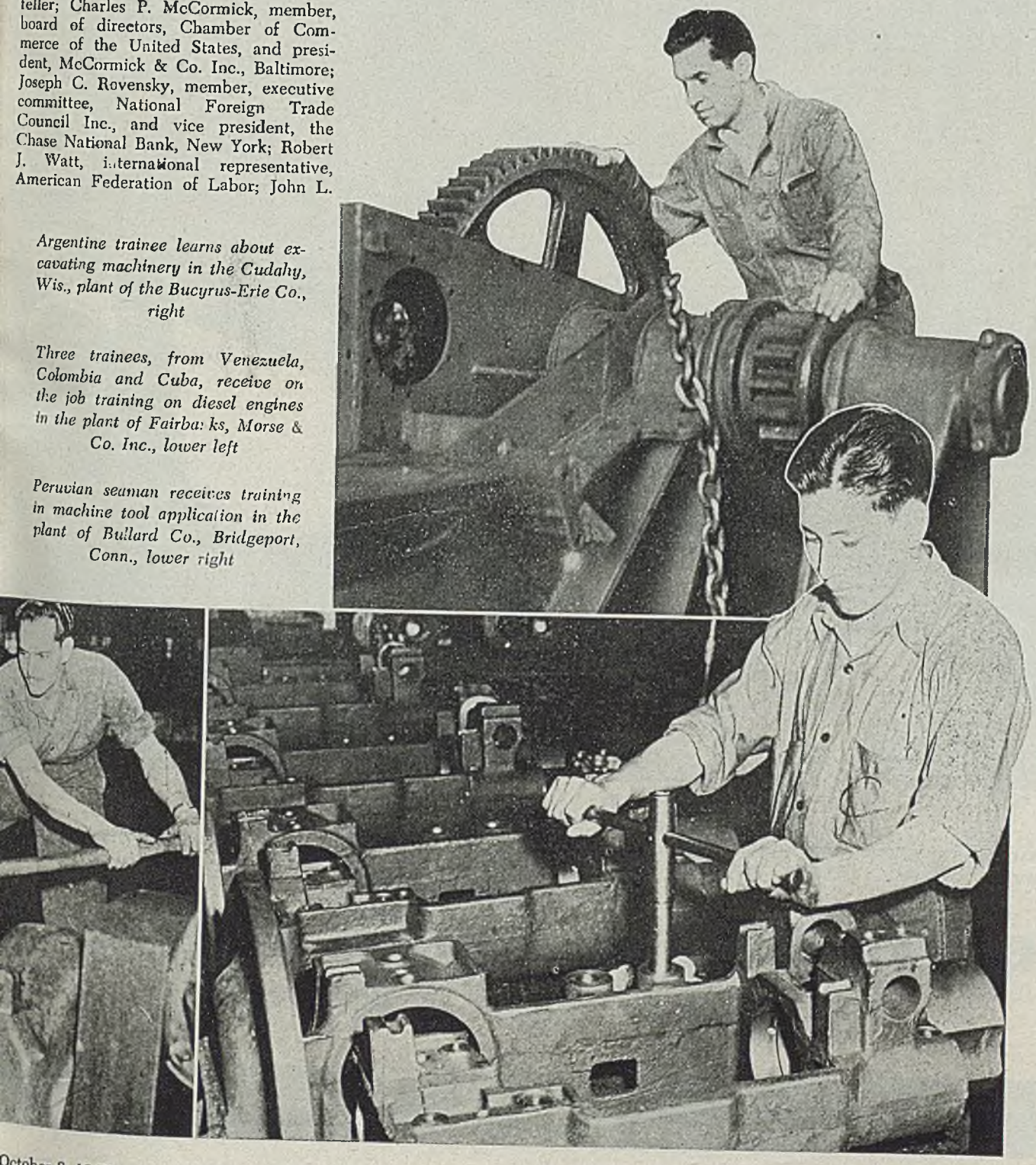


Argentine trainee learns about excavating machinery in the Cudahy, Wis., plant of the Bucyrus-Erie Co., right

Three trainees, from Venezuela, Colombia and Cuba, receive on the job training on diesel engines in the plant of Fairbanks, Morse & Co. Inc., lower left

Peruvian seaman receives training in machine tool application in the plant of Bullard Co., Bridgeport, Conn., lower right

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Ford organization undergoing numerous changes. Harry Bennett relinquishes post as director of administration but continues as a director. John S. Bugas, former G-man, becomes director of industrial relations. Buick and Cadillac unveil 1946 models

HARRY H. BENNETT, bow-tied Svengali of the Ford empire for over a quarter century, appears to have come to the end of his reign in one of the most sweeping personnel shakeups ever to hit the company—and it has had its share of administrative reshufflings. While Bennett has relinquished his post as director of administration, he continues as a director of the company and will act in a consulting capacity unless, as some suspect, he may announce a new venture which would take him away from connections with Ford.

His career with Ford has been one of the most mysterious in industrial annals, made all the more so by the scores of legends which have built up around him since he first became associated with Mr. Ford back in 1918. He has always been the motor magnate's No. 1 deputy, with unquestioned authority to do just about anything Ford asked him. Most of the time he held no official title, and for many years was not even on the company payroll.

Perfected Service Department

In its day, the Ford service department or plant police, organized and directed by Bennett, was one of the most efficient of its kind. Without uniforms, its operatives covered every department of the vast Ford plants and through an ingenious communications system kept in constant touch with Bennett's headquarters. Their brilliance has somewhat dimmed since the unionization of the company in 1941. Personnel of Bennett's staff was a strange assortment of ex-ballplayers, ex-convicts and other "characters" whose allegiance to their chief was of the highest order. Both Mr. Bennett and Mr. Ford have always been strong for giving the underdog and the unfortunate a chance, and Mr. Bennett was the instrument for carrying out the "suggestions" of Mr. Ford.

The full story of Mr. Bennett's career with Ford, assuming it ever could be learned, probably would read like a dime-store thriller. He has been shot at, slugged, nudged off the road in his car and otherwise badgered by mysterious individuals, but he has good-naturedly shrugged off such violence as the playful antics of bad boys.

His departure from Ford, despite the routine tone of the announcement, definitely marks the end of an era at the Rouge. It was not unexpected, for there have been rumors heard of the impending change ever since the time C. E. Sorenson left as production chief.

Full direction of Ford policies has passed from the hands of the elder Ford to his 29-year old grandson who, despite his youth and admitted inexperience, is sweeping through the administrative ranks with all the effectiveness of a new vacuum cleaner. Many officials close to Mr. Bennett over the years are

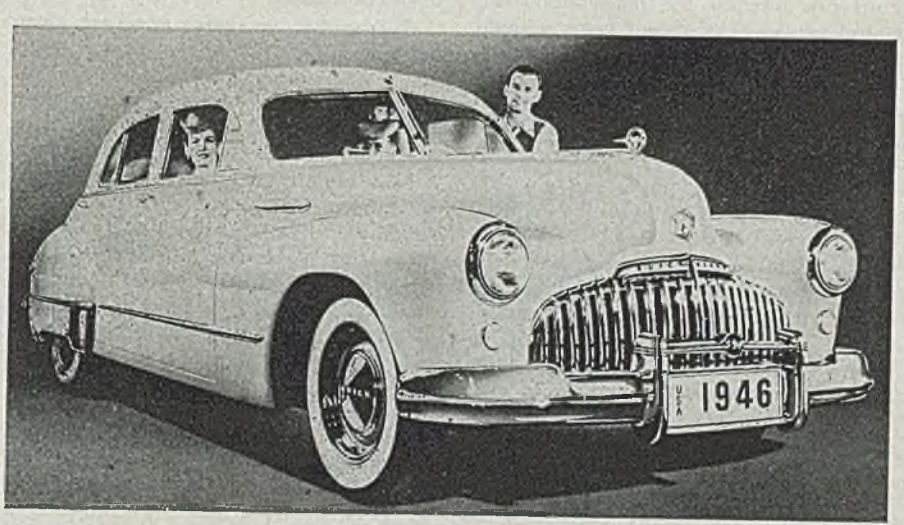
JOHN S. BUGAS

leaving. They include Harry Mack, once head of the Dearborn sales branch of the company, who was transferred to Texas and then resigned; Russell Gnau, for many years secretary to Sorenson and later head of public relations; Stanley Fay, one of Mr. Bennett's principal assistants, and several other lesser lights.

John W. Thompson, once associated with Steve Hanagan and later placed in charge of Ford public relations activity when the account was removed from Hanagan's jurisdiction, has severed his connection with the Ford News Bureau and reportedly is now organizing a new public relations service. He has always been quite close to Mr. Bennett. The news bureau is now nominally in charge of Charles Carll, under supervision of John S. Bugas, 37-year old ex-G-man who was brought into Ford personnel work about 18 months ago. Mr. Bugas apparently is the new Dick Tracy of the Ford organization, being designated as head of industrial relations, a division not previously identified as such. It is understood a new figure is being brought into public relations work for the company in the person of Earl Newsom, an Easterner and college chum of the younger Ford when he was at Yale.

M. L. Bricker is now the top official in both productive and nonproductive manufacturing departments. At one time general manager of the Willow Run bomber plant, he later divided manufacturing responsibility with Ray R. Rausch, the latter now having been assigned to supervision of major construction projects afield and already on his way to the West Coast. Mr. Rausch was popularly supposed to have been a "Bennett man."

Further changes have been effected in engineering departments at Ford under supervision of R. H. McCarroll. Latest addition to the staff is Clyde R. Paton, recently with Packard and prior to that with Studebaker in engineering capacities. He will work with W. S. James, former Studebaker chief engineer, who went with Ford some months ago. Mr. Paton is well known and highly regarded in automotive engineering



Buick introduces its first models for 1946 with production emphasis on the series 50 four-door sedan, now rolling from assembly lines. Mounted on a 124-inch wheelbase chassis its design incorporates full airflow fenders, theft-proof rear wheel shields, restyled radiator grille and bumper assembly and other appearance refinements

Built-in fog lights below main headlamps are a feature of the 1946 Cadillac front end styling. Bumpers have been strengthened and increased in size, while the chrome plated radiator grille has been "opened up" to permit easier cleaning and give better air intake

circles, yet no official mention has been made by Ford of his joining the staff.

J. R. Davis continues in charge of sales and advertising, C. H. Carroll in charge of purchasing, R. I. Roberge, foreign operations, and B. J. Craig and H. L. Moekle, accounting, auditing and finance. They round out a new administrative setup which is essentially young, aggressive and forward-looking in character. Whether a company the size of Ford can weather the major upheavals in top personnel of recent years without a considerable period of consolidation and readjustment remains to be demonstrated. That there may be further repercussions and additional shifts and resignations seems fairly certain.

Three lines of 8-cylinder cars, on 121-in., 124-in., and 129-in. wheelbases, have been announced by Buick and were scheduled to be in production last week in one body style, with the hope for several thousand being assembled this month. Appearance changes center in a new radiator grille, heavier bumpers and bumper guards, elimination of side creases in fenders, and larger parking lights and direction signals. The grille is of interesting design, being stamped from cold-rolled steel and all external surfaces capped with chrome-plated stainless steel.

Engine features an improved finishing method for cylinder bores. After precision boring, a new type of hone is used to finish the bores to receive a lubrite coating—manganese phosphate treatment aimed to provide rapid seating of piston rings together with protection from scuffing during the run-in period. The coating is eliminated from piston rings. Pistons have reverted to aluminum. Carburetor is dual downdraft type instead of the compound units formerly used, requiring redesign of intake manifold. Refinements have been made in the flow of cooling water to give maximum circulation at all points, and the water pump seal ring is now made of carbon.

Overhead valve rocker arms are given the manganese phosphate surface treatment, eliminating the need for copper plating the rocker arm shaft as was done on earlier models. Rocker arm brackets are again of die cast aluminum.

New bumper jack has been developed with the lifting bracket so designed as to straddle the bumper back bar, thereby preventing tendency to slide sidewise when in use. Bumper face plates are mounted in back bars of deeper section to permit use of the bumperjack without encountering excessive deflection. Both front and rear springs are of NE 9260 steel, transmission gears of SAE 1340-A, intake valves SAE 3140, exhaust valves SAE 2112.

Cadillac counts 63 improvements in its 1946 model which was unveiled a couple of weeks ago. In the first full year of production, a goal of 100,000 has been set, or 50 per cent beyond 1941 production. Several million dollars are being spent on plant expansions, including a complete rearrangement and extension of the gray iron foundry. Appearancewise, the car closely patterns its 1942 model counterpart.

All last week and continuing through Oct. 9, Packard is accepting bids on $1 million worth of surplus steel, copper, aluminum and brass, left over from terminated contracts for aircraft engines.

This marks trial of a new method of surplus disposal on the spot, and AAF officers estimate it may save approximately $100,000 by eliminating the necessity for handling the material and preparing it for storage elsewhere, plus future handling by a disposal agency. Complete inventory of all items available makes a list about 2 inches thick, but representative lots include aluminum, brass, and bronze bars, hex and round, various grades of NE and SAE alloy steel square, round and hex bars, carbon and alloy steel bars and strip, cold-drawn seamless steel tubing, aluminum and brass tubing, etc.

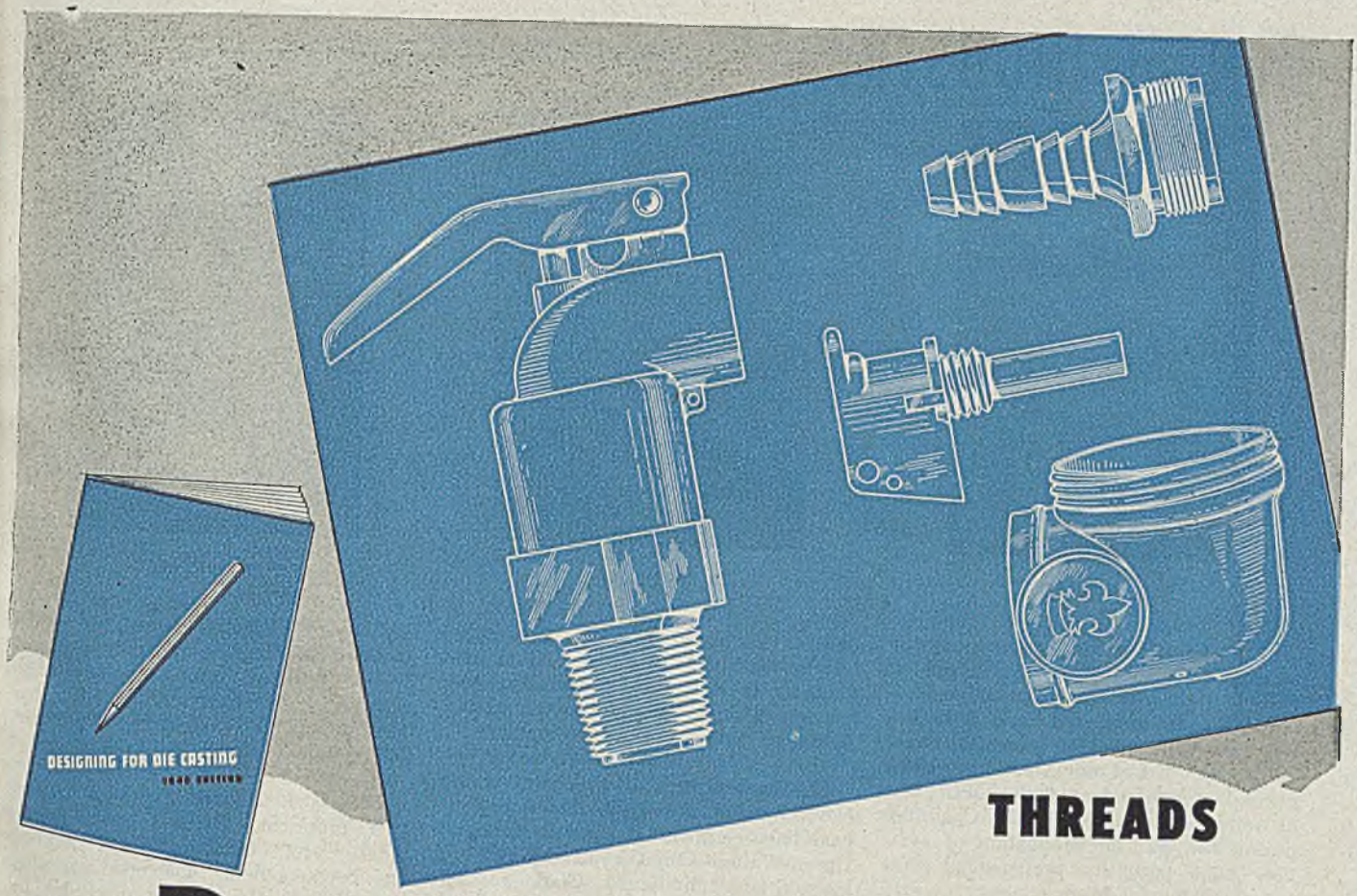
Sales are on a competitive bid basis and must be at least 50 per cent of the market value of the material, all of which is new and in excellent condition. If material is not moved on the initial bids, it will be re-offered with the 50 per cent limitation removed providing buyers can furnish user certificates. Despite being widely advertised in the newspapers, the sale drew only light attendance in its first few days, possibly because of inclement weather, world series baseball interest and other factors.

Packard Announcement Pends

Announcement of 1946 Packard models are expected within the next week to ten days, and some limited production may be possible this month, providing some answer can be found soon for the scores of strikes and production interruptions at suppliers' plants.

There were indications the Kelsey-Hayes strike tieup had been broken at midweek. Employees were asked to return to work Monday and began straggling back in limited numbers, despite picket lines maintained outside the plant by the local union in defiance of orders from international officers. However, settlement of this protracted tieup does not improve the labor outlook appreciably, for many other parts suppliers are running into similar troubles. It is reported 30 different Ford suppliers have been forced to suspend shipments because of labor difficulties. Spicer Mfg. Co. in Toledo is a case in point, where employees walked out demanding 52 hours' pay for 30 hours of work, which would figure approximately a 70 per cent increase in the base wage rate.

Continental Motors Corp. has unfilled orders for more than $110 million worth of engines and parts scheduled for delivery over the next two years, while a majority-owned subsidiary, Wisconsin Motor Corp., has another $17 million of unfilled orders.



DESIGNING FOR DIE CASTING

In designing die castings, *cast* threads should be specified wherever their use reduces cost over that for *cut* threads.

External Threads. It is common practice to cast external threads (see examples above) when they are coarse, or over ¾" pitch diameter, or are located at a die parting. Even Class-2 fits can be held on cast threads. A flash of metal is left on cast threads at the die parting, but this is easily removed by a trimming operation, or by chasing if a truer thread is required. Fine threads should be cut, and threads which are not located at die partings are usually not economical to cast, since the casting must be unscrewed from the die and this slows the casting cycle.

Internal Threads. Cast internal threads are occasionally useful for very steep pitches and, whatever the pitch, the thread can be carried right down to a shoulder or to the bottom of a blind hole. Except for steep pitches and large diameters, however, internal threads are usually obtained at lower cost by tapping. All die castings can be tapped readily, but *zinc alloy die castings can be cored to tapping size*—eliminating drilling or reaming.

This information appears in our booklet "Designing For Die Casting." To insure that you will get the most for your die casting dollar, ask us—or your die casting source—for a copy of this booklet.

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET, NEW YORK 7, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

MEN of INDUSTRY

E. J. BREDESON

F. P. CLARK

T. J. HILLIARD

H. A. Leary, for the past seven years manager of the Chevrolet plant at Muncie, Ind., is retiring from active business life to be succeeded by **E. J. Bredeson**, formerly assistant plant manager at Muncie. **J. L. Coyle**, since July, 1943, general superintendent of the DPC plant at Anderson, Ind., operated by Chevrolet during the war for production of aviation engine parts, has been named plant superintendent at Muncie.

—o—

William C. Phelps, for the past eight years associated with Caspers Tin Plate Co., as sales expeditor, has become vice president, Hafner Mfg. Co., Chicago.

—o—

Col. John Slezak, chief of the Chicago ordnance district, recently was awarded the Legion of Merit with presentation being made in Washington by **Lt. Gen. Levin H. Campbell**, chief of ordnance. The award was made to Col. Slezak for development of a production forecasting control which assisted the general staff in strategic planning of offensive action. When called to active duty in 1942, Col. Slezak was president, Turner Brass Works, Sycamore, Ill.

—o—

William J. Chovanec, formerly a member of the engineering staff, Cleveland Automatic Machine Co., Cleveland, has been named district sales manager, Cincinnati. Mr. Chovanec has been associated with the company for the past 16 years, starting as an apprentice in the machine shop.

—o—

Robert W. Burnham, previously factory manager, Ransom & Randolph Co., Toledo, O., has been named factory manager, Kaydon Engineering Corp., Muskegon, Mich. **Maurice Jensen** has been named general superintendent. He formerly was with Bantam Bearings Division, Torrington Co., South Bend, Ind., where for 12 years he was superintendent of its grinding department.

—o—

Walter P. Schwarm, general sales manager, Milcor Steel Co., Milwaukee, subsidiary of Inland Steel Co., was elected vice president in charge of sales. Succeeding Mr. Schwarm as general sales manager is **Robert S. Schmieder**, who has served since 1939 as manager of the Baltimore branch of the company.

—o—

Lt. Franklin P. Clark, recently of the Navy Bureau of Supplies & Accounts, has been appointed sales manager, Upson-Walton Co., Cleveland. Prior to his wartime activity, Lt. Clark was associated with Jones & Laughlin Steel Corp., Pittsburgh, and he also has been associated with Wickwire Spencer Steel Co., New York.

—o—

Robert E. O'Brien has become a member of the Pittsburgh sales organization, Heppenstall Co., Pittsburgh. Since 1930, Mr. O'Brien has been employed in operational capacities for both Bethlehem Steel Co. and Jones & Laughlin Steel Corp.

—o—

U. R. Jaeger has been appointed sales engineer, New York district, Aluminum Industries Inc., Cincinnati.

—o—

G. A. England has been appointed manager, foundry sales, American Car & Foundry Co., New York. He will make his headquarters in New York.

—o—

George F. Goodyear, Buffalo patent attorney, has joined the executive staff, Hewitt Rubber Corp., Buffalo, where he will serve as assistant secretary. Mr. Goodyear will head the company's legal department and that of its subsidiary company, Robins Conveyors Inc., Passaic, N. J.

—o—

John C. Smith, formerly manager of manufacturing, Westinghouse Electric Corp.'s Naval Ordnance plant, Canton, O., has been named works manager of the company's Center Line, Mich., Naval Ordnance plant. **William G. Miller** succeeds Mr. Smith as manager at the Canton, O. works. **Fred W. Pascoe**, assistant superintendent, foundry, and **Willis Pennow**, section engineer, marine and aviation lighting section engineering department, Cleveland works, have been awarded Westinghouse's Order of Merit. **W. S. Lefebre**, former western sales manager, Philco Corp., Philadelphia, has been appointed assistant sales manager, Westinghouse Home Radio Division.

—o—

Thomas J. Hilliard has been elected vice president, sales, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Hilliard has been general manager of sales since 1938. He will be succeeded by **J. Douglas Darby**, manager of sales in Philadelphia since 1939. **A. Paul Selby** has been named assistant general manager of sales, and **Wesley C. Bobbitt**, manager of sales in Philadelphia.

—o—

P. D. DeLeo has been appointed development engineer; **I. A. Crawford**, research engineer; and **E. Y. Bunting**, machine design engineer, Progressive Welder Co., Detroit. Mr. DeLeo previously was associated with Federal Machine & Welder Co., Warren, O., as design and development engineer. Mr. Crawford recently was manufacturing engineer with Westinghouse Electric Corp., Pittsburgh, and Mr. Bunting was for more than nine year designing and welding engineer, Federal Machine & Welder Co.

—o—

E. Eugene Adams, pioneer designer of lightweight streamline trains and veteran of 40 years' railroad service, has retired as vice president in charge of transportation research, Pullman Inc., and the Pullman Co., Chicago.

—o—

C. B. Cole, Chicago, has been named sales representative for the Chicago and Wisconsin territory, Acromatic Tool Co., Detroit; **Ernest W. Nelson**, Syracuse, is sales representative for Syracuse, Rochester and Buffalo, N. Y.; and **J. W. Billett**, Lynwood, Calif., sales representative, southern California.

—o—

C. E. Westover, formerly with Grede Foundries, Milwaukee, and his son, **Jeffrey A.**, have formed the firm of Westover Engineers, Milwaukee. The new

company has been organized to serve the foundry industry on cost control, occupational and job evaluation and wage incentive problems.

—o—

W. A. Elliott has been elected president, Elliott Co., Jeannette, Pa. His previous position was executive vice president. **Grant B. Shipley**, who remains as chairman, previously served also as president. **F. H. Stohr** was elected executive vice president and **F. W. Dohring**, formerly general sales manager, was elected vice president in charge of sales. Other executive officers include: **R. W. Owens**, vice president in charge of manufacturing; **R. B. Smith**, vice president in charge of engineering; **Dundas Peacock**, controller; and **M. G. Shevchik**, secretary and treasurer.

—o—

J. H. Heintz, sales and construction engineer, has been appointed general sales manager, C. S. Johnson Co., Champaign, Ill.

—o—

John Lauritsen, affiliated for 20 years in various capacities with the New York sales office, Republic Steel Corp., has been appointed general manager, J. B. Kendall Co., Washington, distributor of iron and steel, mill supplies and builders hardware.

—o—

L. B. Keplinger has resigned as vice president and director, Rheem Mfg. Co., New York, to assume duties as president and general manager, Steel Shipping Container Institute Inc., New York.

—o—

Miss G. D. Kile has been named advertising manager, Vanadium Corp. of America, New York.

—o—

Lou R. Crandall has been elected to the board of directors, Curtiss-Wright Corp., New York. He succeeds the late Charles W. Loos. Mr Crandall is president, George A. Fuller Co., New York.

—o—

Robert B. McColl has been elected executive vice president, American Locomotive Co., New York. Mr. McColl is succeeded as vice president in charge of manufacturing by **W. L. Lentz**, Schenectady, who directed the company's tank and locomotive manufacturing program there during the past five years.

—o—

T. F. Dorsey has been appointed general manager, Fort Pitt Division, Pittsburgh Steel Foundry Corp., Glassport, Pa.

—o—

Charles F. Kells, formerly on the industrial engineering staff, West Penn Power Co., has taken over the management of the new postwar educational program of the Electric Industrial Truck Association, and will make his headquarters in Pittsburgh.

—o—

Samuel H. Coddington, formerly general superintendent, Cuyahoga

W. N. RAND

Stamping Co., Cleveland, recently was appointed Detroit representative, Sol H. Freidman Co. Mr. Coddington has been associated with the sheet and strip steel industry in Ohio for the past 23 years.

—o—

William N. Rand has been elected president, Monsanto Chemical Co., St. Louis, succeeding **Charles Belknap**, who continues with the company as chairman of its executive committee. For past eight years, Mr. Rand has been a vice president and since November, 1943, has been a member of the executive committee.

—o—

David F. Austin has been elected vice president, sales, United States Steel Corp. of Delaware, Pittsburgh. Mr. Austin has been acting vice president since June, during which time he continued in a similar position with Carnegie-Illinois Steel Corp.

—o—

M. M. Mautner has been appointed vice president in charge of industrial relations, Plomb Tool Co., Los Angeles.

—o—

Albert E. Baak, formerly associated with Minneapolis-Honeywell Regulator Co., Minneapolis, has been named executive director, Controls Division, Paul Henry Co., Los Angeles.

—o—

Mahlon A. Combs has been appointed assistant secretary, Industrial & Commercial Gas Section, American Gas Association, New York.

—o—

Walter N. Fischer has been named to the newly created postion of assistant to the general sales manager, R. G. LeTourneau Inc., Peoria, Ill.

—o—

James E. Thoms, previously sales manager, Peerless Machine Co., Racine, Wis., has been appointed vice president in charge of sales and general administration.

—o—

J. L. Geddes, eastern credit manager, Caterpillar Tractor Co., Peoria, Ill., has been transferred to the Governental Sales

C. W. KING

Division. **Robert E. Haungs**, recently returned from 32 months' service with the armed forces, replaces Mr. Geddes. **Warren Kinsey**, former personnel director, has been appointed assistant director of industrial relations. Mr. Kinsey has been in charge of industrial relations at Caterpillar Military Engine Co., a subsidiary, since 1942.

—o—

Clark W. King has been named executive assistant, Allegheny Ludlum Steel Corp., Brackenridge, Pa. Mr. King joins Allegheny Ludlum after more than four years' service with the Steel Division, War Production Board, Washington. **Walter R. Breeler** has succeeded Charles Spittall, retired, as general manager of the company's Dunkirk, N. Y. plant. Mr. Breeler formerly was assistant general manager, and has been with the Dunkirk plant since 1926.

—o—

H. W. Nagel has been appointed manager, Chicago sales district, Edison General Electric Appliance Co. Inc., Chicago. He succeeds **L. E. Buxton.**

—o—

R. M. Simpson has been named sales representative for the Chicago territory, Columbia Chemical Division, Pittsburgh Plate Glass Co. **Gordon E. P. Wright** and **Paul A. Ketchum** have been appointed assistant general managers of branches of the company.

—o—

Joseph N. Banky, electrical engineer, Allis-Chalmers Mfg. Co., Milwaukee, was named winner of a graduate fellowship provided by the company for a year's study at Illinois Institute of Technology, Chicago.

—o—

A. J. Bartlett, with the company since 1935, has been placed in charge of the sale of industrial engines to original equipment manufacturers, Le Roi Co., Milwaukee.

—o—

Dr. E. N. Kemler, formerly of Purdue University, Lafayette, Ind., will head the Engineering Research Division, Southern Research Institute, Birmingham. New

ARNOLD G. BROWN

Who has been named manager, Pump Division, Fairbanks, Morse & Co., Chicago, as noted in STEEL, Oct. 1 issue, p. 96.

WILLIAM C. SIMPSON

Who has been appointed manager of sales, Lukenweld Inc., Coatesville, Pa., and noted in STEEL, Oct. 1 issue, p. 96.

OLIVER E. NELSON

Who is general manager of the newly established Export Division, Olin Industries, Inc., noted in STEEL, Oct. 1 issue, p. 98.

additions to the research staff include: Maxine Brogden, Ann E. Perryman, Dr. Fred W. Cox Jr., and William W. Austin Jr.

—o—

Thomas W. Benton has been appointed manager, New Orleans district office, Tennessee Coal, Iron & Railroad Co., Birmingham.

—o—

B. A. Gillies, vice president in charge of operations, Ryan Aeronautical Co., San Diego, Calif., has resigned.

—o—

Harold C. Norman has been promoted to general manager, Hein-Werner Motor Parts Corp., Waukesha, Wis.

—o—

K. L. Clark has become associated with the Detroit Gray Iron Foundry Co., Detroit, and is in charge of cast to shape, air hardening tool steel sales. For the past 16 years Mr. Clark has been connected with the Forging & Casting Division, Ferndale, Mich., Allegheny Ludlum Steel Corp.

—o—

John H. Frye has been appointed general manager of sales, Columbia Steel & Shafting Co., Pittsburgh. Mr. Frye has been associated with the company since 1927 and for the past five years has been on leave of absence, serving as colonel of ordnance, United States Army. **R. H. Shirk** and **Harry B. Reno Jr.** will assist Mr. Frye as assistant general managers of sales.

—o—

Frederick L. Warnke has been named assistant controller, United States Steel Supply Co., Chicago.

—o—

Guy J. Coffey has been elected vice president in charge of sales, Chicago Pneumatic Tool Co., New York. Mr. Coffey joined the company in Philadelphia in 1933.

—o—

Howard A. Knox has joined Jones & Laughlin Steel Corp., Pittsburgh, as assistant manager of sales, Tin Plate Division. He formerly was assistant manager of sales in the tin plate department, Carnegie-Illinois Steel Corp.

—o—

W. King White has resigned as vice president, Oliver Corp., Chicago, but will remain a director. Mr. White was president, Cleveland Tractor Co., Cleveland, until that company was merged with the Oliver organization last year.

—o—

Ironton Fire Brick Co., Ironton, O., has appointed the following sales representatives: **Earl A. Swenson**, Ohio-Virginia territory; **N. G. Phelps**, San Jose, Calif., California; and **Carl F. Miller** & Co. Inc., Washington and Oregon. Pennsylvania Foundry Supply & Sand Co. will represent the company in southeastern Pennsylvania, Delaware and New Jersey.

—o—

Richard F. Sentner, for the past three years a member of the War Production Board, Washington, has returned to Wheeling Steel Corp., Wheeling, W. Va. He has been appointed an assistant general sales manager. Prior to his service in Washington, Mr. Sentner had been manager, Tin Plate Sales Division. Leslie Irvine has been appointed to succeed him in that position.

—o—

Roy A. Bass recently was apppointed director of distribution, Dresser Industries Inc., Cleveland. Before assuming his present duties, Mr. Bass was Buffalo district sales manager, Ross Heater & Mfg. Co. Inc., Buffalo, with whom he was associated for 11 years.

—o—

C. H. Schiller has been appointed manager, market research and sales analysis, American Steel & Wire Co., Cleveland. **H. M. Ridlon** has been named assistant manager of the same division and **A. W. Ruttkamp**, formerly manager, has been assigned special duties for the general manager of sales.

OBITUARIES . . .

Charles H. Apps, 83, estimation engineer, American Locomotive Co., New York, died Sept. 29 at his home at East Orange, N. J. Mr. Apps was the inventor of an oiling system which is standard on locomotives built by that company.

—o—

Eckley B. C. Goyne, 57, for many years a sales executive, Bethlehem Steel Co., Bethlehem, Pa., died recently at his home in Chester, Va. Mr. Goyne had served in the Bethlehem, Pa., Louisville, Ky., and Cincinnati offices of the company.

—o—

Meyer Shubinsky, 62, owner, Standard Metal Co., Milwaukee, died Sept. 24 at his home in that city.

—o—

Eric A. Lindquist, 61, engineer and designer, Perfection Stove Co., Cleveland, died recently in that city.

—o—

Arthur E. Winter, 69, in recent years a member of the Commodity Credit Corp. and Foreign Economic Administration, died recently in Greenwich, Conn. Mr. Winter with his father headed Winter & Smillie, New York, importers and exporters of metals and other commodities. In 1919 he resigned to form the firm of Winter, Ross & Co., which went out of business in 1927.

—o—

William Ernest Brymer, 61, manager, Royal Metal Co., Toronto, Ont., died recently in that city. He had been manager of the company for the past seven years.

Industrial Outlook Considered Promising in Pacific Northwest

Cancellation of war contracts and resulting labor terminations have not resulted in a great surplus of unemployed. Pacific Car & Foundry re-enters car building and repair field. Some industries in area still report a shortage of competent workers

SEATTLE

INDUSTRIAL outlook in this area is promising although currently logging and lumber cutting operators are having trouble with labor. Cancellation of war contracts and consequent heavy labor terminations have not resulted in a great surplus of unemployed. Some industries still report a shortage of competent workers.

Boeing Aircraft is gradually taking back former employees as a postwar program is developed. This company has designed several types of commercial airplanes, two engined, which it is expected will be thoroughly adapted to the needs of air travel and light cargo transportation. It is announced that active solicitation for new business will be inaugurated and, for the immediate future at least, aircraft will be the principal output of the Seattle and Renton plants.

Pacific Car & Foundry Co. has a contract in excess of $1,000,000 for repairs on 500 cars of Western Fruit Express Co., in which work it specialized before the war. The company is actively re-entering the car building and repair field. Additional awards for similar work are reported pending.

Generator Contracts Revitalized

Reclamation Bureau announces that contracts held in abeyance during the emergency have been revitalized for three new generators of 108,000 kw each and other equipment for Grand Coulee dam. This work will complete the west bank power house giving it a total capacity of 992,000 kws. The three generators will be built by Westinghouse, the governors by Woodward Governor Co., Rockford, Ill, and the 150,000 hp turbine by Newport News Shipbuilding & Dry Dock Co., Newport News, Va. The power house now has six 108,000 kw generators, two of 75,000 kw capacity and two service units of 10,000 kw each. The latter were installed temporarily and will be returned to Shasta dam, in California. The east power house is still awaiting installation of turbine and generator equipment.

From Vancouver, B. C., comes the report that six steel ship hulls, costing $12 million, are being scrapped at three shipyards. Each hull contains about 1500 tons of steel. Two of the vessels were within two weeks of launching.

Work on five ship hulls at Oregon Shipbuilding Corp.'s yard, Portland, may be resumed following suspension of construction after the fire of Aug. 30. Alcoa is reported interested in the vessels for use as ore carriers. Three others will be completed for the Maritime Commission.

Jump in Farm Demand for Electric Equipment Seen

Rural demand for a large variety of electrical equipment and appliances will take another sharp jump as a result of electrification work to be launched in the fiscal year 1945-1946. All the funds at the disposal of the Rural Electrification Administration up to July 1, 1946—$509 million—have been or are being earmarked for such programs. In the past farmers and other rural residents have spent for electrical goods about three times the outlay for current distribution, so that the present year's construction program will create a new market of close to $1 billion.

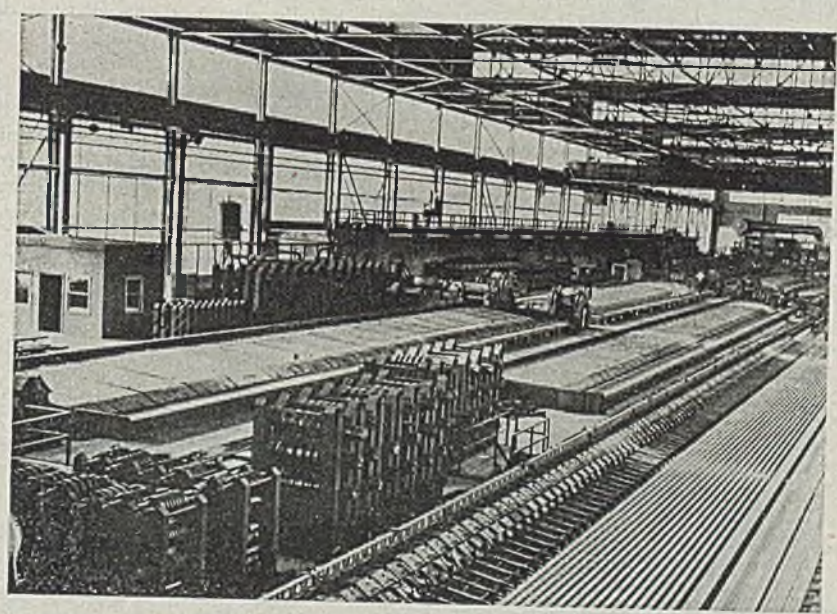
FEA officials estimate that about 49 per cent of farms and rural residences now are served with electricity. The REA program as now set up should increase this to about 58 per cent by June 30, 1948. To make this possible, Congress will have to appropriate an additional $379 million. In addition, public utilities will resume their normal custom of extending their lines to serve outlying areas. Hence it is likely that some 65 per cent of all farms and rural residences will have been electrified by the middle of 1948.

Rural electrification also will give a boost to demand for electrically-operated industrial equipment for manufacturing plants that will locate in such areas to enjoy low tax rates and mesh into the economy by employing farmers and farmers' helpers during off seasons. A marked trend in this direction is expected to develop as increasing numbers of war veterans are discharged.

The REA, incidentally, which was shifted to St. Louis for the period of the war, again will be occupying its old quarters in Washington by the end of 1945.

Consumption of Zinc Scrap Drops 8 Per Cent

Activity in secondary zinc, which reached record proportions in June, diminished in July when scrap consumption dropped 8 per cent to 17,105 tons, U. S. Bureau of Mines said.



FONTANA MERCHANT MILL: General view in the merchant mill at Fontana, Calif., steel plant of the Kaiser Co. Inc. In foreground is a 10-inch cooling bed. Slabs are taken from the furnace in the far background, then rolled through eight mills before coming onto the Nos. 9 and 10 mills in the approximate center of photo. In the center background, surmounted by catwalk, is the merchant mill motor room. Photo by Westinghouse

WING TIPS

Airlines' passenger-carrying capacity will be increased fivefold when planes on order are delivered. Many more communities will be served for air transportation, when pending applications for new stops are granted by Civil Aeronautics Board

UNITED States airlines soon will have three times as many planes as last year and five times the seating capacity. These ships will be capable of increasing their cruising speed from their present average 180 miles an hour to more than 250, according to William A. M. Burden, assistant secretary of commerce.

What the air carriers are setting up for the near future is revealed in a survey by the Air Transport Association of America of the current plans of the 19 airlines, domestic and overseas.

The airlines have on actual order or on option to buy 409 new planes with a seating capacity of 23,275 passengers, Mr. Burden says. This will bring the fleet to 975 planes, capable of carrying 36,180 passengers. This fleet would be amply capable of operating 6 to 8 billion passenger miles annually, which traffic studies have indicated may well be the demand from an unhampered flow of traffic.

The expanded airline fleet is intended to reach out to many new terminals both in this country and abroad and to inaugurate routes hitherto unavailable to civilian transport. It also will provide more service between existing stops.

The United States now has 382 regularly scheduled airline stops; 554 applications are pending before the Civil Aeronautics Board for domestic certificates which would provide approximately 700 new stops. The enlarged network would cover about 800,000 route miles, compared with the present total of 65,000. However, the board has indicated it will go slow in granting applications, possibly allowing numerous trial services for observation as to how they work out under conditions which are now hard to predict.

A hundred pending overseas applications would add 635,000 miles to the prewar total of 80,000 which was stretched to 200,000 miles of air transport network for the Army and Navy during the war. CAB believes, however, the postwar figure should be held to about 140,000 miles.

Current purchasing plans of the domestic airlines will give them a fleet of 736 planes. The tremendous potential volume of air travel which the company executives visualize in ordering such a fleet can be realized by comparison to the all-time record in passenger and cargo carried last year by their fleet which had been greatly depleted by Army and Navy purchase or lease of practically half their ships in 1942.

For the whole year 1944 the airline fleet averaged only 250 planes with a seating capacity of about 4500 passengers. Yet with increased efficiency of operations, the 16 domestic airlines carried the all-time high of 4,668,330 passengers for a distance of 2,264,282,443 passenger miles. Pound mileage of air mail and air express also reached new highs—101,650,404,000 and 34,188,058,000, respectively.

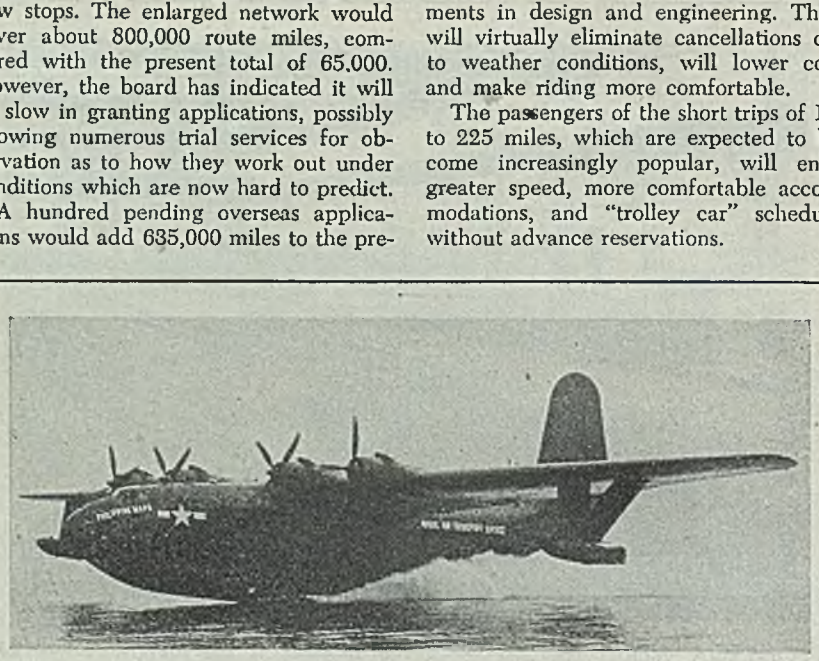
The new planes will range in size from models smaller than those now in trunkline use to 320,000-pound craft carrying 204 passengers at cruising speeds of 340 miles an hour. More than 200 of the planes on order are 4-engine craft. They incorporate many of the wartime improvements in design and engineering. These will virtually eliminate cancellations due to weather conditions, will lower costs and make riding more comfortable.

The passengers of the short trips of 125 to 225 miles, which are expected to become increasingly popular, will enjoy greater speed, more comfortable accommodations, and "trolley car" schedules without advance reservations.

The passengers on longer flights will find planes more commodious, faster and flying on more frequent schedules.

For overnight hops, there will be offered combinations of staterooms, berths and reclining seats.

The new planes will have greatly enlarged compartments for cargo, including express and mail, anticipating the time when all first-class mail will go by air.



NEW MARS: Second of the giant Mars flying boats which the Glenn L. Martin Co. is building for the Navy makes her first engineering test flight. The new ship is designated the *Phillipine Mars*. It is a sister ship of the *Hawaii Mars* which sank in the Chesapeake Bay after a rough landing Aug. 5

Martin Introduces New Passenger-Cargo Plane

A new passenger-cargo transport plane, specifically designed for use by airlines on routes where passengers are not always at a maximum and where smaller landing fields are a part of a "short-trip" system, has been announced by officials of the Glenn L. Martin Co., Baltimore. The new ship has been designated Model 228.

In many respects a "little brother" of the Model 202 which was announced by the Martin organization several months ago, the Model 228 has a passenger capacity of 26—the larger ship has a maximum of 42—and a weight of 28,500 pounds as compared to the 34,300 pounds for the 202. The fuselage measures 68 feet, 8 inches, which is 3 feet, 3 inches shorter than the Model 202.

Original Makers Asked To Be RFC Surplus Agents

Original manufacturers and distributors of aircraft parts, components and miscellaneous equipment which have been declared surplus, are being invited to act as RFC agents in the sale of this material, the Reconstruction Finance Corp. announced last week.

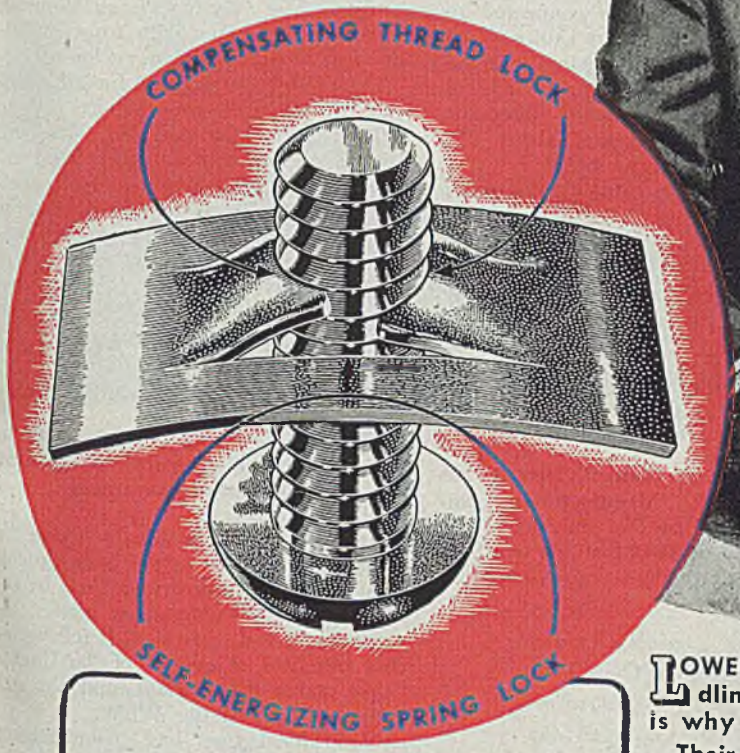
Under a newly adopted "fixed-price" agreement form, these companies may sell surplus aviation equipment for the RFC on a consignment basis and deduct a 40 per cent service fee. This fee is to cover all normal expenses such as receiving, inspecting, warehousing, selling, administrative, and overhead. Additional reimbursement may be allowed for any special work specifically authorized by the RFC.

RFC Asks Bids on 19,000 Surplus Aircraft Engines

The Reconstruction Finance Corp. will ask for bids on 19,000 surplus aircraft engines of a great variety of sizes, types and horsepower, during the 45 day period from Oct. 1, through Nov. 14. Sample engines will be on display at 16 RFC sales-storage depots, and at the Army Specialized Depot, South Bend, Ind.

This offering will be in the nature of a market test to determine the extent of the future market for surplus engines, and also to determine what sizes and types will be in demand.

WHY SPEED NUTS ARE FIRST WITH *Purchasing Agents*



NOTHING LOCKS LIKE A SPEED NUT

Only SPEED NUTS provide a COMPENSATING thread lock and a SELF-ENERGIZING spring lock. As the screw is tightened the two arched prongs move inward to lock against the root of the screw thread. These free-acting prongs COMPENSATE for tolerance variations. Compression of the arch in prongs and base creates a SELF-ENERGIZING spring lock. These two forces combine to definitely prevent vibration loosening.

LOWER COSTS . . . reduced inventories . . . fewer handling problems . . . availability . . . in a few words, here is why Purchasing Agents prefer SPEED NUT fasteners.

Their initial cost, in many cases, is less than ordinary fasteners. Then, when you add in the savings in assembly time and reduction in number of parts brought about through the use of SPEED NUTS, total net assembly costs really take a tumble.

SPEED NUTS keep inventories down, too, because they completely do away with washers, and often eliminate many other assembly parts as well. This, of course, means quick inventory turnover and savings in the handling and dispersing of parts in stock.

Finally, Purchasing Agents have learned that Tinnerman service is dependable. Unlimited production and service facilities assure the utmost cooperation in getting SPEED NUTS on their way to you . . . on time. Investigation will prove that SPEED NUTS should be YOUR first choice, too. Write for information today.

TINNERMAN PRODUCTS, INC., 2039 Fulton Road, Cleveland 13, Ohio

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In France: Aerocessoires Simmonds, S. A., Paris

In England: Simmonds Aerocessories, Ltd., London
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne

Speed Nuts PATENTED *Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS . . . OVER 3000 SHAPES AND SIZES

System for Landing and Launching Light Planes from Suspended Cable Perfected

A PORTABLE rig for landing and launching light airplanes from a suspended steel cable, either on land or at sea and known as the "Brodie System," has been perfected for operational use by the Air Technical Service Command, Wright Field, O.

Through this ingenious arrangement —conceived three years ago but only developed to a production stage in recent months—landing gear of the Army's "grasshopper" fleet need never touch the ground except for refueling, overhauling or parking.

Since it may be parachuted to and set up in well-advanced positions in the desert, mountains, jungles or marshes, the apparatus greatly increases the usefulness of liaison planes. Modifications permit its use at sea aboard cargo or landing ships.

The Brodie apparatus consists of a loop suspended from a taut, horizontal cable. A light plane snags the loop with an overhead hook, and a friction brake gradually halts it as the plane rolls down the cable.

The landing sling offers a 6-foot target of three nylon loops, any one of which may be engaged for a successful landing. But for take-offs, only a short length of nylon and a stirrup are used. From its pendulum perch, 60 feet up, the plane begins to move after the engine is "revved" sufficiently. When flying speed is obtained, the pilot yanks a lanyard, which releases the plane from the stirrup.

An emergency release functions if the plane has not been released from the take-off sling and trolley before the end of the cableway is reached. This release allows the plane to fly free, carrying the take-off sling.

The main cable upon which the plane lands and takes off is supported by four 65-foot masts, constructed of plywood tubing coupled with 24-inch steel split sheaves. The masts are connected to the main cable by secondary cables which form the arms of a "Y," leaving the main cable ends open to the approach of landing planes from either direction. "Deadmen" in the ground about 230 feet away anchor the masts.

Davits at the main cable's end support the hooker who rigs the sling and connects or disconnects the plane hook and trolley. Plane lift-derricks provide a means of lowering or lifting planes to the cable.

Air Technical Service Command test pilot lands an observation plane on the ATSC equipment laboratory's "Brodie System," a hook which brings the plane to a halt as it slides along a suspended cable. The plane takes off with equal ease from this suspended cable. Device is designed to use where construction of landing strips is not feasible. NEA photo

Central Aircraft Council Winds Up Its Affairs

Central Aircraft Council, Detroit, has been disbanded. Manufacturing companies embraced by the council had delivered a total of $14.74 billion worth of planes, aircraft engines and aviation instruments to the armed forces at the time of the Japanese surrender.

Geographic area of this wartime production team's responsibility extended from the Canadian border to the Gulf of Mexico and was bounded on the west by the Mississippi river, with a line running due south from Buffalo serving as its eastern limit. Members included a varied array of industries within that area.

All American To Offer New Lightweight Plane

All American Aircraft Inc., Long Beach, Calif., is entering a new personal owner airplane, the "Ensign," on the market, available to private flyers in December. The "Ensign" is an all-metal, 85-horsepower plane with tricycle landing gear and full vision enclosure.

The production program for All American Aircraft, calls for building 1000 to 5000 "Ensigns" during 1946. Mass production methods, keynoted by latest automotive practices, combined with manufacturing experience gained during the war, will be utilized in the quantity production of aircraft to fulfill demands of the private flyer.

Aviation Corp. To Acquire Farm Implement Company

The Aviation Corp. has contracted to purchase controlling interest in New Idea Inc., manufacturer of farm machinery and implements.

Acquisition of New Idea will give the company a position in the basic agricultural implement industry and will be another step in its program of postwar diversification and expansion. It follows recent purchase of control of the Crosley Corp., maker of household appliances and owner of Radio Station WLW.

New Idea Inc. has manufacturing plants at Coldwater, O., and Sandwich, Ill., and warehousing properties in other eastern and midwestern points.

Aviation Corp.'s present manufacturing divisions and associated companies include broad interests in aviation, shipbuilding, radios, refrigerators and other household appliances, automobile bodies, kitchen equipment, radio broadcasting, and electronics.

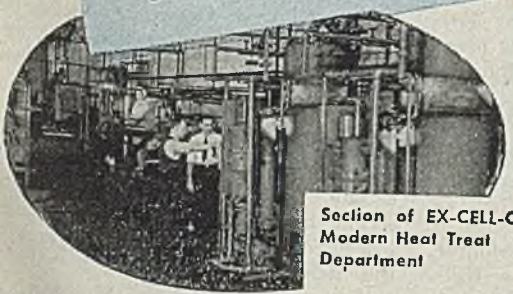
New Fighter Powered with Two Propulsion Systems

A plane powered with two propulsion systems—a General Electric thermal jet engine in the rear and a Wright Cyclone radial engine in the front—built by Ryan Aeronautical Co., San Diego, Calif., for the Navy was announced last week.

By use of two propulsion systems, the plane is able to give efficient performance at high speeds where jet works best as well as at the lower speed where a reciprocating engine is more efficient.

Worried About Tomorrow's Production?

Find Out Today about EX-CELL-O'S Complete Facilities for Manufacturing Parts and Sub-Assemblies



Section of EX-CELL-O Modern Heat Treat Department

Leadership in developing advanced manufacturing methods . . . long years of engineering experience . . . modern and complete facilities . . . that have given Ex-Cell-O an outstanding record in production for war—*all these can help you solve the problem of mass production of accurate parts and sub-assemblies for your new or redesigned products.* Ex-Cell-O, with machining, heat-treating, grinding and assembling and inspection facilities *all under one management,* offers you many practical advantages. Send your print or part or sketch to Ex-Cell-O in Detroit today, or get in touch with any member of Ex-Cell-O's field engineering staff in 32 of the leading industrial centers in the United States and Canada.

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EX-CELL-O's Precision Production Parts *facilities:*

PRODUCTION ENGINEERING

The Ex-Cell-O organization, with skill, facilities and modern methods that have made a wartime record, can make an important contribution in the planning of quantity production of quality parts and unit assemblies for your postwar product.

PRODUCTION MACHINES

- Multiple Vertical Turret Lathes
- Multiple Spindle Automatic Screw Machines
- Single Spindle Automatic Screw Machines
- Hand Screw Machines
- Engine Lathes
- Centerless O.D. Grinders
- Centerless I.D. Grinders
- Single and Multiple Spindle Drilling Equipment
- Form Grinding Machines
- Plain O.D. Grinders
- Plain I.D. Grinders
- Surface Grinders (Plain and Rotary)
- Milling Machines
- Thread Milling Machines
- Broaching Machines (Vertical and Horizontal)
- Precision Thread Grinders
- Thread Rolling Machines
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- Lapping Machines
- Special High Production Equipment

HEAT TREAT

- Induction Heat Treating
- Laboratory for Heat Treat Control Including Micro Examination and Photography
- Atmosphere Control Continuous Hardening Furnaces
- Atmosphere Control Box Hardening Furnaces
- Various Types of Air-Draw Batch Type Furnaces
- Gas Carburize Furnaces
- Box Carburize Furnaces
- Pack Anneal Furnaces
- Nitriding Furnaces
- Cyanide, Lead, and Neutral Salt Pot Furnaces
- High Speed Steel Atmosphere Control
- Vertical and Horizontal Hardening Furnaces
- Continuous Air-Draw Furnaces
- Sub-Zero Heat Treating Equipment

UNIT ASSEMBLIES

For many years Ex-Cell-O has supplied large and small manufacturers with parts and has also supplied many parts in unit assemblies after machining, heat treating and grinding.

INSPECTION

Ex-Cell-O has always maintained that quality in a product is not the result of accident; that quality is built into a product by rigid adherence to accepted quality standards . . . standards that are upheld at Ex-Cell-O by efficient inspection at every step of the machining process.

45-96

Plant Purchase Announced by Steel Foundry

Fort Pitt Steel Casting Co., McKeesport, Pa., to operate as a division of Pittsburgh Steel Foundry Corp.

PITTSBURGH Steel Foundry Corp., Glassport, Pa., has purchased the plant and equipment of Fort Pitt Steel Casting Co., McKeesport, Pa.

The McKeesport firm will be operated as Fort Pitt Division of Pittsburgh Steel Foundry Corp., with T. F. Dorsey as general manager of the division.

With the acquisition, Pittsburgh Steel Foundry Corp. can produce steel castings from 1 lb to 100,000 lb in weight, with melting facilities for carbon and alloy steels.

G. D. Thompson, president, Pittsburgh Steel Foundry Corp., pointed out that each plant is a supplement to the other.

Fort Pitt Division will continue to operate as an electric steel foundry, specializing in production of small carbon and alloy steel castings. Thus the Glassport plant, which makes large open-hearth steel castings, will now have the flexibility in melting equipment that is required for small orders of special carbon and alloy steels. On the other hand, Mr. Thompson pointed out, the Fort Pitt plant can now avail itself of many facilities at the Glassport plant which are not economically possible in a small plant.

All departments except cleaning and finishing at the Fort Pitt plant started production Oct. 1 under the new management. Complete operations will be resumed as rapidly as possible.

Since the first of this year, Mr. Dorsey has been associated with Pittsburgh Steel Foundry as assistant sales manager. During the previous ten years he had been Fort Pitt's sales manager.

Railroad's Use of Radar Will Become Permanent

Use of radar will become a permanent part of the railway communications system of the Rock Island lines. Following two years' intensive experimentation in adaptation of electronic devices and micro-waves to train operations, the Rock Island's new system will embody important developments by the Sperry Gyroscope Co., New York, for military and naval radar operations.

Radar equipment will be installed first on the 160 miles of the Rock Island's double track line between Chicago and Rock Island, Ill.

NEW FOUNDRY: William B. Given Jr., president, American Brake Shoe Co., turns over the first ground for a $2,500,000 construction program for the company's Electro-Alloys Division at Elyria, O. Project includes a completely new alloy foundry, office building and employees' building

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

American Society for Metals, Cleveland, will send a monthly employment bulletin to several major firms in the metal industry to help find employment for returning veterans and ASM members dislocated by war contract cancellations.

—o—

Wilputte Coke Oven Corp., New York, is constructing 47 by-product coke ovens for Citizens Gas & Coke Utility, Indianapolis.

—o—

Walker-Turner Co. Inc., Plainfield, N. J., is enlarging its plants 1 and 2 by 200,000 square feet.

—o—

Monroe Auto Equipment Co., Monroe, Mich., has purchased a plant in Hillsdale, Mich., and is expanding its main factory and another recently acquired plant in Monroe.

—o—

Frederick Post Co., Chicago, is offering its weekly wall calendar, free of charge, for 1946. The calendar includes a section of technical data covering wire and sheet metal gages, screw threads etc., plus a full 12-month calendar on one sheet in addition to the large weekly listings.

—o—

Westinghouse Electric Corp., Pittsburgh, is sponsoring its fifth annual Science Talent Search, conducted by Science Clubs of America, to discover the 40 students among America's one million high school seniors with the greatest scientific potential.

—o—

Massachusetts Institute of Technology, Cambridge, Mass., has received gifts of a half million dollars for establishing a gas turbine laboratory for graduate instruction and fundamental research in this field of engineering.

—o—

Sawhill Mfg. Co., Sharon, Pa., has completed an expansion program to meet demands of peacetime business.

—o—

Waukesha Motor Co., Waukesha, Wis., is planning a new building that would be adjacent to one now being

constructed. The building being planned would be used for assembly of refrigeration units.

—o—

A. O. Smith Corp., Milwaukee, has received an order for 44.3 miles of 24-in. petroleum pipe for Russia.

—o—

Gilman Engineering Works, Janesville, Wis., has started construction of a new factory.

—o—

Lear Inc. announced that all of its production purchasing is being handled from 110 Ionia Ave. N. W., Grand Rapids 2, Mich.

—o—

International Detrola Corp., Detroit, has announced that merger of Universal Cooler Corp., Marion, O., and Utah Radio Products Co., Chicago, into International Detrola has been approved by shareholders of the three firms.

—o—

Bendix Aviation Corp.'s Marshall-Eclipse Division, Troy, N. Y., is producing brake linings needed to aid reconversion of the automotive industry.

—o—

Sheet Metal Engineering Co., 919 West 49th Place, Chicago, of which John Opie is sole owner, has purchased the business and property of R. W. Clemmons & Son, 844 West Erie St., Chicago. The former firm will specialize in heavy work and the latter concern in light work.

—o—

Industrial Iron & Machinery Co. Ltd. announced its general offices and warehouse are located now at 319 Dufferin St., Toronto, Ont.

—o—

Mathieson Alkali Works Inc. is building a new plant which will double the sodium chlorite production of its Niagara Falls, N. Y., facilities.

—o—

Caterpillar Tractor Co., Peoria, Ill., has placed in operation a liberal retirement plan for employees.

—o—

Brainard Steel Corp., Warren, O., has established a home district sales office with headquarters at Warren. The office will serve northwestern Pennsylvania and northeastern Ohio, except Cleveland, and will be directed by B. E. Baker as district sales manager.

—o—

Westinghouse Electric Corp. has resumed production of vacuum cleaners at its East Springfield, Mass., plant.

Heppenstall Co. To Have New Research Laboratory

Research at the Heppenstall Co., Pittsburgh, will be conducted in a completely air-conditioned environment.

Augmenting air-conditioning equipment for the firm's new, windowless research laboratory will be an air-cleansing apparatus which will help assure accuracy and control in experiments. Beneath an asphalt tile floor, wrought iron piping has been installed to form a radiant heating system, which will eliminate conventional heating units from the laboratory.

Powerful fluorescent fixtures recently recessed in an acoustic ceiling will provide illumination.

A greatly expanded testing program for all types of steel forgings, shear and chipper knives, plus automatic tongs will be made possible through acquisition of a variety of testing equipment. Research facilities will include electric induction and salt bath furnaces, subzero testing apparatus, supersonic testing devices, hardness testers, dilatometers for equilibrium diagram studies, and a machine shop with many types of production size tools.

Weinstein Chosen Head Of Chicago Scrap Chapter

Harold Weinstein, Calumet Iron & Supply Co., East Chicago, Ind., has been elected president, Chicago chapter, Institute of Scrap Iron & Steel Inc., succeeding William Pohn, Pohn Iron & Metal Co., Chicago. Mr. Pohn assumes chairmanship of the executive committee.

Frank Grossman, Grossman Bros. Co., Milwaukee, was re-elected first vice president; Frank Cohen, D. R. & F. A. Cohen, Chicago, and retiring chairman of the executive committee, was made second vice president; and A. J. Clonick, Clonick Steel Co., Chicago, was chosen third vice president.

Re-elected to office were Treasurer Henry Rosenthal, Briggs & Turivas, Blue Island, Ill., and Secretary Harvey Kaplan, M. S. Kaplan Co., Chicago.

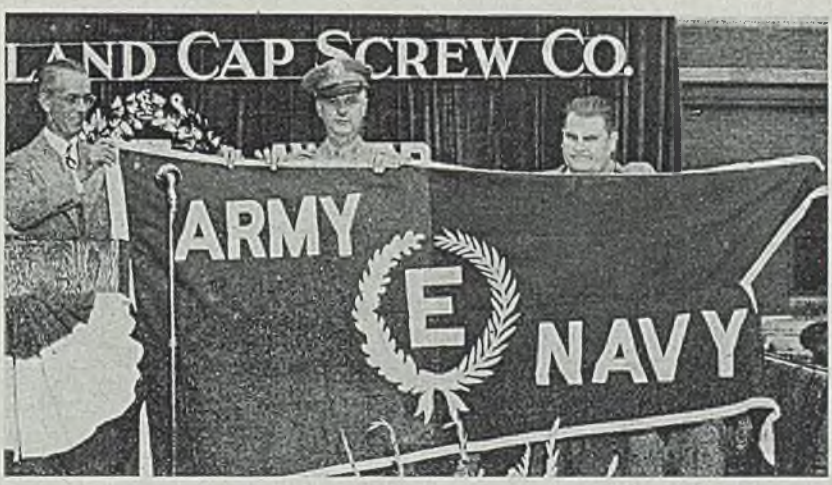
Rheem Mfg. Co. Builds Plant in Rio de Janeiro

New facility for production of steel shipping containers expected to be in full operation by March 1, 1946

CONSTRUCTION of a new plant in Rio de Janeiro for manufacture of steel shipping containers for the petroleum, alcohol, paint and vegetable oil industries in Brazil has been started by Rheem Mfg. Co., Washington.

Full operation of the plant is expected by March 1, 1946. While initial operations will be confined to steel shipping containers, it is expected other Rheem products will be added.

A Brazilian partnership to be known as Rheem & Cia will operate the plant. A new, wholly-owned subsidiary, Rheem Mfg. Co. of Brazil Inc., a Delaware corporation, will have a 70 per cent interest in and will manage the partnership. The remaining interest will be held by two Brazilians, Dr. Euvaldo Lodi, who, besides operating a number of industrial firms, is also president of the National Association of Manufacturers of Brazil, and Dr. Heiter S. Bergallo, president of Empresa Nacional De Petroleo, which operates one of the largest chains of gasoline stations in Brazil. All Rheem foreign plants will be administered by W. E. Zander, vice president of Rheem Mfg. Co. J. Harold Merrick is president of Rheem Mfg. Co. of Brazil Inc.



JOB WELL DONE: Cleveland Cap Screw Co., Cleveland, was advised on V-J Day that it had been awarded the Army-Navy "E" and the formal presentation of the burgee was made the occasion for a victory celebration. Left to right: J. W. Fribley, president; Lt. Col. A. F. Witte, Army; Louis Doksansky, oldest employee of the company

MECHANICAL OXYACETYLENE WELDING

Noncontinuous setup in plant of Artcrest Mfg. Co. provides economies in fabricating cylindrical steel containers

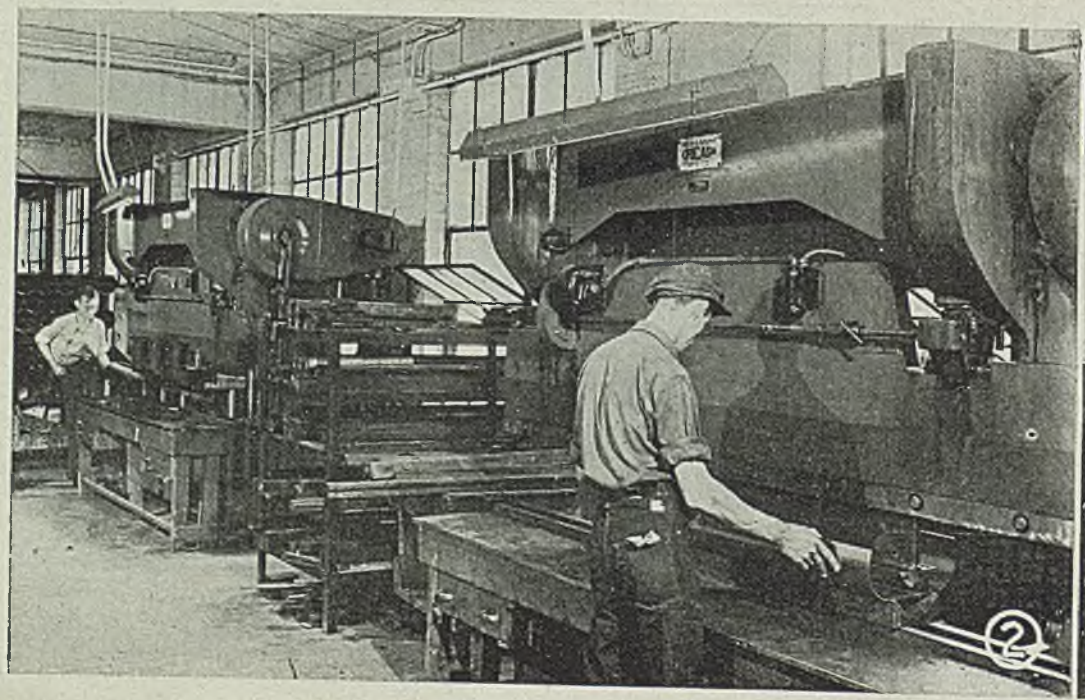
PRIOR to the war the applications of mechanical oxyacetylene welding were limited almost exclusively to the manufacture of continuous butt-welded tubing on large mills which form the tube from strip as well as weld it. Speeds as high as 200 fpm are maintained in production by this method using multi-flame welding beads.

Noncontinuous machine welding, on the other hand, has not until recently been an important application of the oxyacetylene process. In noncontinuous welding each piece is handled individually, being cut to size, formed, fixed in a jig on a welding machine, and the seam or seams then welded mechanically. Such work has usually been done by the resistance process or by flash or automatic arc welding.

Quite recently however, machine gas welding has come into prominence for this class of work, and because it possesses certain advantages it gives definite promise of becoming an important factor in the noncontinuous mechanical welding picture.

Gas welding leaves no flash or bridge to be removed in a separate grinding or shearing operation, and it requires no advance preparation such as grinding or beveling of the edges to be welded. Thus, while the welding time taken by itself may be longer, total time and cost for making the finished joint is no greater, and may in some cases be less. Low initial cost of installation makes the gas process economical for the welding of only a few thousand identical articles, as well as for quantities in the hundreds of thousands or millions.

The automatic gas welding process is characterized by a wide flexibility in the size and shape of the welding tip which can be designed for a specific



By H. O. JONES
Machine Welding Specialist
Applied Engineering Department
Air Reduction Sales Co.
New York

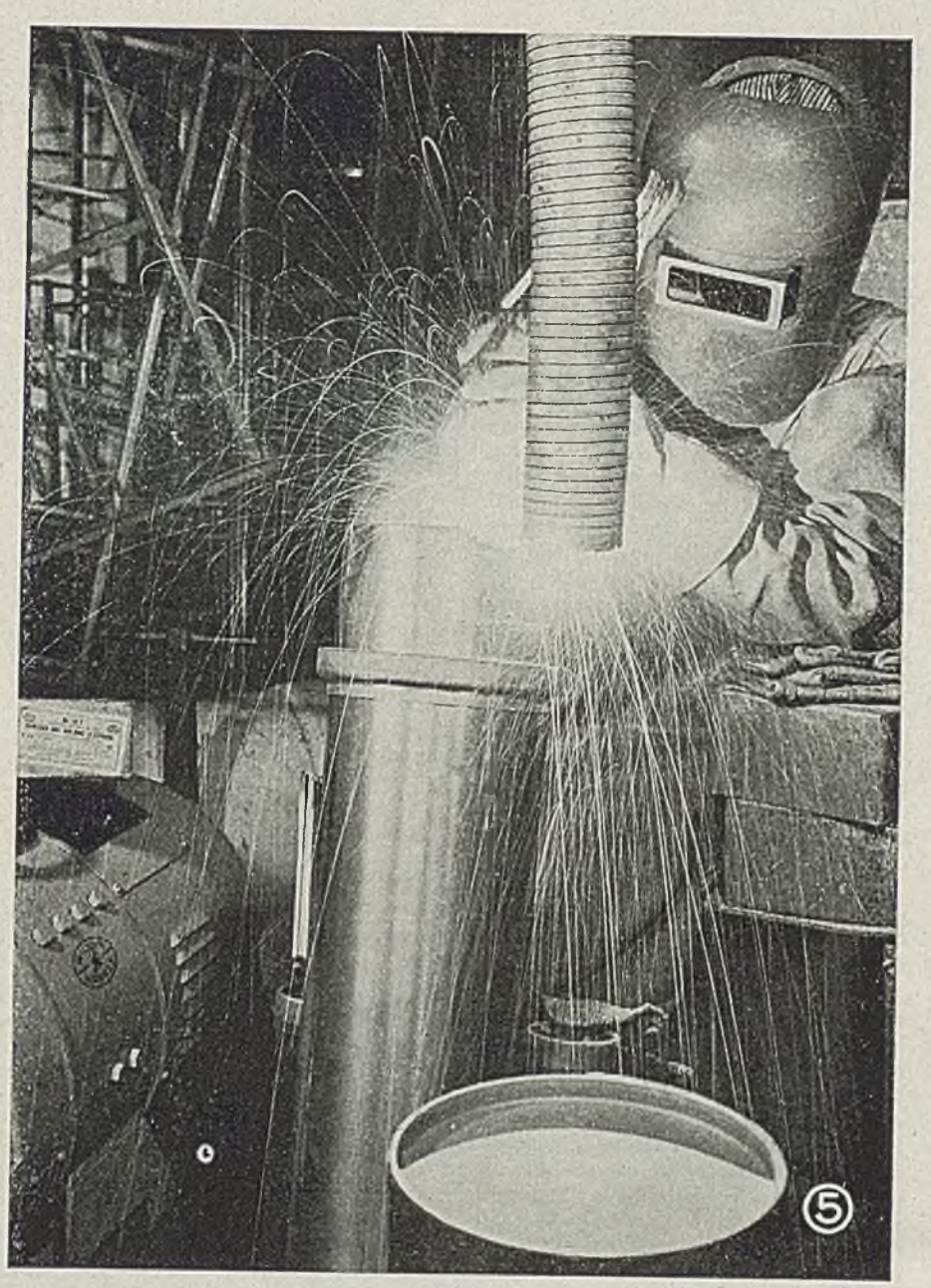
Fig. 1—Smooth appearance of finished weld out to both ends is evident here. Note squareness of ends, maintained by proper jigging of tube during welding

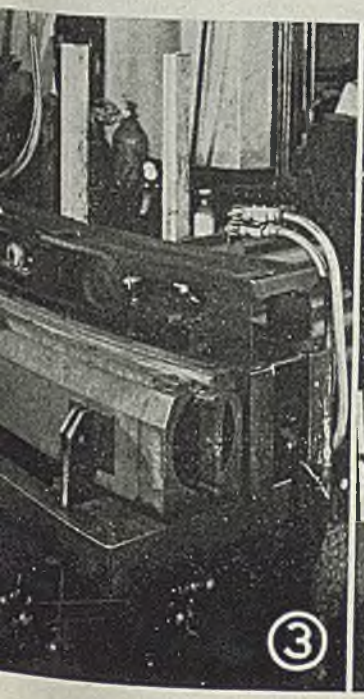
Fig. 2 — Sheared flat sheets are formed into cylinders on these two press brakes. Three pressings on brake at right give rough round shape; brake at left finishes the forming in a split cylinder die

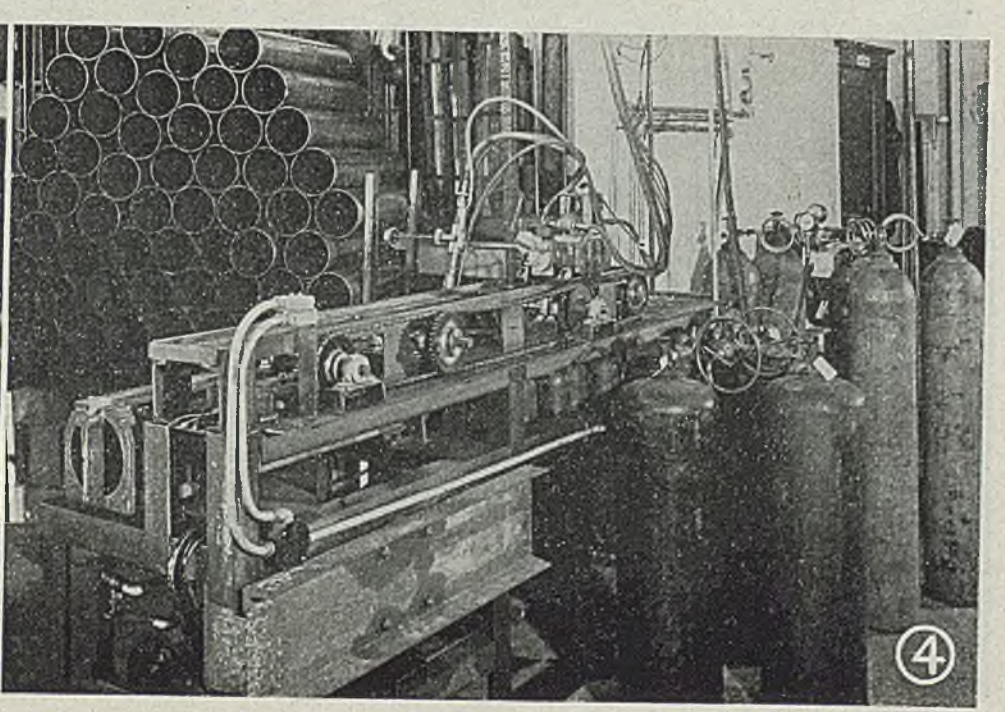
Fig. 3—Tube is held in jig for automatic gas welding of seam. This machine welds 55 tubes per hour at a speed of 78 ipm

Fig. 4—Rear view of seam welding machine showing portion of chain drive. Center chain of the three is idle. Oxygen and acetylene are provided by manifolded cylinders at right

Fig. 5—The tube reclines against side rollers while resting on a turntable which rotates it at the proper speed for making an edge weld between cap and shell







purpose. Size differences enable the torch to weld at any desired speed within wide limits, by increasing the number of flames in simultaneous operation. The shape of the tip is, of course, governed by the shape of the work surface over which it will operate.

Noncontinuous welding is generally applicable in quantity production of round or rectangular articles such as barrels, pressure vessels, shell cases and other parts requiring longitudinal or girth seam welds. Probably the most outstanding work done during the war was shell and powder case fabrication, in which number of manufacturers were engaged. Noteworthy among these has been the experience of Artcrest Mfg. Co., Chicago, in the welding of tubular powder containers. In this kind of work the construction of the jig, and the accurate preforming of the workpiece, are all-important to insure high quality production with a minimum of rejects. Faulty engineering in these respects has caused perplexing problems to arise in other plants manufacturing welded tubes, but at Artcrest the successful solution to not only these but other phases of the manufacturing process as well has resulted in a reject-rate of less than one-tenth of 1 per cent on the automatic seam welding.

A study of the apparatus and procedures used should, therefore, serve to help in establishing principles for this class of work.

The powder container is basically a steel tube 7 in. in diameter and 40⅛ in. long, made of 18-gage cold rolled 1010 rimmed steel. Reinforcing rings and a bottom plate are welded on, and a removable cap is fabricated with a locking spider and gasket to provide an air-tight container. In service this is used to carry two nylon bags filled with smokeless powder, forming one full charge for a heavy gun. The container must preserve the powder against moisture. Thus, all welds must be air and water tight, but need not have maximum strength. All welds other than the longitudinal seam weld are made manually, by resistance or electric arc, while the seam is welded by the automatic gas process to a penetration of about 80 per cent. Ordnance inspection requirements of this seam are that it must have no protrusion and yet have a minimum of 75 per cent of the parent steel strength.

Fig. 6—Finished edge weld on bottom end. Note crimping which holds flanged bottom cap in position for welding

Forming the Tube: The material is rimmed steel with a spongy center, and both the forming and the welding must be done "with the grain." This is taken into consideration in the shearing of the sheet. Accurate squareness in shearing is essential, otherwise the ends will not form into a plane when the tube is formed. Jig stops on the shear assure squareness and accurate sizing to within ±⅛-in. at a production rate of 115 pieces per hour, three sides sheared.

The next and critical operation is the forming of the cut sheets into perfect tubular shape. Knowing how difficult it is to perform this operation with bending rolls, it was decided to do this on two press brakes, notwithstanding the advice of others that this was impossible. As shown in Fig. 2, the press brake at the right is fitted with a die in the form on a 7-in. diameter arc. This is impressed along each edge of the flat sheet with the aid of locating stops, and a third pressing along the centerline produces a near-cylindrical shape in the sheet. Each of these three pressings also creates an indentation near one end of the tube, to function as locators for the bottom plate. This eliminates a separate crimping operation which would otherwise be necessary.

The partially formed tubes are then pressed into a split cylindrical die on the second press brake, shown at the left in Fig. 2, from which the tube emerges in perfect cylindrical shape. Both pressing operations keep pace with the output of the seam welding machines.

Design of Jig: The principal features of the automatic seam welder are the holding jig and the means for propelling the torch at different, set speeds, as well as for automatic opening and closing of gas flow valves. The machines were built by Artcrest with the co-operation of Air Reduction.

In the designing of jigs for automatic gas welding of seams, two things are important. First, since no supplementary welding rod is usually employed, the jig should be in the form of a clamp which is maintained under pressure during welding, to accomplish the double purpose of assuring close contact between the butted edges to be joined, and to compress and follow the contraction of the weld zone, thereby maintaining constant pressure on the tube regardless of contraction in the weld.

Second, the mass of the jig and the clamps adjacent to the weld should be great enough to rapidly carry off heat from the workpiece, in order to avoid distortion from excessive contraction. It is sometimes necessary to provide internal water cooling to the clamps, particularly when light metal is being welded at high speed. A longitudinal bar or mandrel is mounted beneath the seam to aid in aligning the seam. This may be internally water cooled as well, but experience has shown that excessive cooling here tends to slow down the speed of welding to a marked degree.

When water is used a very slow rate of circulation is usually best, to effect a compromise between the extent of torsion, yet maintaining a high welding speed. Reduced speeds naturally mean that the total heat input is greater, and therefore excessive cooling tends to defeat itself beyond a certain point.

The jig employed at Artcrest is not water cooled, though provision has been made for such cooling in the clamps. As may be seen in Fig. 3 it is a split cylinder which may be opened for place-

(*Please turn to Page 146*)

Fig. 7—Making plug welds on removable top caps. When clamped in place the cap keeps the powder dry, but can be removed in an instant

MECHANIZED Mold Preparation

Effects Reduction in Scrap and Scarfing

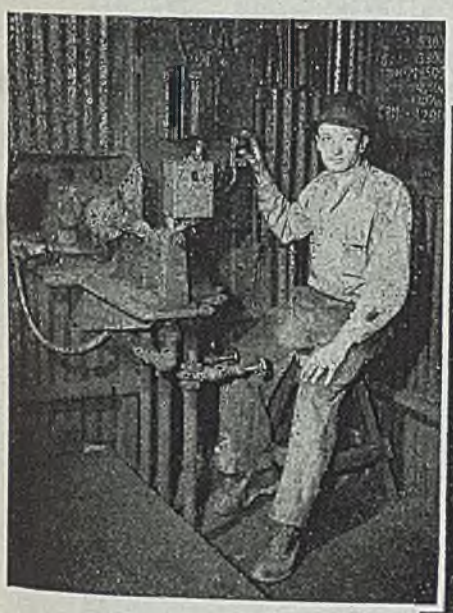
THREE big-end-down 23½ x 26½ x 80-in. ingot molds can be water dipped and pitch coated every 2 min, using a new setup perfected at the National Works plant of National Tube Co. This new system of mold preparation uses less than ½-lb of prepared coal tar pitch per ton of ingots.

Operation consists of picking up three hot (300 to 500°F.) molds by means of a special lifting rig attached to the 15-ton mold yard crane, dipping the set into water to remove any dirt, and positioning them on a special spray platform. The mold lifter, shown in accompanying illustration, is lowered until the cover plate, suspended by chains within the frame work of the lifter, rests on top of the molds. Compressed air then blows in the powdered coal tar pitch through three conical depressions centered under the molds in the base of the platform. The cover plate keeps all but a small part of the pitch from escaping into the atmosphere.

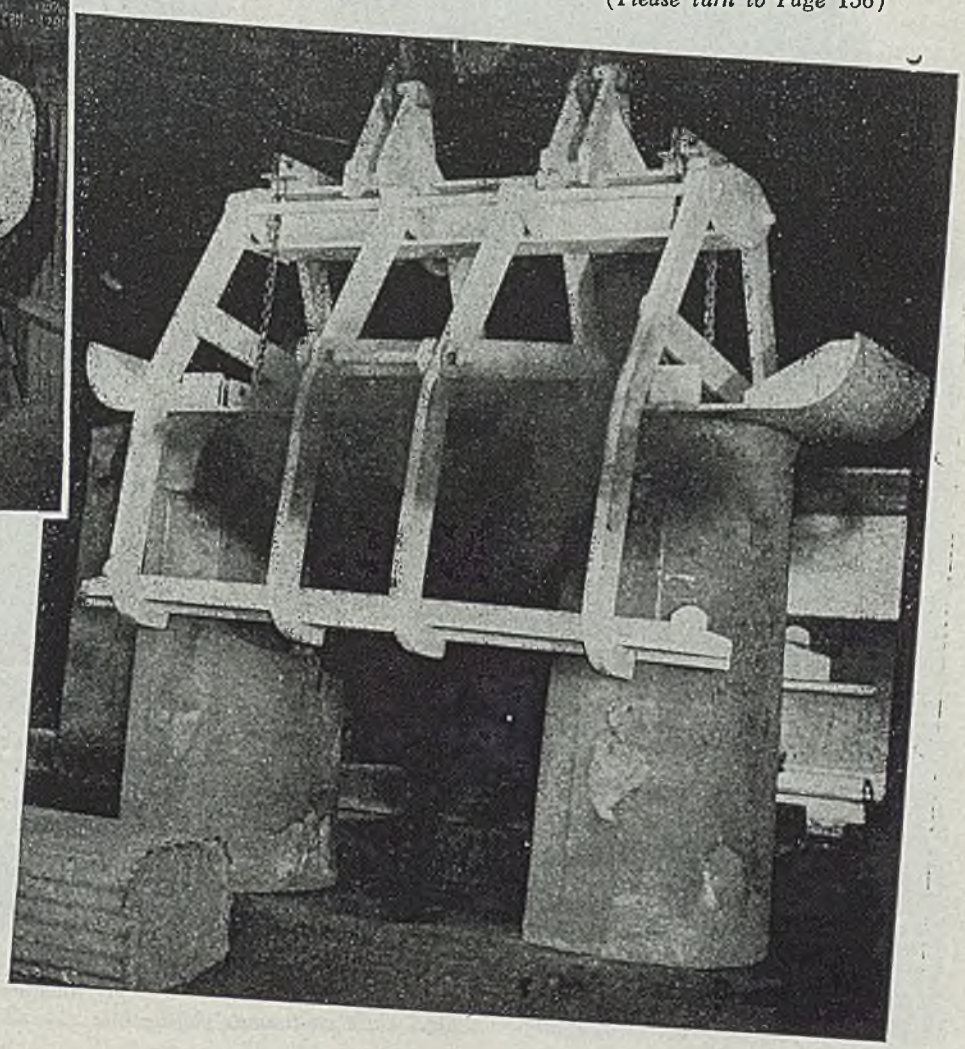
A uniform coating from top to bottom of the mold is obtained with 85 to 95 psi air pressure delivering the powdered pitch through a 2-in. pipe. At this pressure only 5 sec is required for sufficient pitch to be siphoned into the mold to produce a coating of sufficient thickness to repel steel splashes during teeming, and provide the agitation necessary to prevent nonmetallic scum from being trapped in the ingot surface. Exact control of the flow to each of the three molds is obtained through a motor-operated cam arrangement that opens three quick-acting air valves, one at a time, for 5 sec each. A single pushbutton operates the motor for a single blowing cycle, a time switch breaking the circuit after the cams, which are driven through a set of gears, have made one complete revolution. Individual operation of any of the three blasts can be secured by depressing the valves by hand as desired.

As soon as the third mold has been

(*Please turn to Page* 156)



Above—Station from which the lifting and spraying operations are controlled



Right — Lifter and cover showing molds resting on spray platform. Between molds powdered coal tar pitch is being sprayed into the air for display purposes

CURRENT Zinc

In first of six articles Dr. Gray discusses character and life of plated coatings; acid and cyanide baths; bath formulas; operating conditions

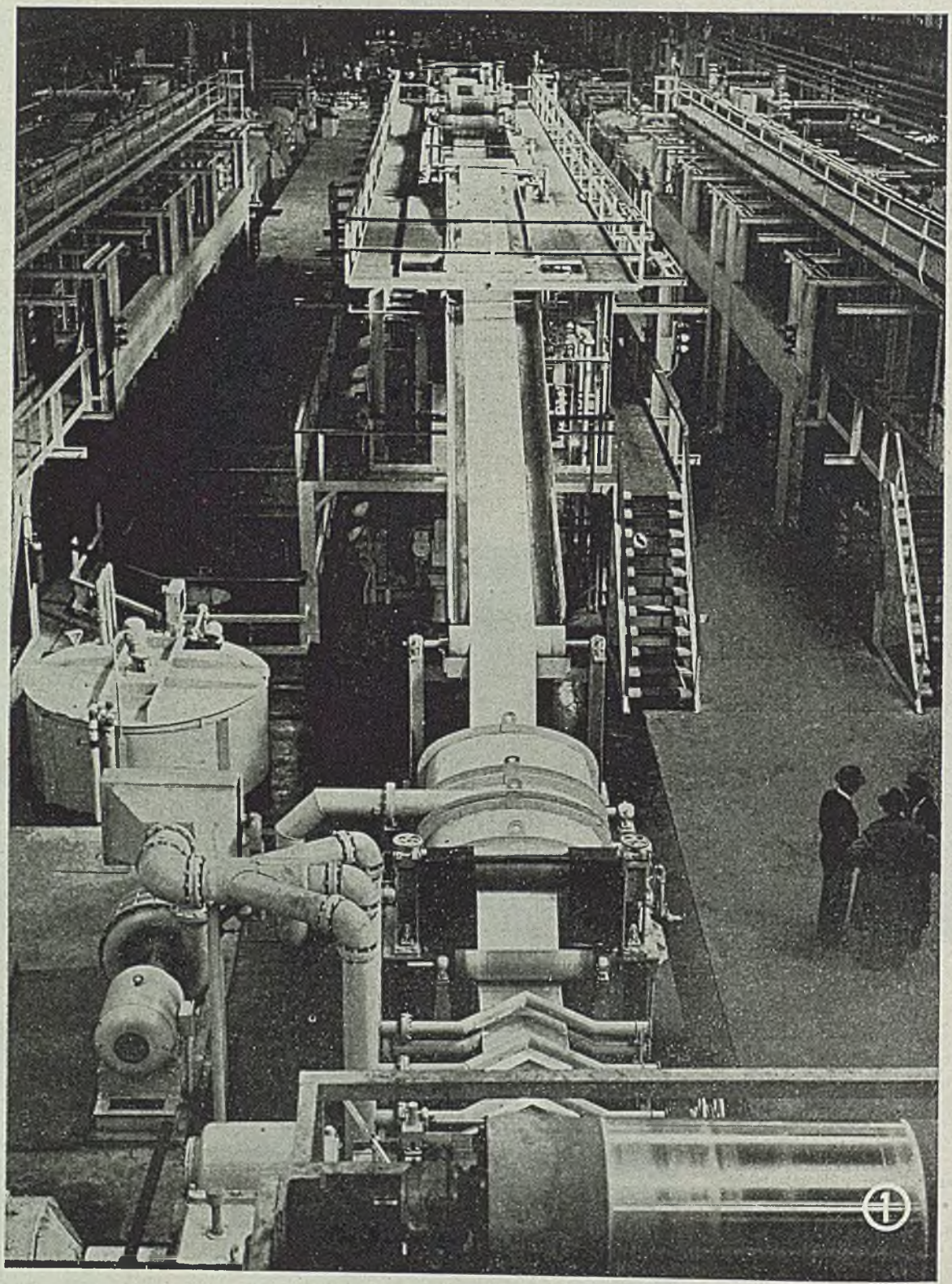


Fig. 1—High purity zinc now is being deposited on steel strip up to 28 in. wide at a speed of 160 fpm and in coating weights ranging from 0.1 to 0.2 oz per square foot. This is Weirton Steel Co.'s continuous plating line

Electroplating PRACTICE

By DR. ALLEN G. GRAY
E. I. du Pont de Nemours & Co. Inc.
Cleveland

FOR more than a century zinc has been the most widely used commercial coating for protecting iron and steel against corrosion. This is rather remarkable considering the vast amount of scientific and technical knowledge that has been amassed during this period. The pre-eminence of zinc as a protective coating for iron and steel is a result of its characteristic resistance to atmospheric corrosion together with its electropositive nature by which protection is extended to steel exposed by flaws, cracks, and pores in the coating. Only cadmium approaches zinc in the efficiency of protection afforded to steel. It is generally accepted that per dollar of coating cost zinc coatings confer more protection than any other metal.

Acid type zinc plating baths used extensively in coating steel strip and wire are somewhat less costly to operate than cyanide baths, but have poor throwing power. The demand for improved appearance in zinc coatings has led to the development from cyanide type baths of attractive "bright" zinc coatings of such refined crystalline structure that light is reflected specularly from their surfaces. The metallic sheen of these coatings is quite unlike the diffuse gray appearance of the ordinary zinc electroplate. On account of their high throwing power and their capacity to produce an attractive plate the cyanide type zinc plating baths have made rapid strides in the past several years and their place is now thoroughly established in industry.

Electroplated vs. Hot-Dip Zinc

An electroplated zinc coating is essentially pure zinc and unlike coatings made by hot-dipping contains no layers of alloyed iron. In addition, electroplating offers desired uniformity on simple shapes and the feasibility of applying zinc coatings of any predetermined weight according to the amount of protection sought. Although there has been much discussion of the subject, the two types of coatings appear to show substantially equal protection; it then becomes evident that thickness and uniformity of coating are the significant factors. Electroplated coatings will withstand severe bending or other mechanical deformation.

This is particularly true in instances of high purity zinc deposits applied from purified acid or cyanide baths[2]. Adherence tests made a number of years ago[3] in which the force required to separate the coating from the base metal was measured showed the adherence of electroplated coatings to be of an extremely high order.

The electroplating process yields coatings of sufficient ductility to permit drawing or bending. Also, the absence of any incidental heat treatment prevents warping and change of temper of steel.

Life of Zinc Coatings

Any estimation of the life of a protective coating requires a definition of what is meant by the term "life"[4]. Under conditions where appearance is not an important factor, the useful life of a protective coating is measured in broad terms by the period of time during which the coating prevents failure of the underlying metal. The definition of the life of zinc-coated iron or steel articles is usually expressed arbitrarily in terms of the per cent of the surface showing rusting. In general, it may be concluded that in a given location the life of a zinc coating depends upon its thickness regardless of the method by which the coating is applied. This does not overlook the fact which has previously been mentioned, that coatings fabricated by the various processes vary in uniformity and may not therefore afford equal protection when coatings of the same average weight are applied. That the life of coatings of comparable uniformity is directly proportional to thickness is well illustrated in Fig. 2[5] in which the per cent of exposed area rusted is plotted against time of exposure for zinc coated iron and steel sheets exposed at Altoona, Pa. and Pittsburgh and Sandy Hook, N. J.

In considering the influence of environmental factors on the life of zinc coatings it appears that the constituents of

(*Please turn to Page* 158)

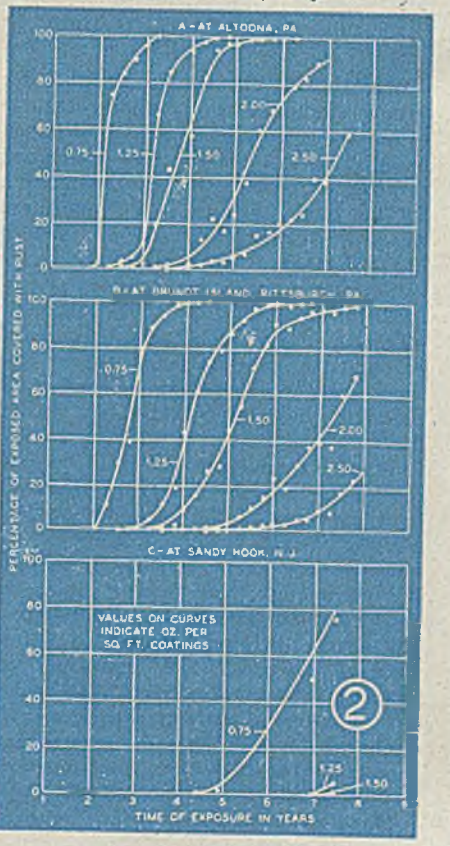
TABLE I

ESTIMATED LIFE OF ZINC-COATED PRODUCTS IN THE ATMOSPHERE[1]

Thickness in.×1000	Weight in oz/ft² of Surface[a]	Life in Years under Atmospheric Conditions					
		Rural	Tropical Marine	Temperate Marine	Suburban	Urban	Highly Industrial
3.6	2.00	50	40	35	30	25	15
2.3	1.25	35	30	25	20	17	9
1.8	1.00	25	20	15	12	10	7
1.1	0.60	10	8	7	5	4	3
0.68	0.37	7	6	5	4	3	2
0.44	0.25	5	4	3	3	2	1

[a] In the case of galvanized steel sheets the weight of zinc is specified in terms of total zinc on both sides of the sheet, *i.e.*, a 2-oz sheet has 1 oz of zinc per sq ft of surface. Consequently in estimating the life of galvanized sheet in the light of data given in this table, the specified weight and thickness values for the sheet should be halved.

Fig. 2—Progressive development of rust on zinc-coated sheets exposed at Altoona, Pa. and Pittsburgh and at Sandy Hook, N. J.[5]



Equipment Employed in Straightening Operations

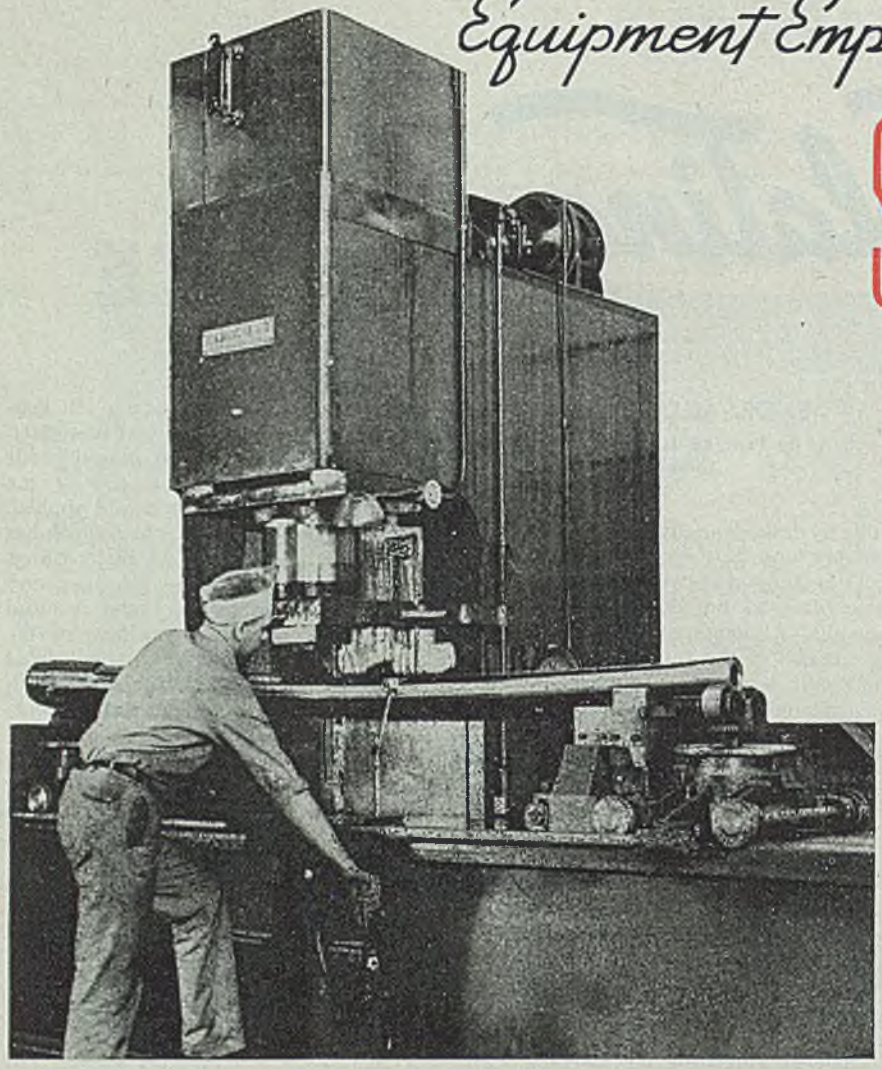


Fig. 1—Straightening 75 mm gun barrels at the Yoder Co., Cleveland, was facilitated by this 150-ton hydraulic press

Pipe, tubing, steel plate, wire, small rods and ordnance components are straightened with aid of machines and fixtures of many types. Portable hydraulic unit widely used in maintenance. Coiled tubing straightened, measured and cut automatically. Pneumatic presses effective. Roller leveler handles ¾-inch plate

By JOHN E. HYLER
Peoria, Ill.

METHODS and equipment used for various straightening operations continue to be developed and improved, attention being given to toolmaking, to production and to maintenance, with due recognition for inevitable differences in procedure. Arbor presses often are used for a variety of straightening work, along with the various other duties they perform. Pneumatic presses of this type, fitted with high-efficiency air cylinders, have been found exceptionally good in many cases. One arbor press maker is producing them in capacities ranging from 1700 to 18,000 lb.

Wherever straightening is to be performed on a wide variety of relatively light parts, as in the toolroom or heat treating plant, heavy straightening equipment is not often indicated. Where there is enough work to keep a piece of equipment moderately busy, hand-operated straightening presses are used. These units are rugged and powerful, yet simple and easy to operate. One make[3] has a fine-thread screw-type pressure ram operating down through an overarm, and carriers a pair of centers for trying out the work being straightened.

Hand-operating straightening units are not all light-duty units; some are hydraulic, a suspended hydraulic jack being incorporated and used for a straightening ram. One company[3] has incorporated a 125-ton hydraulic jack into a press in this manner. Designed as a straightening press, the unit also can be used for bending. This is true of considerable press-type straightening equipment. This particular unit incorporates an adjustable lever mechanism by means of which the stroke can be set for fast operation at low pressure, or for slow ram movement at high pressure. The frame supporting the hydraulic jack can be moved longitudinally in reference to the press bed, and the jack itself can be moved laterally on this frame. Thus, the jack can be positioned at any point within a 34 x 84-in. area.

Some metalworking plants may not be familiar with a portable hydraulic unit which has been used for many straightening operations. This particular device[4] has been found of special value for maintenance work, as for instance the straightening of a shaft or other part right in a machine, as a matter of a temporary repair, to keep things moving. However, this is by no means its only application. It consists of a hand-operated hydraulic pump that is light and easy to carry, plus an all-directional hydraulic ram that is used for the actual straightening pressure. The pump and the ram are connected with a generous length of high-pressure hydraulic hose, so that the particular position of the pump in relation to the ram is of no consequence. Thus, the device is flexible. Various special attachments can be used in connection with the ram to make the device applicable to various kinds of work.

Pipe Straightening

Importance of pipe and tubes in both structural and mechanical-action roles often causes them to be routed through a straightening operation. In some cases it is pipe of large diameter. Presses have been especially designed for pipe straightening to handle pipe up to 10-in. diameter, yet they are portable, and consist of a relatively lightweight steel frame with a simple but powerful hydraulic pump and ram, which one man can hand-operate with ease, applying any desired pressure up to 20 tons[5]. Some

firms which specialize in straightening equipment have pipe and tube straighteners in various standard sizes and types, some of these being roll types of equipment[6].

One machine[7] that is designed for production straightening of round bars and tubes is so driven with a 50-hp variable-speed motor, that the work may be traveled through it at varying speeds up to 500 fpm. The work is passed between two seats of three rolls each. The rolls are set oblique to the direction of stock travel, and for that reason impart a polishing action to the work being straightened. One of the rolls in each set of three is driven. The other two rolls in each set of three are idlers, and each pair of idler rolls is adjustable toward or from the driven roll in the set, making firm contact of all the rolls possible on various diameters of stock from 2 to 3½-in. diameter. Positioned between these two sets of three rollers each, is a central idler. No stationary guides are used in this machine, the only contact being that of rotating finished surfaces that will not scratch the work. Facilities are incorporated for relieving the pressure between the rolls without alteration of the setup, should the work become jammed.

Tube Straightening

Tubes of relatively short lengths that are being incorporated into some type of mechanism, and requiring straightening during the process, are a different story. It is usually the case that a straightening press of sufficient power for the work in hand is used. In some cases the tubes to be straightened will vary in length, some of them being short and others long. A flexible arrangement of a hydraulic straightening press with an extended table equipped with roller-mounted fixtures is shown in Fig. 1. This is a 150-ton press. Another hydraulic press of 50-ton capacity, engaged in straightening steel tubes for composite rear axle housing is shown in Fig. 2.

Tubes get down to small sizes in many cases, and yet require straightening. In those instances where copper tubing is used in the manufacture of such products as unit heaters, radiators, refrigerators, etc., it comes to the plant in coils, and a straightening operation is necessarily imperative. However, much time and trouble has been saved here by incorporating a straightening mechanism into a cutting off machine[8], so that feeding, straightening, measuring and cutting to lengths is automatic. Some machines of this kind have been built which are adjustable for cutting any lengths of tubing up to 6 ft. After the end of a coil of tubing has been inserted in the feed rolls of the unit, the feeding rate is around 50 fpm, and everything is automatic.

A peculiar phase of straightening is found in cases where it is desired to make a straight cut on the edge of a piece of sheet material that is not straight to begin with. It often has references to sawing, but probably could be applied to the making of a straight line cut with a rotary shear, or like applications. It is known that sawyers of plywoods, plastics, sheet metals, etc., have used the idea to advantage. It consists of what is called a guide-line light[9]. Above and at the infeed end of a machine is positioned a powerful light in a housing, with a rectangular opening at the bottom of the housing, the opening being of considerable length. Across the housing opening is stretched, in direct alignment with the cutter and the line of cut on the machine below, a so-called shadow-line. This line falls directly over the line of cut, being in the same plane, and therefore it casts a shadow line on the work enabling one to see the entire line of cut that has not as yet been made. With the aid of such a device, material can be fed to a cutter in such manner as to obtain a fully straight edge, with the greatest economy of material.

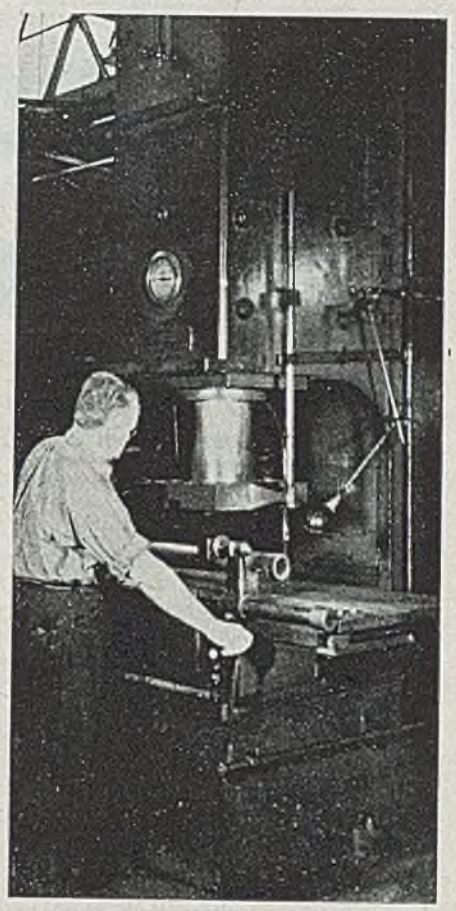
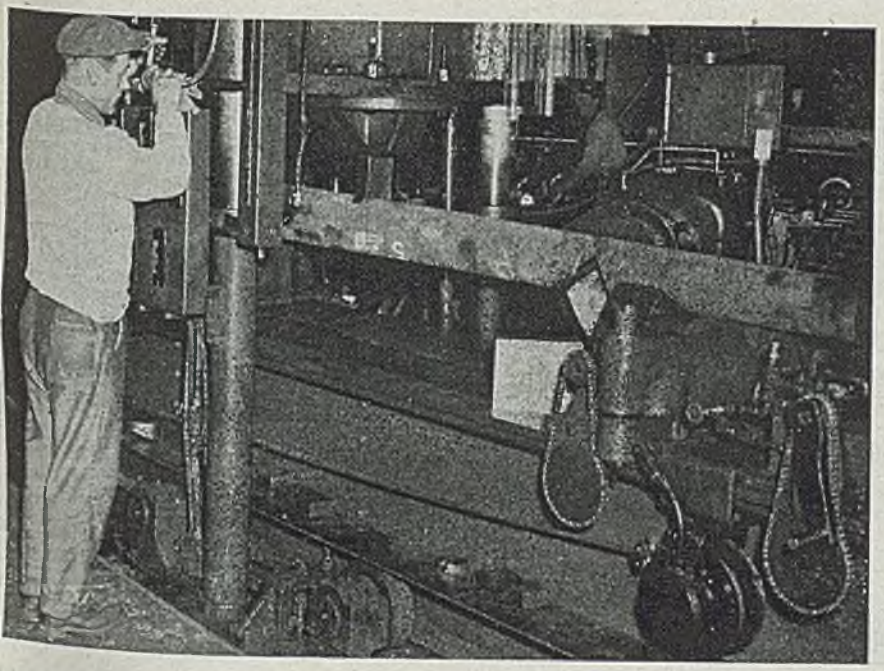


Fig. 2—A standard 50-ton hydraulic press here is shown straightening steel tubes for composite rear axle housings at Mack Truck Corp., Allentown, Pa.

Fig. 3—Here rough gun barrels of larger size are straightened on this 250-ton straightening press in the plant of Struthers-Wells Co., Titusville, Pa. All photos courtesy of A. B. Farquhar Co. Ltd., York, Pa.



Armor Plate Straightening

Considerable armor plate as produced for application to tanks is warped by heat treatment, and must be straightened. One method that has found much favor is to strike these tough steel slabs repeatedly between striking dies mounted in a large press brake[10]. Some machines are made for the purpose of straightening plate. Roll-type leveling machines applicable to steel sheets have been made by a number, but some of these will take care of armor plate 3/4-in. thick, and can be designed and built to handle heavier armor plate straightening if desired[11].

Shaft straightening always has been of great importance, and will continue to be important. A 75-ton hydraulic straightening press is built with roller-type fixtures. Its testing fixtures are fitted with rollers on the bottom for traversal, and with rollers on the top for testing the parts being straightened.

One large manufacturer of hydraulic presses and other hydraulic equipment has developed a special shaft-straighten-

(*Please turn to Page* 172)

IMPROVED TOOLING

. . . . greatly aids Southern plant in stepping up output per worker from $2985 to $6179 per year

By G. ELDRIDGE STEDMA

SOUTHERN industry, in the past, was often characterized by absentee ownership and management. Manufacturers did not develop because the South tended to look North for capital. Its enterprising sons, going North and East for schooling, tended to stay there to work and live. Labor was largely unskilled. Freight rates penalized the South's opportunity for national competition. In certain areas, there was general listlessness produced by enduring symptoms of malaria and hookworm. Production per manhour was not enviable. The economics were too much based upon agriculture and, more unfortunately, upon single crop dependence.

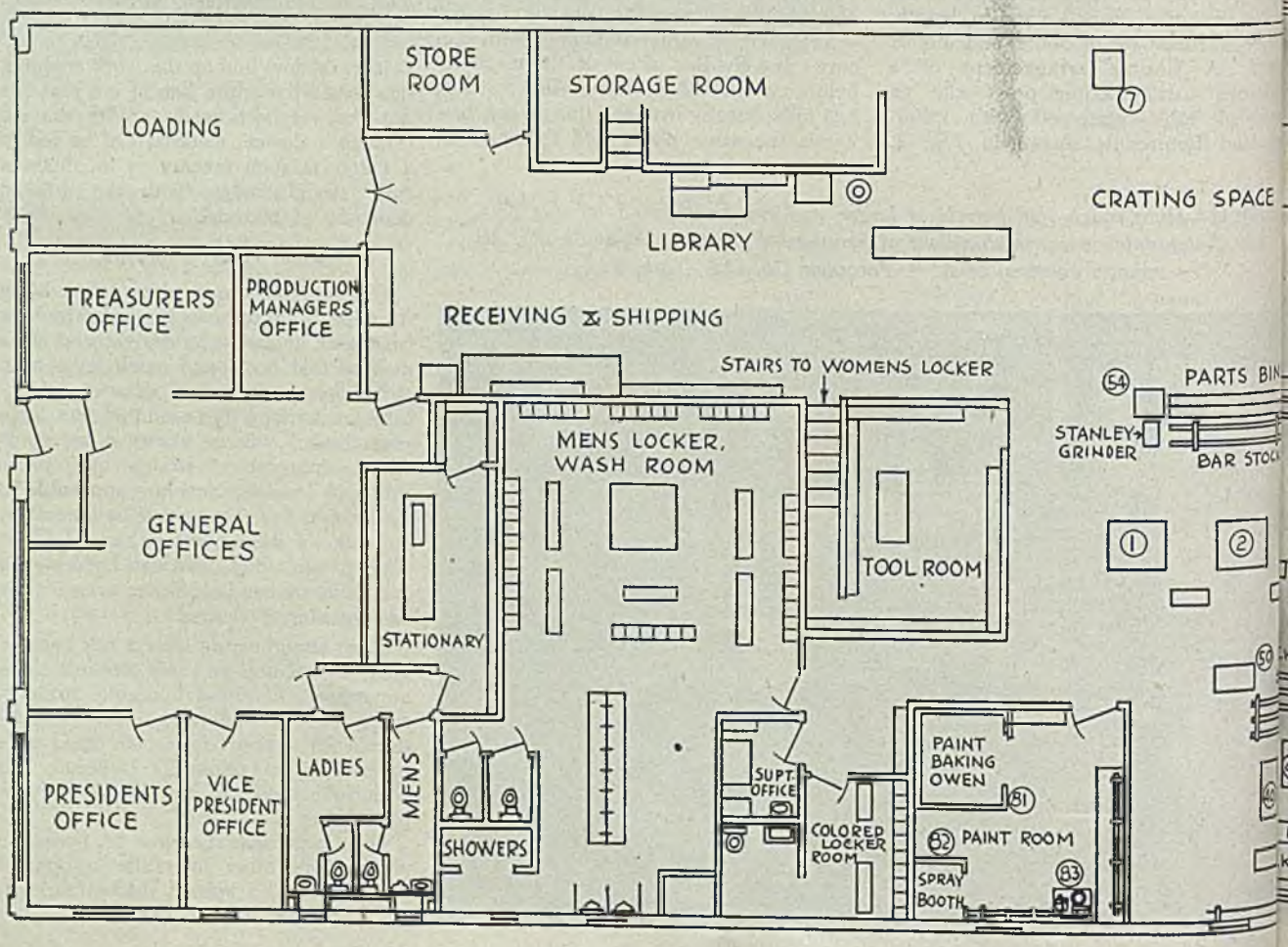
The South is now undergoing an almost complete metamorphosis that bears watching. The impetus of war production, in which the South has shared importantly, has endowed it with a community of skills which rank well nationally. Such instruments as the Resources Utilization Board, jointly financed by the City of Chattanooga and its Hamilton County under State legislative enactment, have revealed the low ratio of the South's industrial production as compared with its sectional consumption conclusions that show extensive opportunities for new industries, particularly in the metalworking fields. Legislative developments of favorable portent are occurring, such as the progressive leadership of Governor Arnall of Georgia in his personal pleading of the railroad rate case before the U. S. Supreme Court.

Widespread postwar intention toward decentralization, as announced by such industrial leaders as C. E. Wilson, president, General Motors Corp. (*New York Times*, April 19, 1945) also favors the South. Northern plants are not intending to relocate in the South to benefit from low wages anymore, because there will be no unusual wage advantage. This tends to limit the growth of absentee ownership.

A progressive group of younger southern industrialists with ample capital for small ventures is appearing. The citizenry of the South, alert to the relationship of new industrial enterprise to their aims for advancing employment, payrolls, living standards and prosperity, are showing a new willingness to finance

Fig. 1—"Production illustrations" like that shown here are employed instead of ordinary blueprints to speed output and simplify work. Note it includes listing of machine, feed, speed, standard time, material, and other references in addition to detailed description of the particular operation it covers

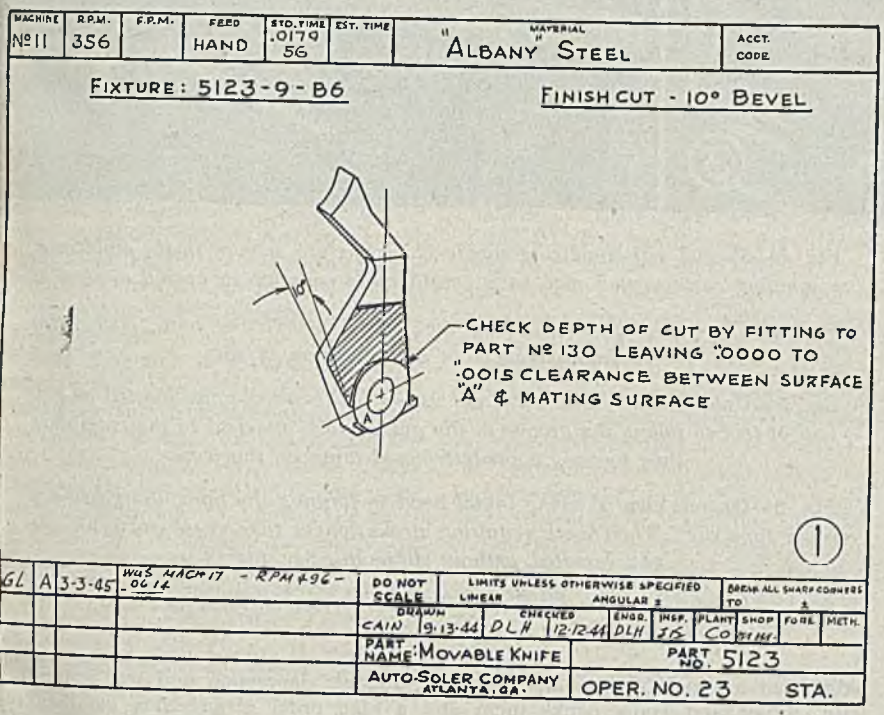
Fig. 2—Floor plant showing arrangement of equipment and departments at Auto-Soler Co., Atlanta



sound ventures. The South undoubtedly is reaching toward an era of industrial advancement that will have significant postwar effects.

An outstanding example of what can be expected in the development of smaller metalworking plants in the South is the Auto-Soler Co. of Atlanta, whose methods and tooling are described here. This company was organized in 1933 by a daring young salesman, William H. Wilkerson, still president, with a shoestring capital of $6050. It has safely passed through its pioneering period during the depression years and has arrived at a progressive national expansion of somewhat spectacular proportions in the years since 1940.

The company produces two basic machines: (1) An automatic soling machine for shoe repair that eliminates most hand nailing. This machine makes its own



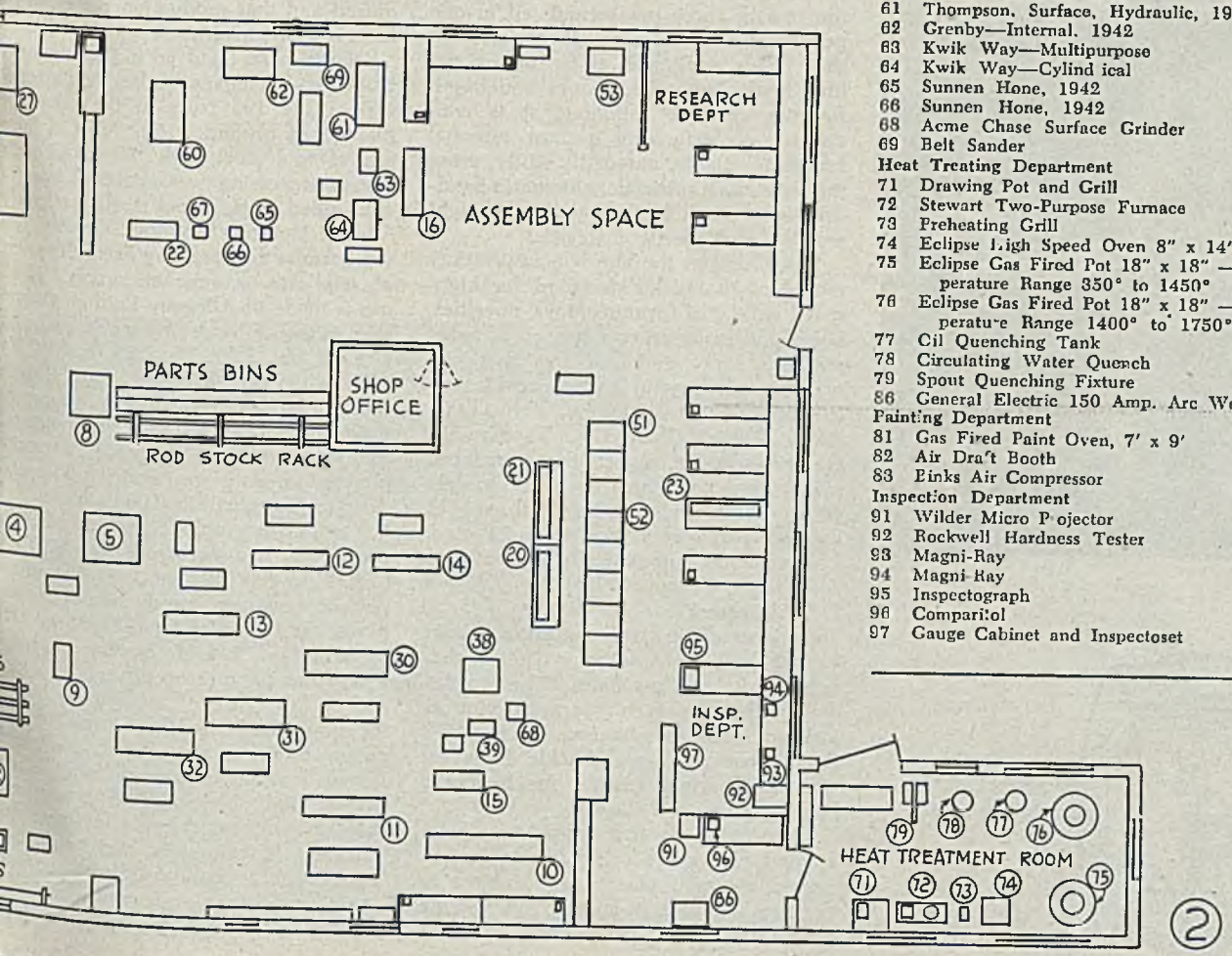


TABLE I — FACILITIES
(See Fig. 1)

Milling Machine Group
1 Cincinnati—Universal #2, 1942
2 Brown & Sharpe—Plain #2
3 American—Plain #1½
4 Le Blond—Plain #2
5 Bridgeport—Universal, Turret, 1942

Saws
7 Delta Rip, 10"
8 DoAll Metal Cutting Band, 1942
9 Peerless Power Hack

Engine Lathe Group
10 Bradford 16" x 8', 1942
11 South Bend, 16" x 6'
12 Sebastian Gold Seal, 12" x 6'
13 Sebastian, 14" x 6'
14 Logan, 10" x 3', 1942
15 Logan, 10" x 3', 1942
16 Sheldon, 11" x 3'

Bench and Speed Lathes
20 Atlas, Bench, 1942
21 Atlas, Bench, 1942
22 Delta, Double Duty, High Speed
23 Delta, Double Duty, High Speed

Knurling Machines
26 Special Wire Knurler, 18 to 20 gauge, 1942
27 Special Wire Knurler, 18 to 20 gauge

Turret Lathe Group
30 Foster #5, 1942
31 Warner & Swasey #2
32 Warner & Swasey #2

Presses
38 Punch Press, 2 Ton
39 Arbor Press

Shaper Group
40 Cincinnati 16"
41 Steptoe 14"
42 Atlas 7"

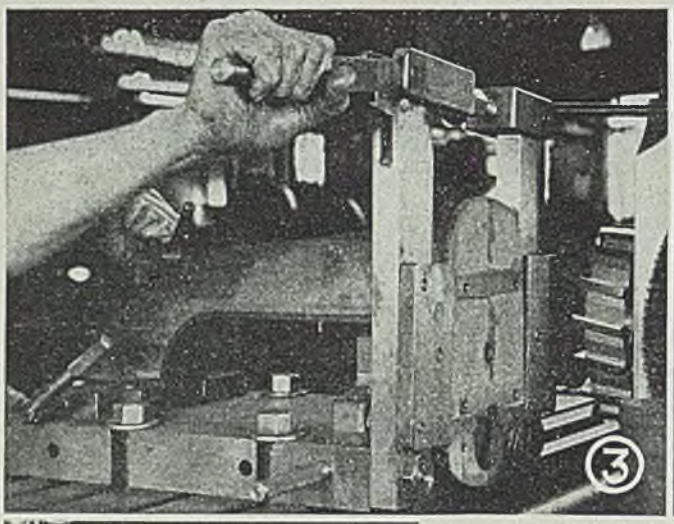
Drill Press Group
50 Rockford 20"
51 Delta (3) 17"
52 Delta (5) 14"
53 Delta 14", 1942
54 Delta 14", 1942

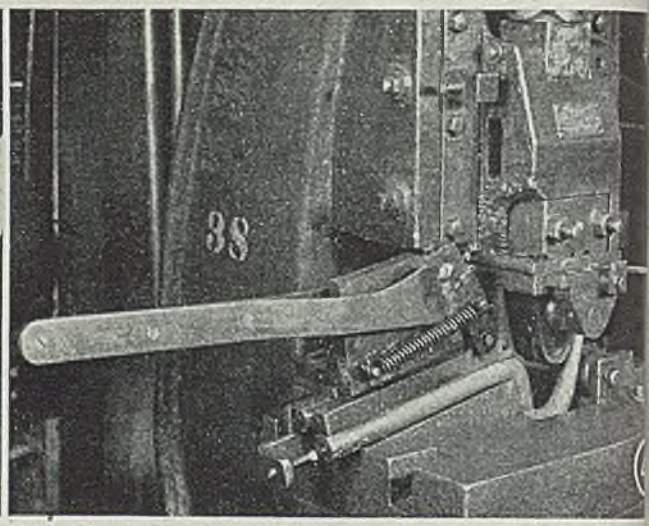
Grinder Group
60 Landis-Universal, 1942
61 Thompson, Surface, Hydraulic, 1942
62 Grenby—Internal, 1942
63 Kwik Way—Multipurpose
64 Kwik Way—Cylindrical
65 Sunnen Hone, 1942
66 Sunnen Hone, 1942
68 Acme Chase Surface Grinder
69 Belt Sander

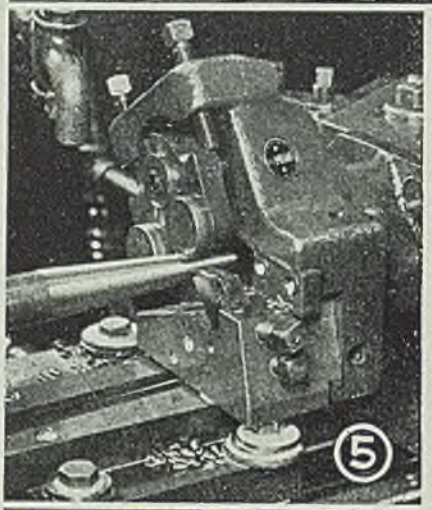
Heat Treating Department
71 Drawing Pot and Grill
72 Stewart Two-Purpose Furnace
73 Preheating Grill
74 Eclipse High Speed Oven 8" x 14", 1942
75 Eclipse Gas Fired Pot 18" x 18" — Temperature Range 350° to 1450°
76 Eclipse Gas Fired Pot 18" x 18" — Temperature Range 1400° to 1750°, 1942
77 Oil Quenching Tank
78 Circulating Water Quench
79 Spout Quenching Fixture
86 General Electric 150 Amp. Arc Welder

Painting Department
81 Gas Fired Paint Oven, 7' x 9'
82 Air Draft Booth
83 Binks Air Compressor

Inspection Department
91 Wilder Micro Projector
92 Rockwell Hardness Tester
93 Magni-Ray
94 Magni-Ray
95 Inspectograph
96 Comparitol
97 Gauge Cabinet and Inspectoset







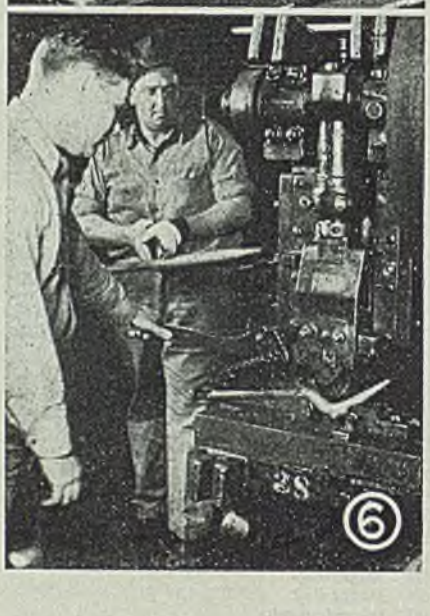


Fig. 3—Special self-equalizing toggle clamp fixture solves "float" problem in machining castings that may have considerable variation in overall dimensions

Fig. 4—Closeup of two-step roller die, shown completing horn. Hand lever controls engagement and selection of dies

Fig. 5—Unique box tool to cut taper uses a ball bearing roller located on bottom of tool to follow the groove in the guide block attached to the cross slide, thus forming a predetermined taper on the work

Fig. 6—Overall view showing initial bend in forming the horn, using two-step roller type die. Then work requiring stroke longer than press can work, can be handled without difficulty. See Fig. 4

Fig. 7—Fastener dial has numbers rolled into surface on setup in Fig. 8

nails from a spool of specially knurled wire, drives and countersinks them at the rate of three per second, all in one pedal-controlled stroke. It handles all shoe repair work such as toe pieces, top lifts, heels, half-soles, shanks and bases. Because of shoe rationing, it is considered as performing a most essential function. (2) The automatic nailer, using the same basic principle, eliminates hand-driving of small brads and nails in light wooden and plastic materials.

Just added to the line is a heavy duty model of the nailer designed for high-speed nailing of furniture, toys, novelties, boxes and many other items. It is being enthusiastically endorsed by the wood working industry in that it revolutionizes light-nailing operations. The Take-Along Travel Chair Co., Thomasville, Ga., for example, reports that it reduced nailing time per chair from 5 min to only 40 sec. Both machines hold 5-lb coils of knurled steel wire in Nos. 18 to 21 gage. The machine automatically cuts 1/4 to ¾-in. needle-pointed lengths, selected by dial control.

Because of its high priorities, about 80 per cent of Auto-Soler volume has been on its own machines. The remainder has been of such war production as lock and recoil mechanisms for the PBY flying boat pontoons, shackle bolts for tank transporters, pistons for hydraulic landing gears, and the like.

The conditions that make Auto-Soler a good case study of what may be expected of small plant aggressiveness in the South is that so much of its volume has remained of its own nature during 14 difficult depression and war years, th a high order of precision has been r quired and that production per manho has risen so steadily.

Of 236 parts involved in the automat nailer, the company makes or process 170 of the 193 parts in the soler, th plant itself produces 160. Most of thes are of tool steel, only 19 to 42 par whose processing was analyzed were c cold-rolled stock. Tool steels are large Albany, Ontario, Seminole, Deward, Je sop brands; the company using the polic of triplicate sources of supply. Muc use is made of Allegeny-Ludlum Ontari steel in the oil hardening series; analyzin C 1.48, Cr 11.22, Mn 0.29, Si 0.34, V 0.25, with Mo. 0.75 per cent. This the material of which the componen stationary, movable and stud parts o the driver knives are made, a precis production sequence requiring 30 oper tions to limits within 0.0005-in.

Auto-Soler employs 110 people. I production has increased from $101,50 in 1940 to $636.521 for 1944. More i portant, average production per e ployee has increased from $2985 in 19 to $6179 in 1944. It has no conversi problems. Its present plant is equipp with a full range of modern machine including late models in milling ma chines; saws; engine, bench and spee lathes; knurling machines; turret lathe presses and shapers; drill presses an grinders. A centralized heat-treat de partment is maintained and its paintin department is equipped with gas-fire ovens, and Binks air compressors.

Shop layout is unusually modern

achieving high production per square foot. A research laboratory and production control room is provided. Floor layout is shown in Fig. 2. Symbolic of the progressive spirit of this plant is the use of production illustrations and a unique system of material and work control on a weekly lot basis.

All operations are reduced to production illustrations of 8½ x 11-in. blueprint size for standardized filing. This takes the place of the operations, the speed and feed, standard time allotted to the job and estimated time, material and account code.

A production illustration, see Fig. 1, appears mechanically and in perspective with all dimensions, developed so that the green operator can quickly understand his function without knowing how to read a blueprint. The customary other specifications and routings appear upon it. A library of 600 such production illustrations is kept in Tool Department, filed for instant reference and fresh to the moment.

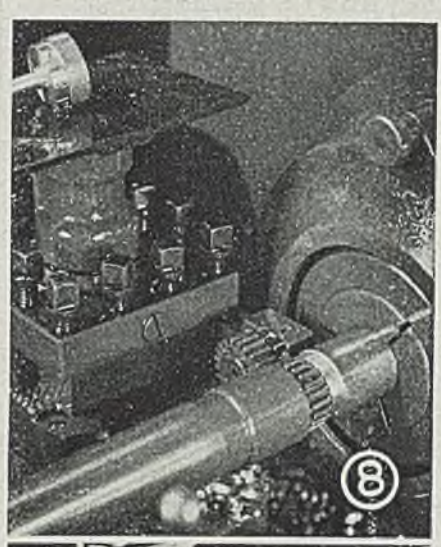
Scheduling and control system is somewhat unique, borrowing its technique from the method of scheduling military operations. It calls its D-Day an "A-Day" (or Assembly Day) which always starts each Monday morning and concerns the assembly of a lot of 40 or more machines to be finished and ready for shipment on Saturday noon or A-Day plus 8. The psychological effect of this weekly lot scheduling and timetable has upped production materially. It gives the entire shop personnel a clear and current picture of performance in relation to schedule, permits all to know status, clears the floor over the week end so that all can go home with no shop worries.

The operations preceding A-Day are divided into groups of 10 in numbered sequence and their flow of preparation as make-ready for A-Day is tightly scheduled on an A-Day minus X basis so that all parts, production, sub-assemblies and electric work will be on hand in proper order, having proceeded through fabrication or service of supply in orderly flow.

This setup starts on A-Day minus 13 with the first main assembly billing under Operation Group No. 10. See Tables II and III. It then proceeds from department to department on a declared timetable through planning, parts, production, sub-assembly and electrical to arrive at Main Assembly on A-Day.

Another method is the Auto-Soler "roving inspector" plan in which all work must secure inspection approval before the operation can start into production at the beginning of each shift. The particular machine or job is set up, the roving inspector checks it at machine side, then the operation is thrown into production. Because of this, rejects in all operations are exceptionally low, there being practically no scrap or re-work to affect costs.

Small as it is, the plant does all of its own research, experimental and production tooling, having a completely equipped tool department both in design and tool production. It seems worthy to detail certain tooling jobs to evidence the abilities now to be found in the South. Heretofore, most such tooling has been sent to outside special-



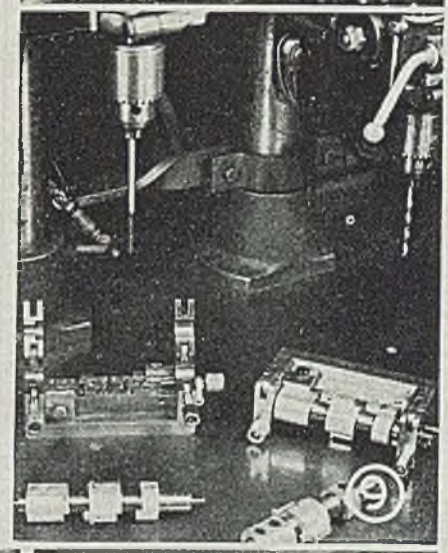
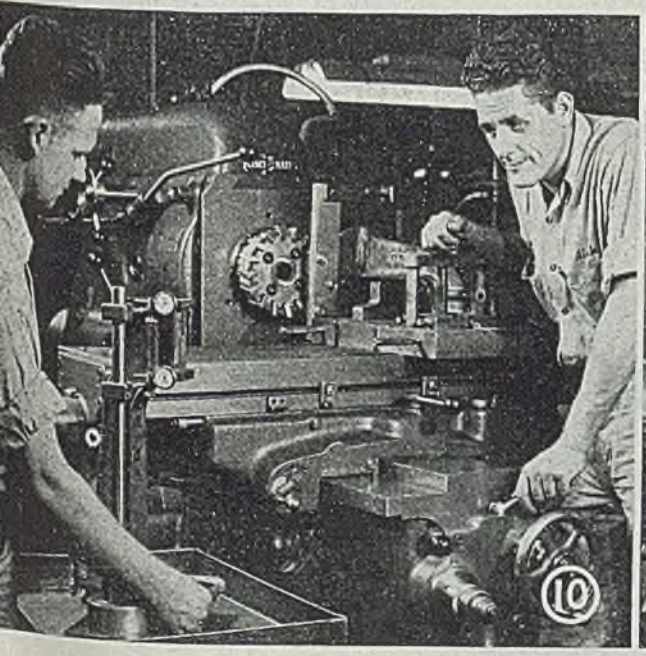


Fig. 8—Work held in lathe has number impressed in surface from roller die that is driven through a gear alongside work itself, thus avoiding necessity for special drive to die

Fig. 9—Unique drill jig accurately locates three members on a screw in exact relation to each other for drilling, also simultaneously "inspects" the complete assembly

Fig. 10—All Auto-Soler operation setups must pass rigid inspection before and during production runs. Here roving floor inspector is checking piece while operator awaits okay before continuing run

Fig. 11—For milling high carbon, high chromium steel—one of 24 operations in making one side of a pair of Auto-Soler shearing knives



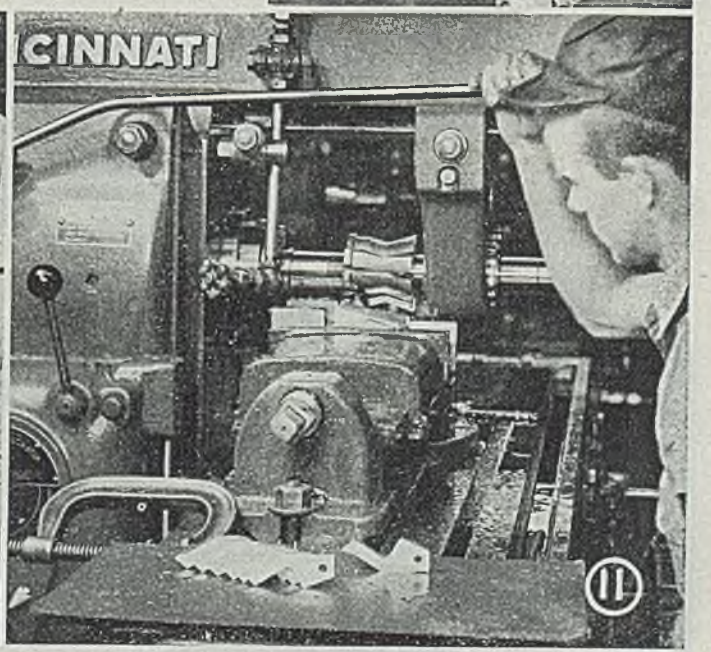


TABLE II—MASTER TIME SCHEDULE

OPR.	NAME OF OPERATION	DEPARTMENT	MON	TUES	WED	THUR	FRI	SAT
10	Main Assembly Filling	Mr. Wilson						
20	Bill & P. O. Horns	Planning						
30	Fill B/M Horns	Parts		A-13				
40	Start Production Horns	Production						
50	Bill & P. O. Electric Pedal	Planning						
60	Bill & P.O. Sub-Assembly	Planning			A-12			
70	Bill & P.O. Flange	Planning						
80	Bill & P.O. Bases	Planning						
90	Bill & P.O. Main Assembly	Planning						
100	Bill & P.O. Horn Bushing	Planning				A-11		
110	Fill B/M Electric Pedal	Parts						
120	Fill B/M Flange	Parts						
130	Paint Flange	Paint						
140	Start Production Electric Pedal	Production					A-10	
150	Fill B/M Horn Bushing	Parts					A-10	
160	Fill B/M Upper Guide Assembly & Lower Guide Casting	Parts			A-12			
170	Fill B/M Dial & Guide Assemblies	Parts						
180	Fill B/M Motors	Parts						
190	Fill B/M Bases	Parts						
200	Fill B/M Foot Pedals, Lifter Arms, & Lifter Arm Stops	Parts						
210	Fill B/M Motor Bracket	Parts						A-9
220	Fill B/M Table Post	Parts						
230	Paint Electric Pedal	Paint						
240	Paint Horn Bushing	Paint						
250	Paint Upper Guide Assembly & Lower Guide Casting	Paint						
260	Paint Foot Pedals, Lifter Arms, & Lifter Arm Stops	Paint						
270	Paint Horns	Paint						
280	Paint Motor Brackets	Paint						
290	Start Production Dial & Guide Assemblies	Sub-Assm.	A-7					
300	Start Production Motors	Electric						
310	Start Production Bases	Production						
320	Start Production Flange Assembly	Production						
	Complete Motors	Electric						
	Complete Flange	Production						
330	Fill B/M Electric Assembly	Parts		A-6				
340	Fill B/M Horn Assembly	Parts						
350	Fill B/M Drums-Arms-Face & Side Plates	Parts						
360	Paint Drums-Arms-Face & Side Plates	Paint						
	Complete Production Dial & Guide Assm.	Sub-Assm.						
370	Start Production Horn Assm.	Sub-Assm.			A-5			
380	Start Production Electric Assembly	Electric						
	Complete Machining Bases	Production						
390	Fill B/M Bracket Assembly	Parts						
400	Fill B/M Shelves & Drawers	Parts						
410	Fill B/M Main Assembly #1	Parts						
	Complete Horn Assembly	Sub-Assm.				A-4		
420	Start Production Bracket Assembly	Sub-Assm.						
430	Paint Bases	Paint						
440	Start Production Shelves & Drawers	Production					A-3	
450	Start Production Main Assembly #1	Assembly						
460	Paint Shelves & Drawers	Paint						
470	Fill B/M Feeder Arm Assembly	Parts						A-2
	Complete Bracket Assembly	Sub-Assm.						
480	Fill B/M Main Assembly #2	Parts						
490	Fill B/M Main Assembly #3	Parts						
500	Paint Feeder Arm Assembly	Paint	A DAY					
510	Start Main Line Assembly	Assembly						
	Complete Electric Assembly	Electric						
520	Main Line Assembly #3	Assembly	A-1					
530	Fill B/M Main Assembly #4	Parts						
540	Main Assembly #4	Assembly		A-2				
	Complete Assembly	Assembly						A-5

ists, usually in the North since only about 2 per cent of essential tooling is accomplished by the plants themselves in the South, it is reported. This trend toward in-plant tooling is seen as evidence of the progressiveness of the new industrial South.

The driving head on these automatic soling and nailing machines is mounted on a bracket casting. This requires milling the bottom of the casting, including a shelf clearance cut. This is accomplished on a miller using a 6½-in. face mill at 63 and 60 rpm respectively with feeds of 7 5/8 in. and 4 5/8 in. at a standard time of 0.0315-0.0320 and 0.0155-0.0165 respectively. The bracket, received as a rough casting, is machined on its top, all faces and bottom. A specially designed fixture is used to mill bottom and clearance. The difficulty in this machining is the variation in casting dimensions at the bottom. It is necessary to locate the part in the mill from its top, small end. The distance is so great between locating points at the top and milling surface of the bottom that there is wide variation to be overcome, for the bottom must be square with the face of the head of the assembly within 0.005-in.

Toggle Type Fixture

The procedure employed in the fixture is to locate the work on the top machined surfaces by four locating buttons. These clamp down and sidewise on the bracket top with screw clamps that support the bottom while the cut is being made. The fixture might be described as a toggle with floating, serrated jaws, see Fig. 3. The toggle clamps sidewise to equalize the action. The fixture has a screw to take care of variations in casting width up to 1/16-in. The floating jaw is hinged on a center pin and two stud pins produce the required "float." The float takes care of the angle of variation, as well, which is about 5°.

The horn is the part on these machines which positions the work against the driver. It is peculiarly bent and tapered. Produced from SAE-1020 1 1/8-in. round, it involves a tapering and hot forming operation, both of which have interest.

The taper is turned on a Warner & Swasey turret lathe at 848 rpm and a feed of 0.010-in. with a special taper tool. The taper proceeds at 1¼-in. per foot over a distance of 5¼ in. The special taper tool is mounted in a slide on the box tool. See Fig. 5. A grooved piece of metal is mounted on the cross slide, set to the angle of the taper. A roller on the bottom slide travels up in the slot or groove, taking from 1/8 to 1/2-in. in one cut.

The hot forming of the horn, after taper, is accomplished in two swipes on the punch press, using a unique set of progressive, roller dies designed by company engineers. See Figs. 4 and 6. The

Fig. 12—Research staff members working on new Auto-Nailer now being developed

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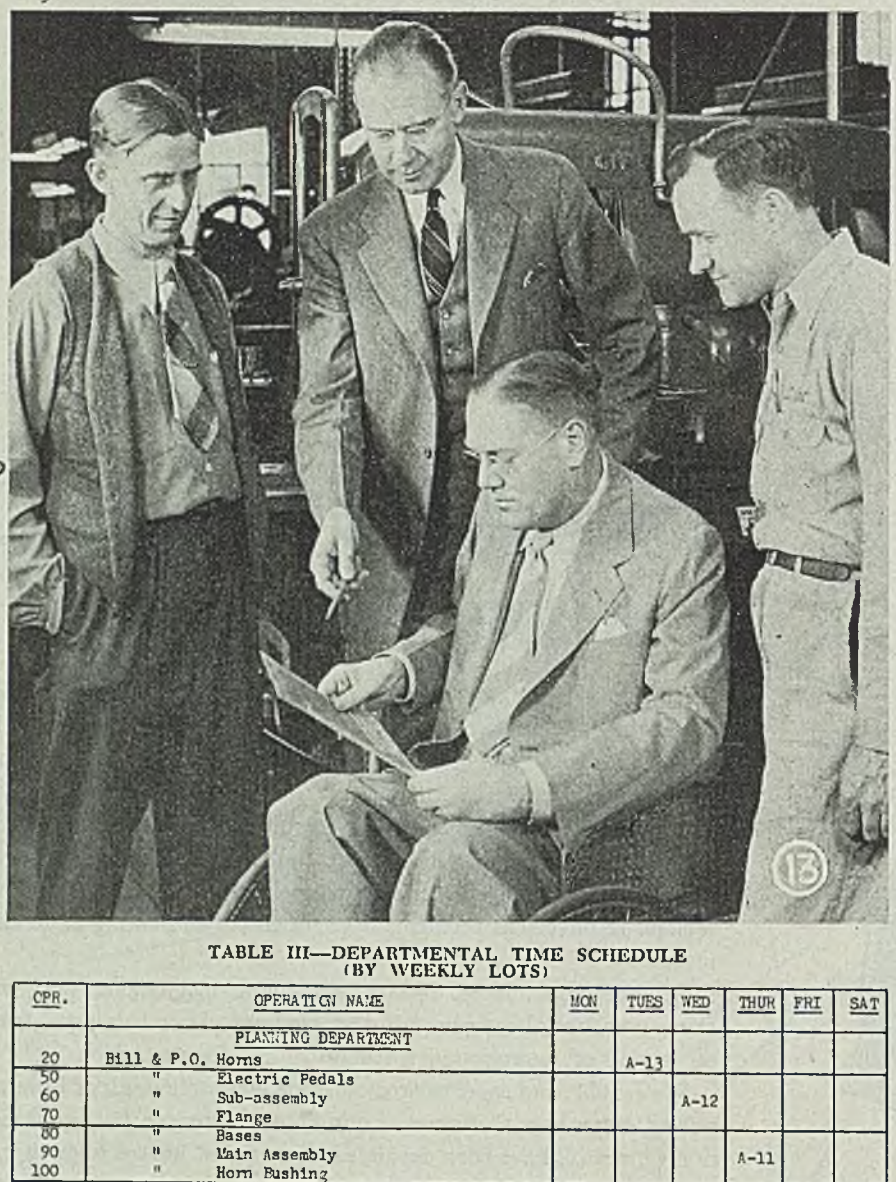

Fig. 13—Left to right: D. W. Hollowell, chief engineer; W. H. Wilkerson, president and founder of Auto-Soler Co.; A. S. Wilson, vice president in charge of production; C. H. Watkins, general superintendent

TABLE III—DEPARTMENTAL TIME SCHEDULE
(BY WEEKLY LOTS)

OPR.	OPERATION NAME	MON	TUES	WED	THUR	FRI	SAT
	PLANNING DEPARTMENT						
20	Bill & P.O. Horns		A-13				
50	" Electric Pedals						
60	" Sub-assembly			A-12			
70	" Flange						
80	" Bases						
90	" Main Assembly				A-11		
100	" Horn Bushing						
	PARTS DEPARTMENT						
30	Fill B/M Horns		A-13				
110	" Electric Pedal						
120	" Flange				A-11		
150	" Horn Bushing						
160	" Upperguide Assembly & Lower Gde.Cast.			A-12			
170	" Dial & Guide Assembly						
180	" Motors						
190	" Bases						A-9
200	" Foot Pedals,Lifter Arms-Lift.Arm Stops						
210	" Motor Brackets						
330	" Electric Assembly						
340	" Horn Assembly		A-6				
350	" Drums,Drum Arms,Face & Side Plates						
390	" Bracket Assembly			A-5			
400	" Shelves & Drawers						
410	" Main Assembly #1				A-4		
470	" Feeder Arm Assembly						A-2
480	" Main Assembly #2	A					
490	" Main Assembly #3	DAY					
530	" Main Assembly #4		A-1				
	PRODUCTION DEPARTMENT						
40	Start Production Horns		A-13				
140	" Electric Pedals					A-10	
310	" Bases						
320	" Flange Assembly	A-7					
440	" Shelves & Drawers					A-3	
	SUB-ASSEMBLY DEPARTMENT						
290	Start Production Dial & Guide Assemblies	A-7					
370	" Horn Assembly			A-5			
420	" Bracket Assembly				A-4		
	ELECTRIC DEPARTMENT						
300	Start Production Motors	A-7					
380	" Electric Assembly			A-5			
	Complete Motor Assembly Unit	A DAY					
	MAIN ASSEMBLY DEPARTMENT						
450	Start Production Main Sub-Assemblies #1					A-3	
510	" Main Assembly - Bases	A DAY					
520	" " No 3		A-1				
540	" " No 4			A-2			
	Complete Main Assembly						A-5

work comes from the central heat tre department at 1600°F. There are fo men in the crew accommodating th press; one man at the heat treat furnac one at the press and two helpers trave ing between. The haul distance is abo 35 ft.

The helpers insert the tapered roun placing it against a stop. The pressma clamps the work. His step on a fo pedal engages the first stroke, causin the roller die to form 50 per cent of th bend. The die rolls over as the met gives. He then shifts a lever, Fig. which brings the second roller die pr gressively against the work, the latte being stationary. The second stroke ac complishes the finished contour. Th bend depth is 3 in.

The two progressive roller dies ar 2 in. in diameter. The problem here wa that the bend was greater than th stroke capacity of the press. The ho in the bolster plate had to be employe to get enough strike. The work is do on an old 22-ton Jones press, one of th very few old machines in the plant. Af forging, the work is dipped in a cleani bath to prevent scale. This is a solut oil-water mix in the ratio of 1:60.

Machines Produce Own Nails

The soling and nailing machines pr duce their own nails from a knurled co of wire. The dial mechanism that reg lates the nail length is graduated i increments of 1/8 from 3/4-in., neces sitating seven markings, See Fig. This numbering operation is accom plished on a turret lathe by special too ing, Fig. 8. A shaft with the driving ge of this tool is held in the turret. T number cutter is attached to a drive gear and is held on the cross slide. Th pitch diameter of these gears equa the outside diameter of the dial so th by inserting the cross slide into th depth of the work approximately 0.01 in. the gears rotating at the same spee as the work, the turn impresses the num bers in the circumference of the di The pins of the driving gear seat in the face of the dial when the turret engaged. The work then turns the dr ing gear which, in turn, drives the g attached to the numbering die.

The double-acting lock and re mechanism, pictured in Fig. 9, sh ingenuity. It consists of 33 machin parts. It is of the screw type, a mo actuating the drive screw. The proble here is to locate the nuts and the st at the end so that at the end of ea stroke, the stop on the nuts would b perfectly in line. Operation of the mec anism involves six complete turns wi a 1/32-in. clearance overall for fr movement of the nuts. These are drill

(*Please turn to Page 178*)

A Quick Change Here

STEPPED PRODUCTION UP 50%

Above: Drawing from round (approximately 5" dia.) to hex shape (approximately 2¾" across flats) in one pass—one of the three operations on which use of Carboloy Dies increased, by 50%, output of nose cups for jelly bombs.

★ In the drawing of nose cups for jelly bombs, at C. M. Hall Lamp Company, Detroit, the production line "snagged" at these three vital points (1) "ironing" the walls from .140" to .125" thickness, (2) drawing from round to hex in one pass, (3) final sizing. Extremely rapid wear on chrome plated dies required frequent press down-time, at intervals ranging from a few hours to 3-4 days. A special crew of die service men worked continuously on die replacements.

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Lubrication in the Drawing of Metals

By SAMUEL SPRING
Chemist
Frankford Arsenal
Philadelphia

Mr. Spring discusses physical methods of testing drawing lubricants in a 2-part article which will be concluded next week. For further data on drawing lubrication, see STEEL for March 19, 26; April 2, 9; August 13, 20

THE adequate evaluation under production conditions of lubricants for drawing metal is extremely difficult and tedious because of the multitude of variables that are difficult to maintain under control for considerable lengths of time. In addition, the rejection by production superintendents of any projects that might interfere with production schedules, requires keeping the amount of testing under these conditions at an absolute minimum. This is usually the case even when temporary production drops are to be duly compensated by increased rates of production in the future.

Physical testing drawing lubricants will be treated here with emphasis on laboratory methods. These methods have great value as screening procedures to reduce the number of production tests to a minimum and in demonstrating trends in the development and use of lubricants. In all cases, their limitations must be securely kept in mind and interpretation of the data accordingly made.

In previous discussions on lubrication in metal drawing[1] it was pointed out that two of the most important requisites of good drawing lubricants are:

1—Adequate weld preventive properties.

2—Low resistance to deformation of the lubricant itself.

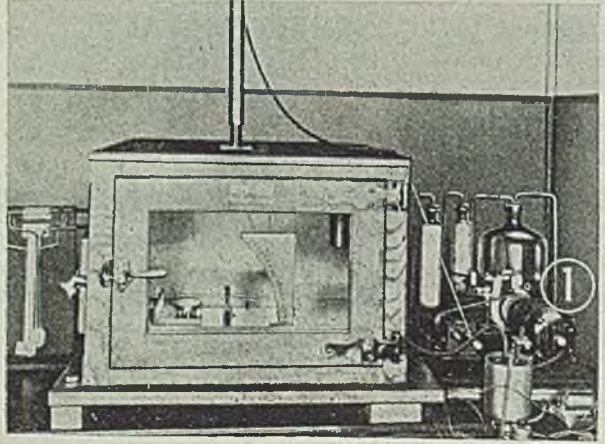
The first requisite is considerably more important than the second. The prevention of welding in drawing operations may be performed by different types of lubricants depending upon the pressures involved. In general, pressures during metal drawing are high and lubrication can be efficiently obtained only by the use of polar boundary lubricants and extreme pressure lubricants. The latter is required for the more severe operations particularly in deforming metals with high yield limits, such as steel.

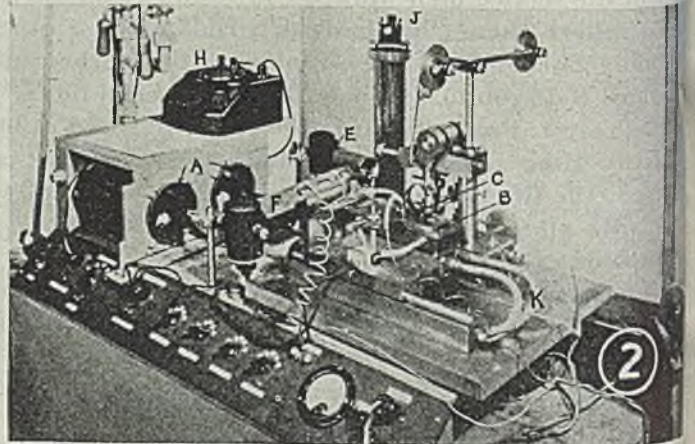
Polar or boundary lubrication occurs under conditions of high pressures and low speeds (plus appropriate lubricants) such that a thick film of lubricant cannot be maintained between the surfaces. Polar lubricants include long chain fatty acids, oxidized and polymerized mineral oils, etc. Extreme pressure lubrication occurs under those still higher pressures and temperatures at which polar lubricants are unstable, and involves the formation of moderate amounts of stable inorganic compounds that are not easily displaced. An important exception to the above lubrication requirements is in the case of dried, plastic deposits such as soaps and waxes. In this case, the deposit is maintained in position by a somewhat obscure mechanism[1].

Exclusive of testing drawing lubricants, a good many methods have been devised to test the properties of lubricants under boundary lubrication and extreme pressure lubrication conditions. Since these properties frequently determine the performance of drawing lubricants, as mentioned above, these methods are of interest to this treatment. In some instances, these methods have been

Fig. 1—Inclined plane apparatus[13] for testing boundary lubricants

Fig. 2—Bowden apparatus[10] for measuring and analyzing friction between slowly moving surfaces, with and without lubricants. Water-driven pistons (A) drive lower flat surface (B). (C) Upper curved surface. (D) Surface thermocouple. (E) Light source for recording friction. (F) Light source for recording surface speed. (G) Leads to heating element for heating lower surface. (H) Galvanometer for giving visual readings of surface temperature. (J) Galvanometer for recording surface temperature simultaneously with friction. (K) Rubber tubing to cooling system below heating element. Recording camera not shown





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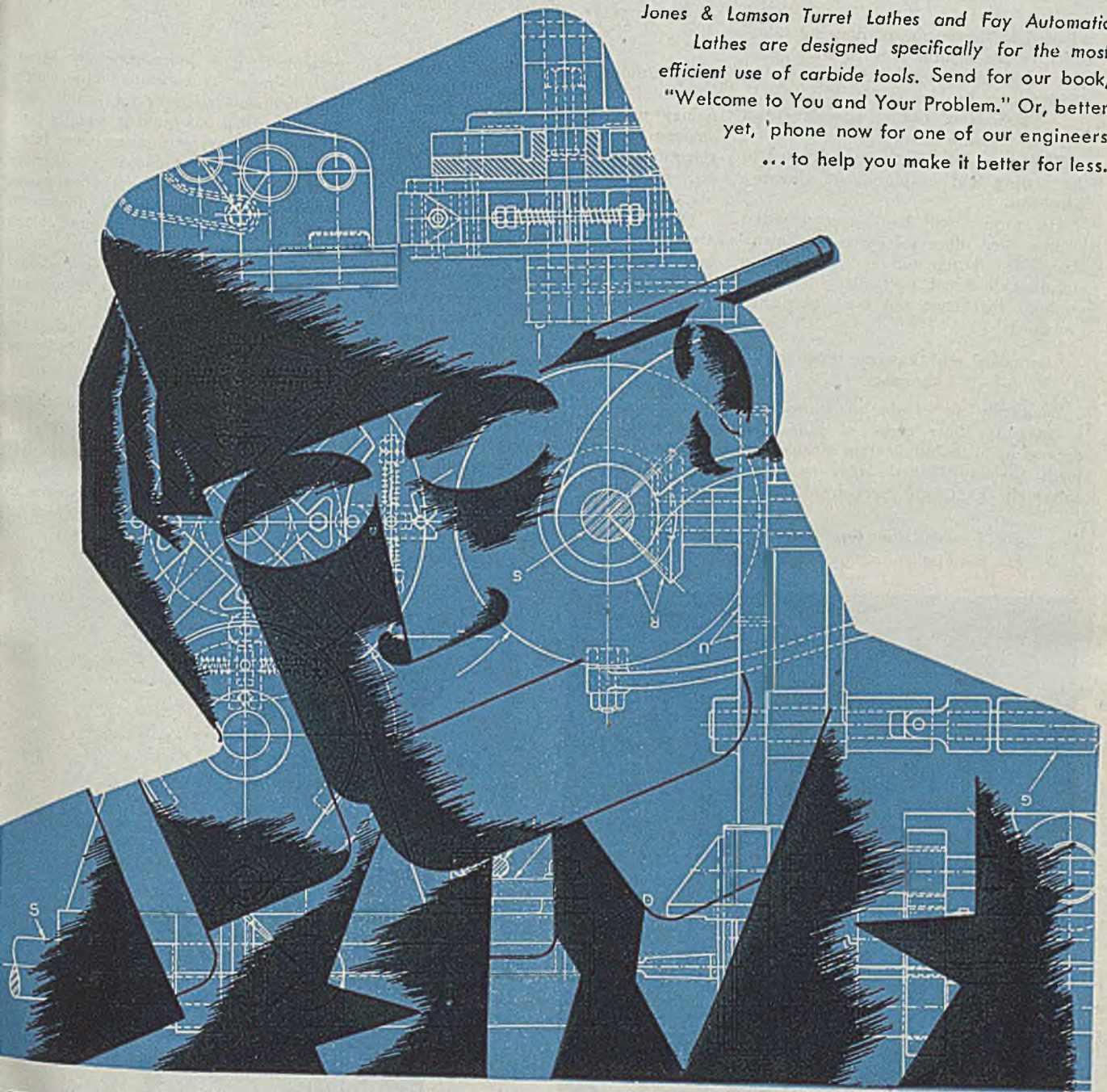

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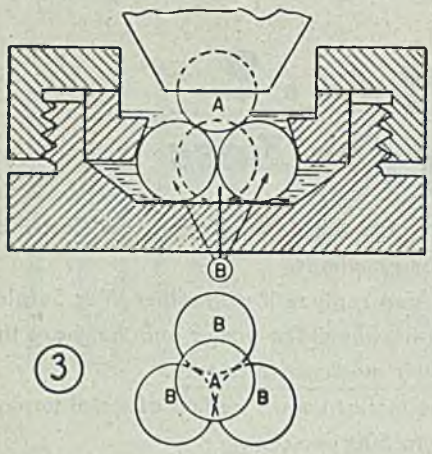


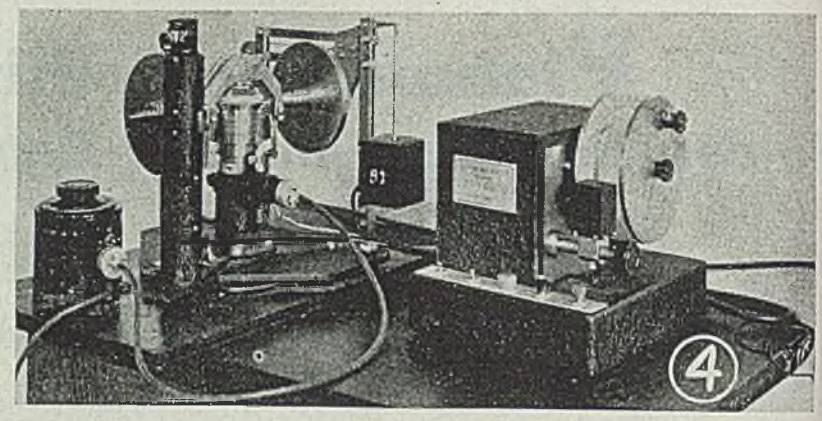


Fig. 3—Cross-section of 4-ball bearing apparatus
Fig. 4—Four-ball top with photoelectric chronograph

adapted to the testing of drawing lubricants, or are capable of such adaptation. This discussion consequently will be divided into two sections:

1—Methods of testing boundary and extreme pressure lubricants.

2—Methods that have been applied to the testing and evaluation of drawing lubricants.

The former will be discussed rather briefly since other references are available. The latter will be discussed in considerable detail, particularly for those methods that have not been published previously.

Boundary and Extreme Pressure Lubricants

Practically all of the machines used to measure these types of lubrication depend upon the application of moderate loads to very limited areas to obtain extremely high unit pressures. Before specific description of these methods, it is desired to discuss some of the terminology used in this work. First, the concept of "oiliness" may be considered, since many of the devices to be described have been referred to as "oiliness" testing machines.

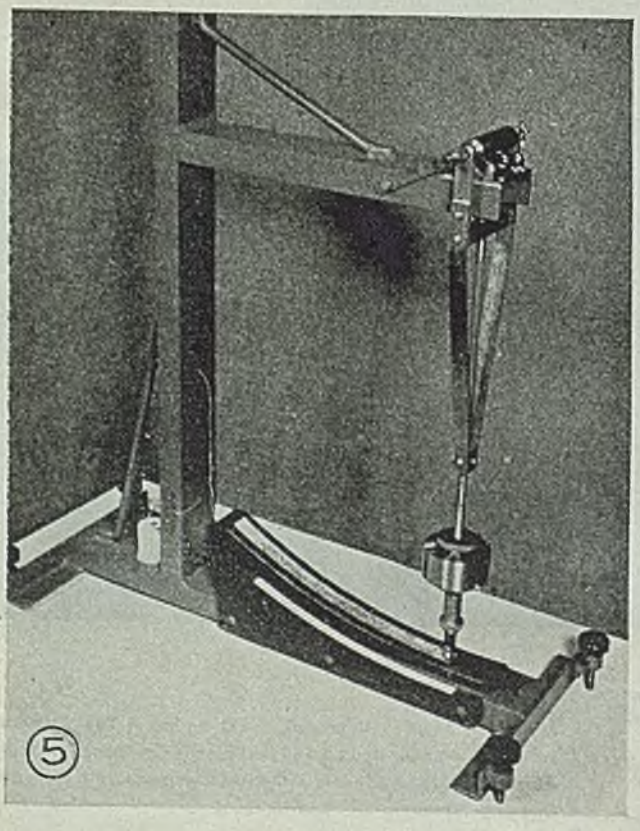
Oiliness was defined by the ASME in 1919[2] as "a term signifying differences in friction greater than can be accounted for on the basis of viscosity when different lubricants are compared under identical conditions", i.e. the property which causes two lubricants of the same viscosity to give different values for the coefficient of the friction with the same instrument[3,4]. Thus defined, this concept could include polar lubricants and extreme pressure lubricants although the latter were practically unknown as such at the time that this definition was presented. It is more generally agreed that "oiliness" is associated more closely with boundary or polar lubrication[3,5,6,7,8,9], although it has quite frequently been referred to when extreme pressure lubrication is being considered[10,11]. Because of this confusion and the erroneous concept-forming tendencies of the word itself, it is believed that this term, coined when the phenomena involved in its usage were poorly understood, should not be employed in further discussions.

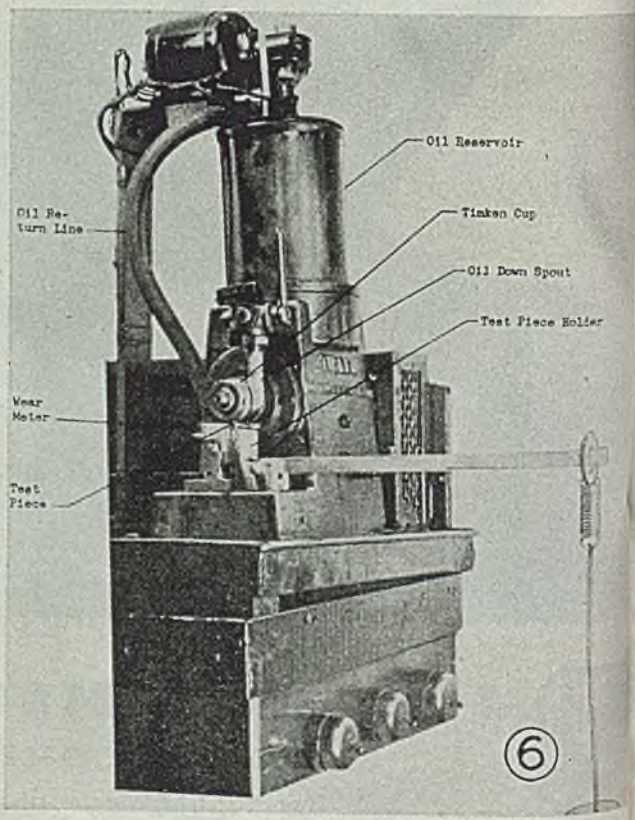
The terms film strength, anti-weld, and load carrying capacity which have been associated with extreme pressure lubrication will be discussed later.

Methods of Testing Boundary Lubricants

A—Slider and inclined plane. (Fig. 1) This method was developed by Hardy[1] and has been used by several other investigators[13,14,15]. An inclined plane with accessories for sensitive adjustment of

Fig. 5—Pendulum type tester
Fig. 6—Timken machine for testing EP lubricants





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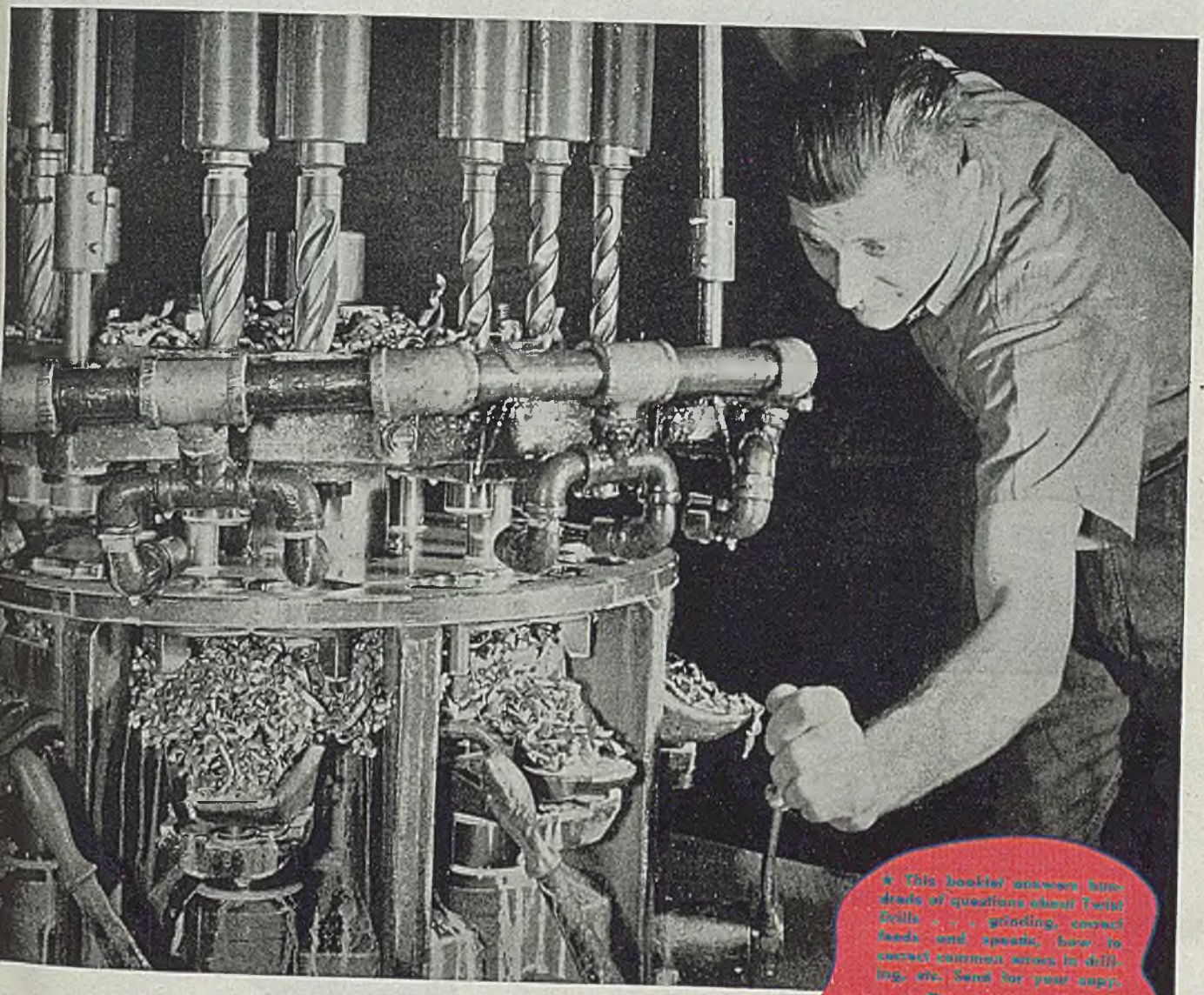

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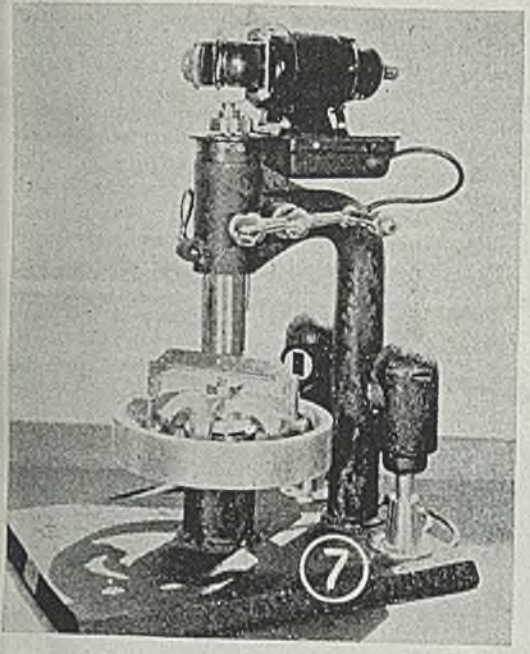


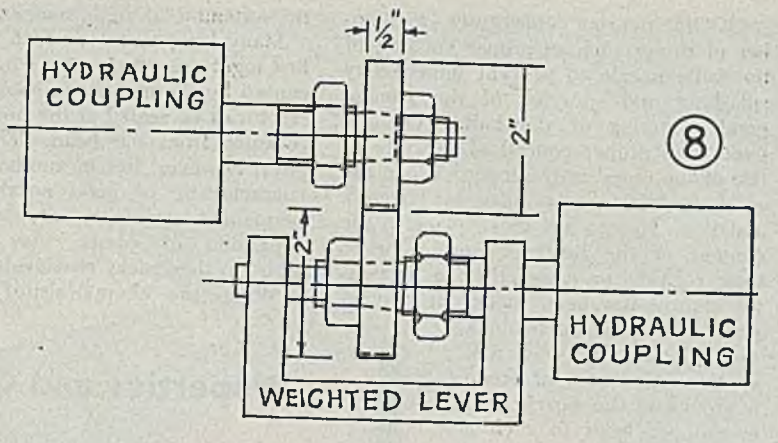


Fig. 7—Four-ball lubricant tester

Fig. 8—SAE machine for testing hypoid gear lubricants

the angle of inclination is used and a curved slider under high load is allowed to rest on the lubricated plane. The angle of elevation for the first movement of the slider is determined and the coefficient of friction calculated. This method has the advantages of simplicity of design and can also be used for measurements in a vacuum. The validity of the method is attested to by the large number of fundamental relationships that have been determined with it.

B—Deeley Instrument[16]. This consists of a heavily loaded tripod with pegs as legs resting on a disk covered with lubricant. The disk is moved slowly. The movement of the tripod actuates a vertical spindle to which a spiral spring and pointer are attached; when slippage occurs between the pegs and the disk due to the stress on the spring, a reading on the pointer gives value from which the coefficient of friction can be calculated. Many modifications have been made by Wells[17], Fogg & Hunvicks[9], Herschel[18], and Bridgemen[19]. The Wells Apparatus was used by Francis to test wire drawing soaps[17].

C—Bowden Apparatus[20] (Fig. 2). The instrument consists essentially of a lower flat surface with an upper curved surface (hemisphere slider) resting on it. The lower surface (B) is driven at a uniform rate by a water piston (A). The upper surface (C) is supported by a spring device for applying the load, and a bi-filar suspension for measuring the frictional force. The inertia of the system is small, so that it is capable of responding readily to rapid fluctuations in frictional force. Measurements are made such that opportunity is afforded for the magnification of effects due to welding of surfaces, because of the repeated contacts between the same surfaces. The data obtained by this rather complicated and very precise device have fitted into a comprehensive theoretical pattern that has been a prime factor in progress in the field of lubrication.

It has also been possible to apply many of these conclusions to practical lubrication problems. On these bases, it appears that these techniques are valid. It is with this instrument that the "stick-slip" process of motion of rubbing surfaces was studied. Somewhat similar equipment, with certain modifications has been used by Morgan, Muskat and Reed[21], for other highly refined studies.

D—Four Ball Top (Figs. 3, 4). In this device, three steel balls are clamped together and a fourth ball is caused to rotate upon them under variable speeds and loads. The coefficient of friction is obtained by determination of the time required to stop after the rotor is given a definite initial angular velocity[22] or the decelerating torque is determined[23].

E—Pendulum[24]. A heavy pendulum is suspended from a finely polished cylinder oscillating on four fixed steel balls and changes in amplitude are measured. In the instrument pictured in Fig. 5[18] a small light is inserted in the pendulum and a photographic record obtained.

F—Almen or General Motors Testing Machine[25]. Consist of three end-thrust ball bearings mounted so that the upper and lower races can be revolved concentrically and loaded axially. The starting torque under load is measured.

G—Other direct methods include the Moore-Carvin Machine[26] and the Ralston Apparatus[27]. Indirect methods have been employed such as determination of the heat of absorption of oils on metals[3], the the clogging of metal capillaries[28], the interfacial tension and absorption of oils on metal[31] and the adherence of the lubricant to a rotating drum[29].

Measuring Extreme Pressure Lubrication Characteristics

These methods probably are more applicable to drawing lubrication problems than measurements of frictional resistance under high unit pressures. In all instances the occurrence of seizure or wear, that is, removal of metal under frictional conditions is used as a criterion of lubricant evaluation. These machines were primarily developed to test hypoid gear lubricants for automotive applications but gave rather conflicting results in many instances[30]. However their design is such that they can be useful for other applications. In measuring extreme pressure lubrication characteristics three designations have been applied to the properties measured, namely:

1. Film strength.
2. Load carrying capacity.
3. Anti-weld capacity.

As in the case of the term "oiliness" previously discussed, considerable confusion exists in this terminology. It appears to be more generally agreed, if agreement may be said to exist, that Film Strength or Boundary Film Strength should be applied to the ability of those organic lubricants that are adsorbed on metal surfaces to prevent wear and welding (with eventual seizure) under fairly high pressure and temperature conditions. As such it refers to a manifestation of boundary or polar lubrication and its main difference from the previously discussed methods lies in the methods of testing inferred. That is, it infers a more prolonged testing method in which the results of metal-to-metal contact are intensified and magnified by repeated contacts between the surfaces, which results in aggregation of one surface upon another, or disruption of surfaces.

The other terms, load carrying capacity and anti-weld may be construed to refer specifically to the property of lubricants containing reactive constituents, such as sulphur, chlorine or phosphorus, of forming stable films on metal surfaces that prevent large scale welding by preventing intimate contact between the surfaces. Differentiation between the terms might be made on the basis that the "anti-weld" property of a lubricant prevents seizure even though conditions are so severe that considerable welding and wearing occur. It is considered, however, that it would be preferable for this term to be re-

(*Please turn to Page* 180)

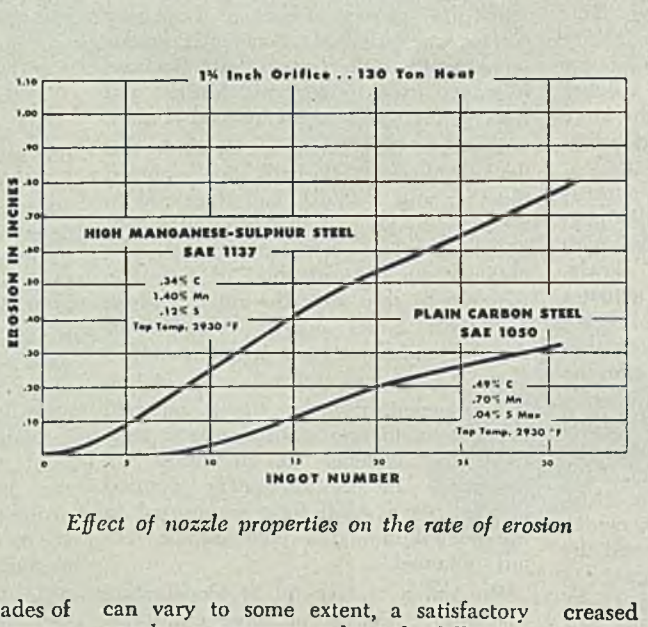
Properties and Care of

LADLE NOZZLES and STOPPERS

GOOD pouring constitutes a number of things such as proper opening of the ladle nozzle to prevent unnecessary splashing and spraying of the stream, good centering of the ladle over the mold, and proper control of the rate of rise of the metal in the ingot. When the mold is full, the stopper is lowered, and if no change has taken place in the contour of the head or nozzle, or in their relation to each other, a successful closure has been made. If a complete closure is not made a small stream of steel will continue to flow and erode a groove in the nozzle seat or stopper head to such a depth that it may not be possible to shut off the leaking steel.

The technique to follow in such a case was explained by L. G. Ekholm and L. D. Hower, Jr., Carnegie-Illinois Steel Corp., at a meeting of the Open Hearth Committee of the American Institute of Mining and Metallurgical Engineers in Pittsburgh. The authors point out that the ability of the steel pourer to stop such a dribble depends both on his technique and the character of the refractory materials, for the nozzle must be deformed until it assumes the contour of the stopper head to make a perfect closure. This requires plenty of pressure on the part of the steel pourer, a relatively hard stopper head and a soft, yielding nozzle seat. Evidence shows that a nozzle with a low softening temperature will provide a shutoff with the least effort. A satisfactory nozzle must also possess satisfactory resistance to erosion and thermal shock.

The curves in the accompanying illustration show how a nozzle orifice increases in size from ingot to ingot when casting two different grades of steel. The upper curve, indicating greater erosion, was obtained from an SAE 1137 high-sulphur screw stock heat, while the lower curve was produced by a regular SAE 1050 plain carbon steel heat. Nozzles are particularly allergic to sulphur and manganese steels, but as steel cannot be made to suit the refractory, the refractory must be developed to suit the steel. Nozzle erosion, however, can be reduced by greater density, stronger mechanical bond, and higher refractoriness. Fortunately, the resistance to erosion of the low PCE nozzle may be improved to such an extent by proper density and mechanical bond that high refractoriness has not been found necessary except for particularly corrosive grades of steel. Tar impregnated or carburized nozzles give promise of still more resistance to erosion without loss of the plastic softening at high temperatures.



Effect of nozzle properties on the rate of erosion

Many leaky nozzles which start at the first ingot arise from severe nozzle cracks caused by thermal shock. Sometimes the crack can be sealed at the nozzle seat by pressure from the head. The best answer, however, lies in another important characteristic of good nozzles, namely, permanent expansion on reheat, for the expansion of plastic clay apparently seals up the cracks effectively.

While the characteristics of nozzles can vary to some extent, a satisfactory nozzle must possess at least the following four characteristics:

1. **Low Softening Temperature:** This is essential to facilitate the deformation of the seat and assure perfect nozzle closure. Low softening temperature is generally synonymous with low refractoriness.

2. **High Density (Low Porosity):** High density and attendant high mechanical strength reduce erosion. While a dense and highly refractory nozzle is prone to crack, no great difficulty is experienced with *low* refractory nozzles, particularly when possessing the third essential, namely:

3. **Appreciable Permanent Expansion on Reheat to 2450°F.:** This characteristic, found only in nozzles of low softening point, assists in sealing cracks.

4. **Good Workmanship, Freedom from Laminations, and Uniform Burn:** These factors must not be overlooked since uniformly round nozzle seats, freedom from internal defects, and a good clean burn are essential to good service performance.

Clay-graphite stopper heads analyzing 15 to 20 per cent carbon possess relatively high load bearing strength and can carry considerable pressure at high temperatures without excessive deformation. High refractoriness and carbon content tend to counteract the relatively high porosity, so such stopper heads can be considered as less likely to erode than the nozzle orifice. Chemical corrosion by certain grades of steel can become severe, but in general the real loss of heat material is through its lack of resistance to thermal shock. To weld up cracks the head must be compressed and deformed to some extent. In spite of the high load bearing strength of the clay-graphite head, this can be done provided sufficient pressure can be applied. Even ordinary pressures can weld up cracks near the surface of the head where it is hot and slightly pyroplastic. More often than desired, however, thermal cracks become planes of weakness and instead of sealing up on the application of force, open up and cause pouring troubles.

Responsibility and credit for good pouring belongs to five people: The stopper setter, the nozzle setter, the steel pourer, the manufacturer of the nozzle, and the producer of the stopper head. This responsibility is hard to divide, but the ability of the steel pourer is just as important as the quality of the refractories. One instance is actually on record where the number of perfect shutoffs in a shop was increased from 93 to 98 per cent merely through the increased knowledge and efforts of the casting crews.

Assuming a sound and homogeneous stopper head and a nozzle with high density, low softening temperature and sufficient reheat expansion, certain generalizations can be made concerning the proper manipulation of the stopper assembly.

First, and perhaps most important, the necessity for stopping a leaking stream however slight, at the first opportunity. The steel pourer must supply all the force necessary to deform the nozzle and effect a shutoff while the stream is still small. No more force than is absolutely necessary should be used at any time, but if a heat tends to leak the steel pourers should start working. It takes a little time to deform a viscous pyroplastic material like the nozzle

(*Please turn to Page* 184)

CARBON HAS NO MELTING POINT!

CARBON, in all forms, volatilizes without melting at temperatures far above those encountered in commercial operations.

The use of large carbon blocks for blast furnace linings is an excellent example of carbon's extraordinary ability to retain its shape—*and strength under pressure*—at white hot temperatures. In addition, it is highly resistant to chemical attack by the most corrosive slags. Hence it has become the preferred material for many high temperature applications in the metallurgical and electrochemical fields.

Graphite's very low coefficient of thermal expansion—.0000015 per °F—explains why some graphite molds for ferrous and non-ferrous metals withstand several thousand pours without longitudinal or cross-sectional change. Graphite electronic tube components, at temperatures far exceeding operational requirements, maintain an unmatched degree of dimensional stability.

Furthermore, "National" Carbon and Graphite are available as porous materials or in the form of "Karbate" impervious products for the chemical industries. We invite your inquiries on the many applications and installations of these highly versatile materials of construction.

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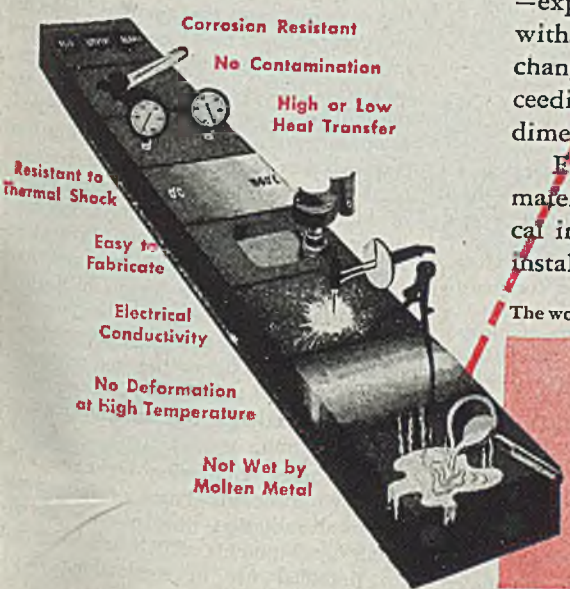

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Carbon Lining

Prevents Formation of Salamander

Six stacks in this country employ carbon brick or paste in hearth construction. One carbon lining is on order and three are contemplated. Carbon mold plugs are in development stage; mold inserts are on trial at Eastern plant. Runner lining promises new use for carbon

CARBON linings for blast furnaces, long the standard material for that purpose in Europe, are now being given much consideration in this country. This trend was brought out in a paper on "Carbon and Graphite in the Iron and Steel Industry", by Frank Vosburgh, National Carbon Co. Inc., New York, which he presented at the Pittsburgh regional meeting of the Association of Iron and Steel Engineers, William Penn hotel, Sept. 26.

In citing the reasons for using carbon in German blast furnaces he stated the refractories were relatively poor and that German ores were low grade with consequent large volumes of highly corrosive slags which were hard on the refractories. As a result, there was much experimenting with carbon brick and small blocks, many of which were made by the blast furnace people themselves and were of questionable quality. However, the furnaces were ill adapted to carbon use and the results varied from good to bad. In spite of this the use increased until in 1939 it is reported that 85 per cent of German iron was produced in carbon-lined furnaces.

Linings of carbon paste tamped into place hot are the cheapest form of carbon; at least the carbon paste itself is cheaper than formed and baked carbon blocks or bricks, but he doubted if the tamped carbon lining is sufficiently lower in cost than the brick or block lining to be of consequence.

When large blocks are used for lining the furnace, those in the wall are machined so that butting faces, made up with carbonaceous cement, are tightly joined, for wide paste joints are not easily handled in the vertical position. He recommended that joints between the hearth blocks be 1½ to 2 in. wide and filled with carbon paste tamped in hot.

Whereas it may be said that the carbon lining of a blast furnace for the hearth and hearth walls will be more costly than a clay brick lining, nevertheless the important factor is that if at the end of a campaign no salamander is found in the carbon-lined furnace (judging by the evidence available) then the extra cost of the carbon is of little consequence. Any comparison should include the cost of removing a salamander weighing up to 1500 tons. When to that cost is added the value of 10 to 20 days of lost time at $1000 or more a day, the carbon lining is cheap at almost any price. In addition if run-outs are prevented, then an important objective will have been attained.

Carbon linings will come close to being competitive on a dollar basis when the carbon is carried to the mantel, as is generally the case abroad, for then the higher cost of the carbon is offset by the cost of the cooling plates extending upwards from the top of the hearth jacket, a figure that makes up one-third to one-half of the cost of the ceramic lining.

Since 1943 a great deal more interest has been shown in the material and as of Aug. 1, 1945 progress has been as follows:

Hanna Furnace Co., Buffalo, N. Y., has put layers of carbon paste in the hearths of two furnaces.

Carnegie - Illinois Steel Corp., Pittsburgh, has installed one hearth and sidewall lining, and has purchased a second lining of ceramic sized blocks.

Interlake Iron Corp., Duluth, Minn., has purchased a carbon lining for hearth and sidewalls made of large blocks.

Carnegie-Illinois Steel Corp., Chicago, has installed in the hearth of one furnace a pad 36 in. thick of large blocks which run from shell to shell.

National Tube Co., Lorain, O., has ordered a carbon lining similar to that of Carnegie-Illinois, Pittsburgh.

At least three other linings are being discussed as probabilities for 1946.

A number of mold plug designs have been tried out, Mr. Vosburgh announced, but the most popular size is now approximately 6 in. largest diameter and 3 to 5 in. thick. A design called the mushroom plug, in which the top is flared out to cover more of the bottom of the mold, was investigated, but results did not appear to warrant the costs. It is probable that a size slightly larger than 6 in. will be the final design, so that, with reasonable care, the stream of metal will always impinge on the carbon. Such a plug should be satisfactory and economical.

Bethlehem Steel Co., Bethlehem, Pa., was the first to make a thorough trial of carbon and graphite stools. A tapered disk 20 in. diameter was used, set into the underside of the stool and held in position by a steel plate under it. Iron inserts had to be replaced after each pour —a hot, disagreeable job on which it was difficult to keep men. The graphite insert lasted throughout a week's cycle, a marked difference and one greatly appreciated, even in cold weather.

Still another comparatively new use of carbon on which there has been considerable experimental work, in this country at Carnegie-Illinois Steel Corp., Pittsburgh and at the Appleby-Frodingham Works, United Steel Companies, Ltd., England, is the lining runout troughs and runners of blast furnaces. Metal and slag do not stick to the carbon brick. Oxidation after a tap can be prevented by brushing the bricks with a clay wash as soon as the metal ceases to flow. C. D. Elliott, English superintendent, says: "Iron draining from a carbon runner is exactly like mercury draining from a sloping desk. If the iron is cold and of high-sulphur content, a skull does form in the runner, but it is always loose. What has been said with regard to iron runners applies equally well to slag runners."

Determines Both Temperatures

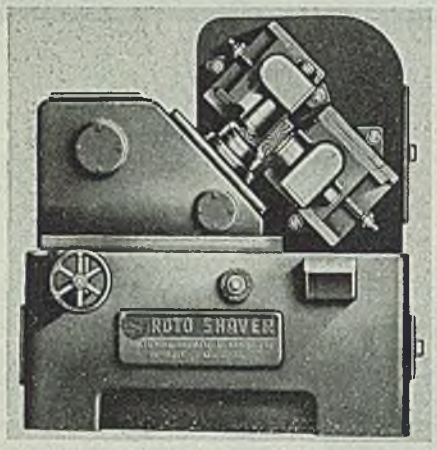
In surveying published information on various methods of measuring liquid iron and steel temperatures, H. T. Clark, assistant manager of research and development, Jones & Laughlin Steel Corp., Pittsburgh, directed attention to the two methods of measuring both temperatures which are being given serious consideration — the quick-immersion platinum thermocouple and the open-end tube immersion pyrometer. These have employed the available materials and instruments and have taken advantage of their potentialities. The platinum thermocouple is an accepted means of measuring high temperatures, and the photoelectric and total radiation pickups apparently permit of high reproducible results when used under propitious conditions. Present refractories, he contended, do not long withstand the erosive action of furnace gases, slag and metal, and they are subject to breakage by heat shock and mechanical blows; hence the one pyrometer dispenses with refractories entirely while the other reduces the amount required to a minimum.

The quick immersion technique with the two foregoing types of instruments or total radiation pickup units are recent developments which are being put to practical use in steelmaking shops.

INDUSTRIAL EQUIPMENT

Shaving Machine

A new Roto shaving machine for finishing the back face and bore of automotive rear axle ring gears is announced by National Broach & Machine Co., 5600 St. Jean avenue, Detroit 13. This operation replaces green grinding of the two named locating surfaces prior to gear cutting operation. The machine may be used to finish



pressure plates, internal ring gears and other parts. Cutter heads can be made for a variety of special applications.

The complete cutting cycle on large truck ring gears both back face and bore is approximately 15 to 20 sec. Approximately 3000 to 4000 parts can be shaved before the cutters need regrinding on basis of removing up to 0.015-in. of stock from back face and 0.020-in. from the diameter of the bore. Both back face and bore are shaved simultaneously to tolerances required for accurate gear generating.

Unit is designed for easy and rapid loading and unloading. Design of cutters is such that they may be sharpened on any standard cutter grinder. It will handle ring gear bores from 4¼ to 9 in. and gears having an OD of up to 15⅜ in.

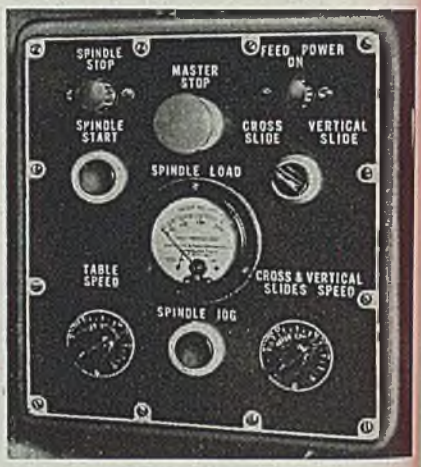
Hydraulic power is used to clamp work and traverse work slide. Feed is controlled by cam. Work is rotated during cutting cycle. A 1 hp motor drives the work part and a 1 hp motor drives each cutter. Both drives are through V-belts. Change sheaves provide for speed changes. Cutter head angles are adjustable.

Milling Machine

The new No. 4 vertical milling machine, a product of Reed-Prentice Corp., Worcester 4, Mass., is equipped with electronic feed drive for table, cross-slide, and vertical slide (spindle head). This machine is designed so that the push button control station and operating levers are centrally located.

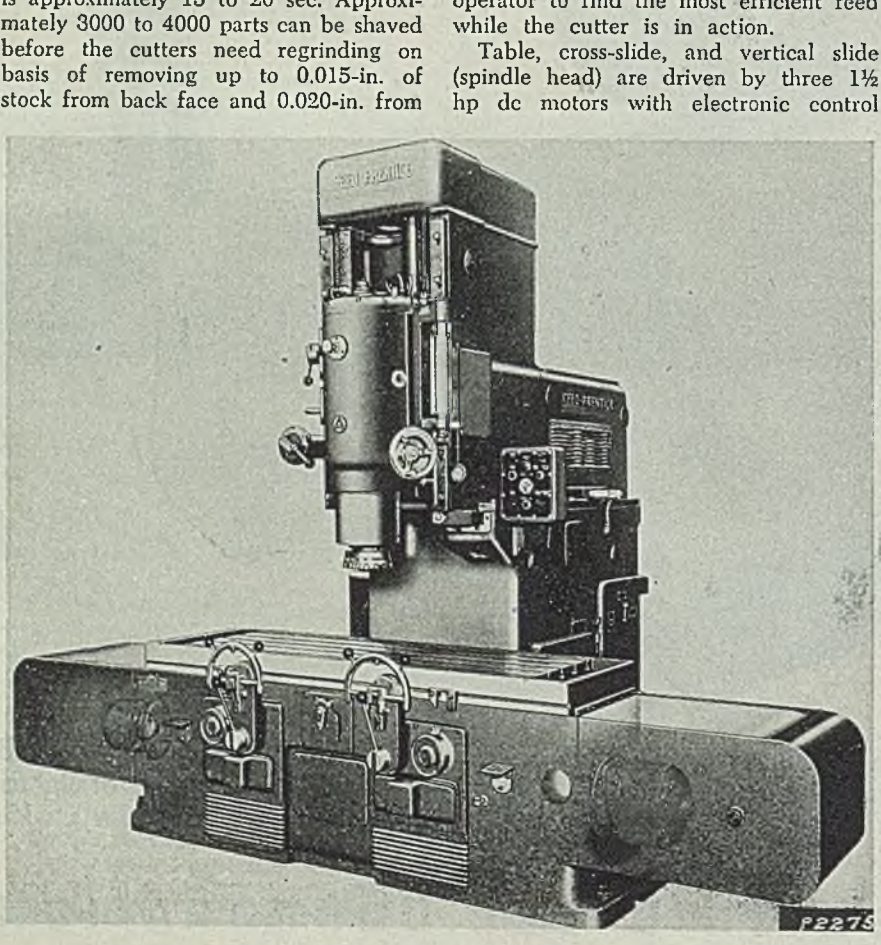
Another feature is that the operator can set the feed rate by adjusting the potentiometer's knobs. This enables the operator to find the most efficient feed while the cutter is in action.

Table, cross-slide, and vertical slide (spindle head) are driven by three 1½ hp dc motors with electronic control to provide variable feed rates. The range of the drives is from less than ½ in. to over 25 ipm. Rapid traverse motion is powered by two 3 hp, ac motors one for the table and the other one for the cross-slide, with conventional magnetic reversing control and plugging switches, and is controlled by the five position power feed lever. The spindle is driven by a 10 hp motor. However the capacity of the machine is such that



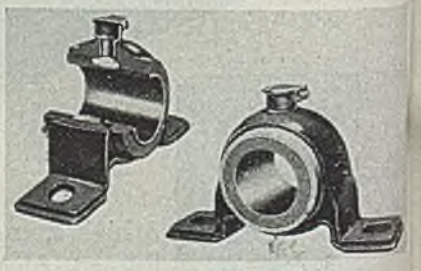
it will take a 20 or 30 hp motor for application of negative rake milling cutters.

Electronic units provide overload and undervoltage protection armature drop compensation to maintain speed within close limits regardless of load fluctuation, and dynamic brake stop from any speed to prevent coasting. There are two electronic units for the control of the three motors, one unit for the table motor and the other for the cross-slide and vertical slide (spindle head) motors. Shift of the latter unit from one motor to the other is accomplished by means of a selector switch mounted on the push button control station.



Bushed Bearing

Known as type F Bronzoil bearing, a new bronze bushed bearing for small shafts specially adapted for fan and blower service is announced by Dodge



Mfg. Corp., Mishawaka, Ind. This bearing is fully self-aligning. Inner housing is spherical to conform to a spherical socket in the formed steel outer housing of the bearing which permits free self-

All claims are those of the manufacturer of the equipment being described.

ROSÁN INSERTS AND STUDS

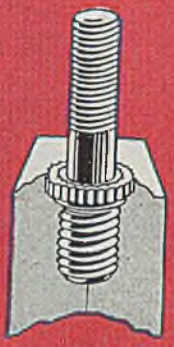
revolutionize fastening in

SOFT METALS · PLASTICS · WOOD

ROSÁN INSERT MOLDED IN

INSTALLATION OF INSERT WITH LOCKING RING

ROSÁN STUD



Permanent because locked in the material.

May be molded in, or installed later for repair or replacement purposes.

Removable by drilling without disturbing the parent material.

The heart of the Rosan Locking System is the locking ring. Its serrations are broached into the parent material and prevent turning or loosening under vibration or torque.

Rosan Inserts and Studs are easily installed, can be easily removed. They do away with the need for oversize replacements, and so effect great savings in parts inventory, in addition to the savings in parts salvaged.

Leading aircraft companies have adopted the Rosan Locking System. The automotive industry and others are also recognizing the advantages of this revolutionary method of fastening.

Write or wire for full information.

National
HEADED AND THREADED
PRODUCTS

THE NATIONAL SCREW & MFG. CO., CLEVELAND 4, O.

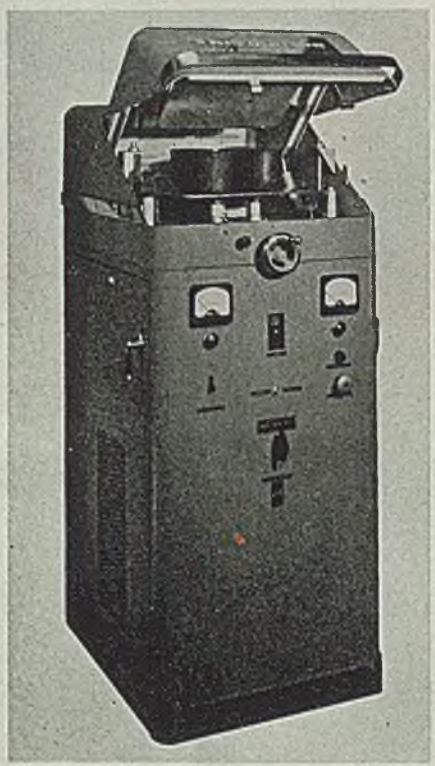
alignment and avoids cramping the shaft.

A bronze capillary bushing which carries about one-third of its volume of lubricant is used as a liner. This bushing is provided with a shoulder which offers a broad, flat bronze bearing surface which is always lubricated and reduces friction between bearing and collar which positions the shaft.

Bearing is compact; frontal area which measures the obstruction to air flow has been reduced which results in greater volumetric efficiency to blower. Provision for lubrication is simple and adequate. A liberal oil reservoir with a close fitting wick surrounds bronze capillary bushing and supplies required amount of oil as needed. Wick and oil cup are supplied with bearing.

Dielectric Heater

A new dielectric heater, Heatmaster, applicable for plastics, dehydration, sterilization and other purposes is introduced by Thermatron Division, Radio Receptor Co. Inc., 251 West 19th street, New York 11. It is a compact model, particularly



designed for heavy duty preheating in the plastic molding industry where floor space is limited.

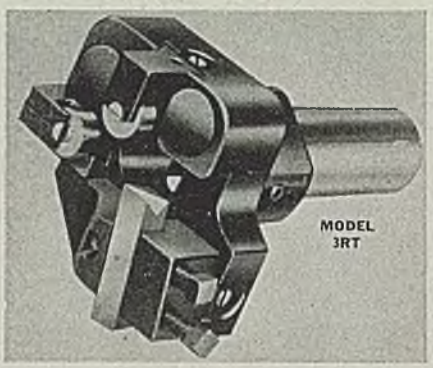
Self-contained and ready to use, unit incorporates a built-in electrode cage, automatic protection, heavy electrodes and radial-fin air cooled tubes. Other features include type pushbuttons, overload relays and circuit breaker, connecting terminals, fully calibrated dials.

Heater is capable of heating 3.3 lb preform in 1 min or a 5 lb preform in 90 sec. Its capacity makes it suitable for general purpose production as well as research requirements involving substantial power.

Technical specifications for type K-5, 5 kw output are as follows: Input, 8 kva (approximate); line voltage; 220 v 60 cycle, 3 phase; frequency, 30 mc, to 15 mc, 5 mc optional; tubes, external anode; size, 24 in. wide, 28 in. deep; 59 in. high; weight, approximately 1000 lb. Other units are available over a range suitable for many purposes.

Screw Machine Tools

Model 000RT is a new screw machine tool developed for very small work. With this tool, using rollers, it is possible to accurately turn parts as small as 0.075-in. Using carbide blocks in



place of rollers, parts as small as 0.020-in. can be turned.

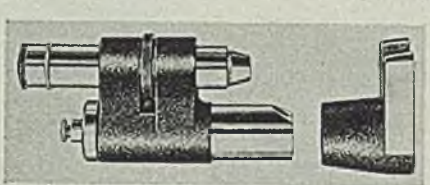
Individual roller block adjustment is possible. The tool bit is held rigidly in tool bit holder which gives maximum support for heavy cuts. Bits can be removed for grinding and returned to the same precise setting with a minimum of adjustment.

A larger size screw machine tool is the Model 3 RT. Quick and accurate set-up and precision performance under exacting conditions are possible with both automatic and hand screw machines. It is available with 1¼ or 1½ in. shank diameter.

These tools are the product of Boyar-Schultz Corp., 2110 Walnut street, Chicago 12.

Microscopes

Standard reticle of new microscopes offered by Polan Industries, Huntington 19, W. Va., permits accurate measurement to 0.001-in. and measurements may be estimated to plus or minus 0.0002-

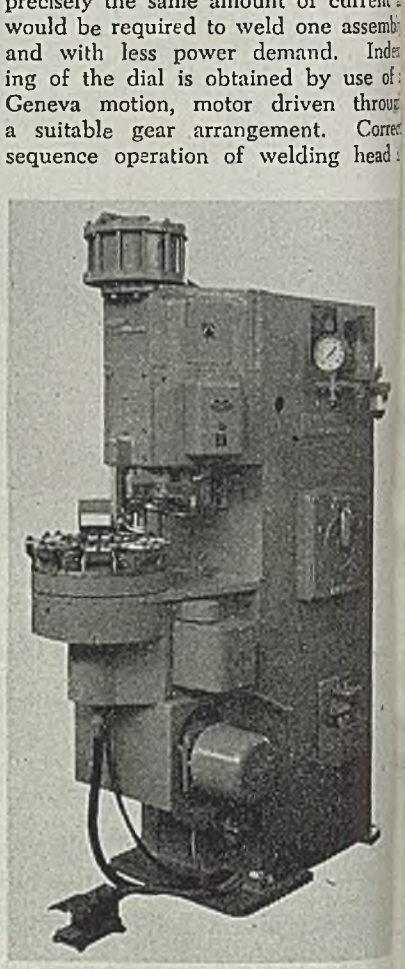


in. accuracy. The instrument may be equipped with reticles having special designs for contour inspections or measurements of specific tolerances on tools or parts. It has built-in illumination which consists of flashlight bulb and cells. The 16.7 Kellner eyepiece and the three power acromatic objective give an overall magnification of 50-power which is adequate for normal inspection of machine parts.

The device is equipped with separate removable base, bottom and sides of which are ground flat. Parallel sides which are 7/8-in. from optical center have ground surfaces which makes it possible to use the instrument with gage blocks and measuring wires. Bottom surface has a prismatic groove which optically centers instrument on round rods and curved surfaces of machines.

Dial Feed Welder

By arrangement of the secondary circuit, the new welding machine offered by Taylor-Winfield Corp., Warren, O. welds two assemblies simultaneously with precisely the same amount of current as would be required to weld one assembly and with less power demand. Indexing of the dial is obtained by use of a Geneva motion, motor driven through a suitable gear arrangement. Correct sequence operation of welding head



insured by a drum switch of the adjustable fan cam type which permits welding during the locked interval of the Geneva.

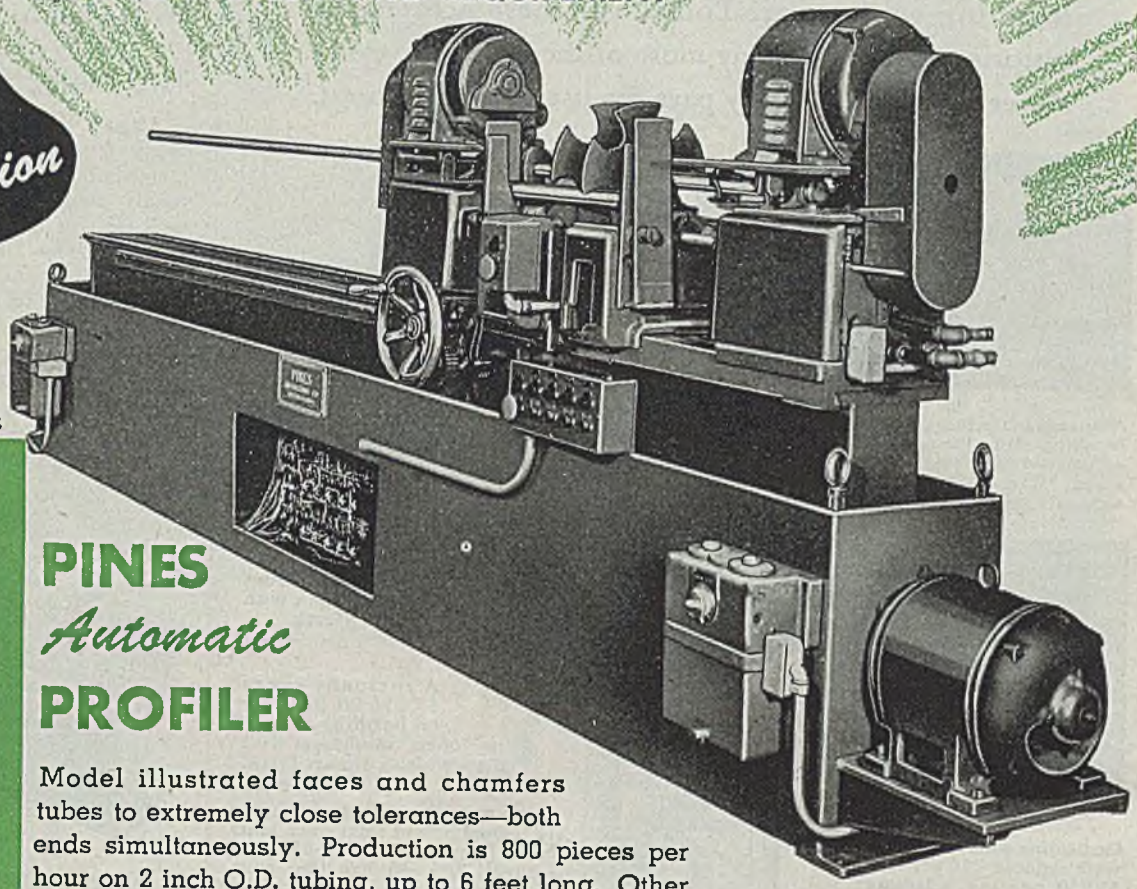
A single air cylinder is connected to two heads through an antifriction bearing equipped equalizer bar which assures identical pressures on the two welding dies. The heads are of square quill type mounted side by side in common slide. Dies of the two heads are connected to the two pads of transformer secondary by flexible copper bands. As a result, inductive loop of secondary is reduced to a minimum and maximum electrical power factor is obtained.

Each of the several die holders is mounted on a copper table, lower surface

PRECISION MACHINING with PINES *Automatic* PROFILERS

BUILT TO MEET ANY MACHINING REQUIREMENT

Heavy Duty Construction



TYPICAL PINES PROFILER MACHINING OPERATIONS

PINES *Automatic* PROFILER

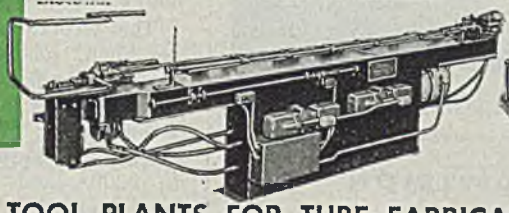
Model illustrated faces and chamfers tubes to extremely close tolerances—both ends simultaneously. Production is 800 pieces per hour on 2 inch O.D. tubing, up to 6 feet long. Other PINES PROFILERS burr, bore, center thread, turn, drill and ream tubes and rods, one or both ends at the same time. Operations may be combined. They really whittle down production costs.

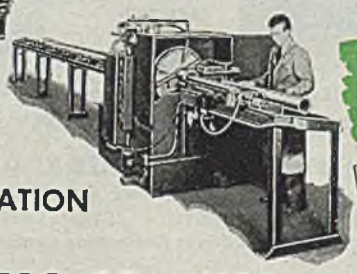
PINES *Automatic* BENDER

Precision, high speed machines with push button control, angle-of-bend selector, booster attachment and other exclusive features.

PINES *Automatic* CUT-OFF

The right type for every cut-off application —rotary, friction wheel, and abrasive models.





LOOK TO PINES TO *COMPLETELY* TOOL PLANTS FOR TUBE FABRICATION

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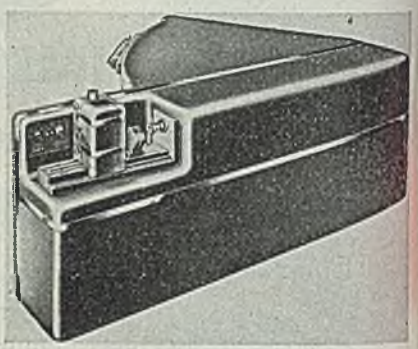
SPECIALISTS IN TUBE FABRICATING EQUIPMENT

which is water cooled. As current flows only from one die to the next die through a dual die holder, no insulation is necessary excepting of work locators. Since two assemblies are welded simultaneously, just half the indexing speed is required that would be necessary for the same production by individual welding. Worker's fatigue is reduced as welder is equipped with automatic work ejectors. Ejection is done by a blast of air which, in addition to ejecting work automatically, cleans dies of dirt and flash ready for the next operation. A stripper is provided so that work which adheres to dies is automatically held in its locator until head lifts, eliminating possibility of jamming and subsequent wreckage.

Two Meter Spectrograph

A new two meter grating spectrograph designed for the analysis of highly alloyed ferrous metals and other materials containing complex spectra, as well as for general research work is announced by Harry Dietert Co., 9330 Roselawn avenue, Detroit 4. Capable of identifying 72 elements, the unit may be used for identification, sorting and miscellaneous or research applications, as well as routine or research quantitative analysis.

A high-dispersion yet compact instrument was achieved through the use



of super-fine gratings with a large number of ruled lines per inch. Two kinds of original gratings are available. One grating has 36,600 lines per inch or 91,500 total lines. This grating produces a dispersion of 3.40A per mm in the first order and 1.70A in the second order. The spectrum available for photography in the first order is 2100-7000A and 1850-3500 in the second order.

The second grating has 24,400 lines per inch, totaling 61,000 lines. This gives a dispersion of 5.2A per mm in the first order and 2.6A per mm in the second order. The spectrum that may be covered in the first order is 1850 to 9200A and 1850 to 4500 in the second order.

The spectrograph can be supplied with either of the two gratings described. Both gratings may also be furnished, in which case one or the other may be brought into use by a small angular shift of the incident beam from one grating to the other.

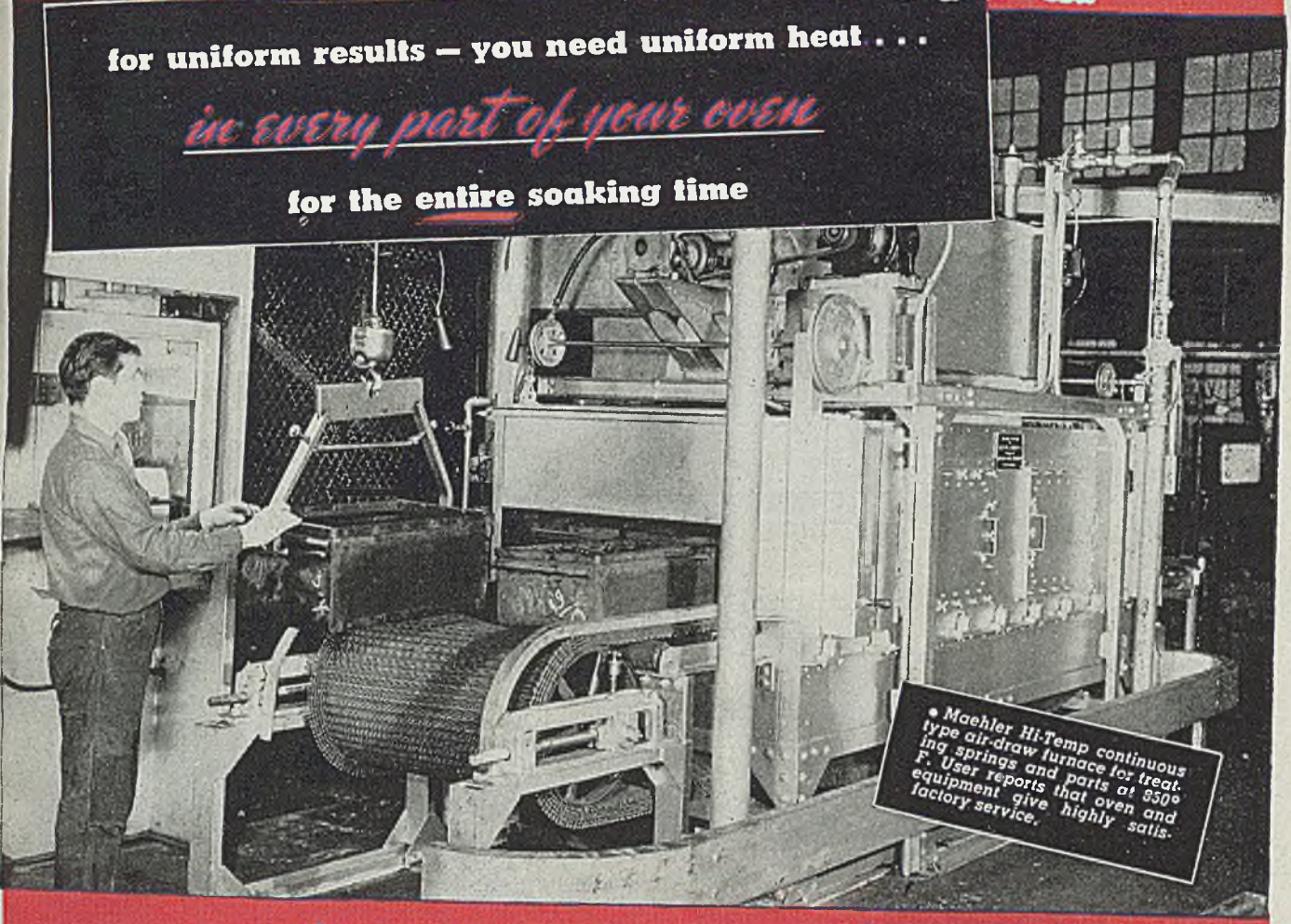
A 24-in. movable camera provides

HEAT TREATING

for uniform results — you need uniform heat . . .

in every part of your oven

for the entire soaking time



• Maehler Hi-Temp continuous type air-draw furnace for treating springs and parts at 950° F. User reports that oven and equipment give highly satisfactory service.

recent tests show MAEHLER ovens give you temperature variations *of not over 2° F.!*

CAREFUL tests, made during actual operation, show a variation of not over 2° F. in Maehler Ovens. Here indeed is the answer to your need that will assure you of more uniform results — will increase efficiency and reduce the number of rejects due to improper heat treating.

Maehler's long experience designing and building ovens for the heat treatment of all kinds of metal can help you obtain better results too. Maehler ovens — oil fired, gas fired or electrically heated are available for handling temperatures up to 1300° F.

If you're interested, we'll be glad to give you names of companies using Maehler ovens for work similar to yours. Our engineers can work with you in designing a complete heat treating system to help you do your job best. Write today for full information. No obligation.

THE PAUL MAEHLER CO.
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• MAEHLER •

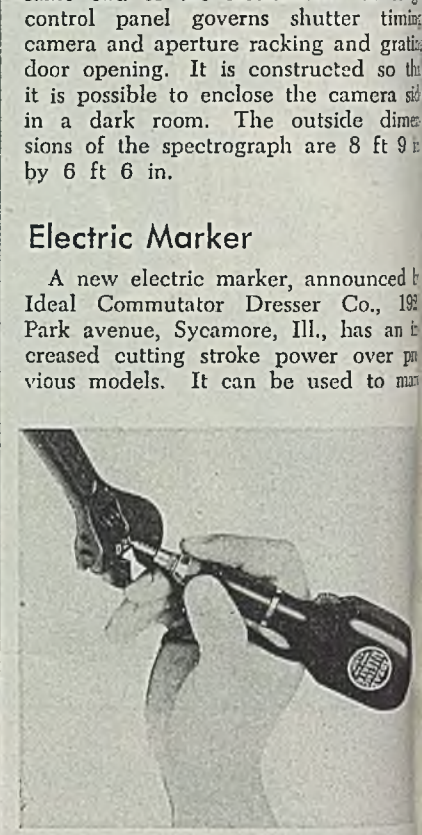
Industrial Ovens and Furnaces for Normalizing, Stress-relieving, Bluing, Aging, Tempering, Annealing, Drawing, Etc.

a 20-in. spectrogram on a 35 mm spec rum film. Camera is movable on radius arm allowing instantaneous phot graphy in the regions from 1850-920 Angstroms. This allows positioning alo the Rowland circle so that any 20-i portion of the total 60-in. spectru may be photographed at one time. Tw cameras may also be supplied for simul taneous photography of 40-in. of th spectrum. Eighteen spectra can b photographed on a single strip of fil

Controls and camera are located at th same end of the instrument. A sing control panel governs shutter timin camera and aperture racking and gratin door opening. It is constructed so th it is possible to enclose the camera sid in a dark room. The outside dime sions of the spectrograph are 8 ft 9 i by 6 ft 6 in.

Electric Marker

A new electric marker, announced b Ideal Commutator Dresser Co., 19 Park avenue, Sycamore, Ill., has an i creased cutting stroke power over pr vious models. It can be used to mar



steel, glass, ceramics or plastics. A adjusting nut makes it possible to va the impact so that it can be used t mark on any of these materials.

The device operates from any ac elec trical outlet. It is 6 in. long and weigh 10 oz. For average marking, a hardene alloy point is furnished as standard. F extra hard materials from 54 up to 6 Rockwell hardness scale C are to b marked, use of a diamond point is recom mended.

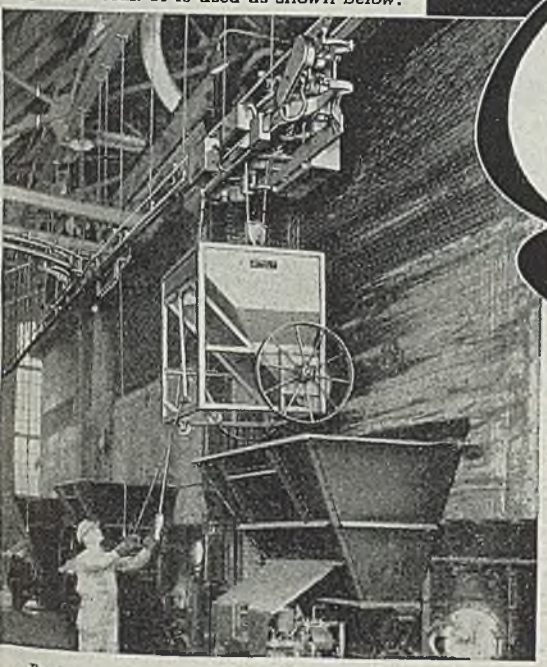
Vapor Collector

A new vapor collector for stoppi and collecting vapor from oil or cutt fluids arising from cutting, grinding a similar operations and returning it the source of its supply is introduce by Aget-Detroit Co., 602 First Natio building, Ann Arbor, Mich.

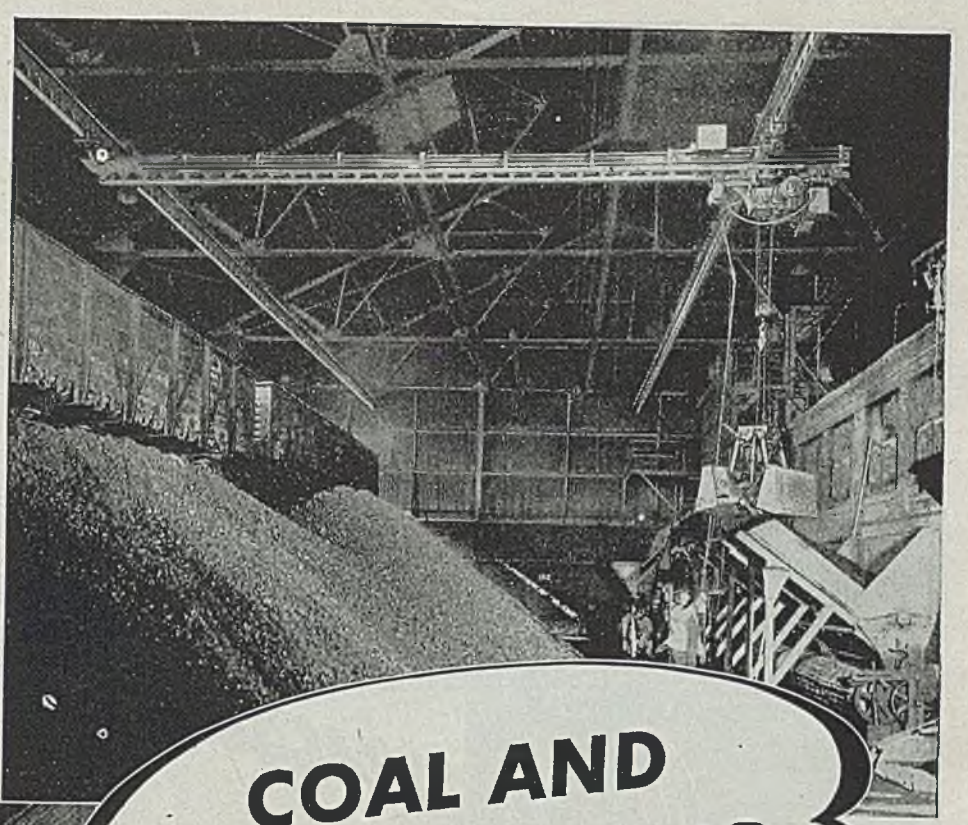
The collector is for use on virtua any type of high speed production ma chine tools employing cutting oils coolants such as screw machines, threa grinders, centerless grinders, wet carbid tool grinders, etc. It employs a mot driven multiple blade fan to provi suction to draw the vapor from the

80 to 100 tons of coal are fed every 24 hours to the stoker hoppers of two 340 h.p. and two 560 h.p. boilers in this plant with a motor-driven floor-controlled Cleveland Tramrail crane and one-half yard single line grab bucket.

This bucket is ¼ yard size and carries ½ ton of coal. It is used as shown below.



Buckets are rolled under discharge chutes of overhead bin or to outside coal storage and filled. They then are picked up and delivered to stoker hoppers by Tramrail System. Same equipment hauls ashes away.



COAL AND ASH HANDLING MADE EASY

In many boiler rooms the problem of handling coal and ashes has been simplified by means of a Cleveland Tramrail overhead system. This equipment not only eases the work but cuts costs.

Both overhead cranes and rail systems are used depending upon the application. For large boiler rooms, as illustrated above, grab bucket handling cranes have proven advantageous. Overhead rail equipment as shown at left with electric hoist is in use in many small and medium size plants. One man usually can take care of a boiler room with this equipment and keep it clean and orderly. Inexpensive manually-operated equipment for handling one-half to one ton coal per hour can also be furnished.

GET THIS BOOK!

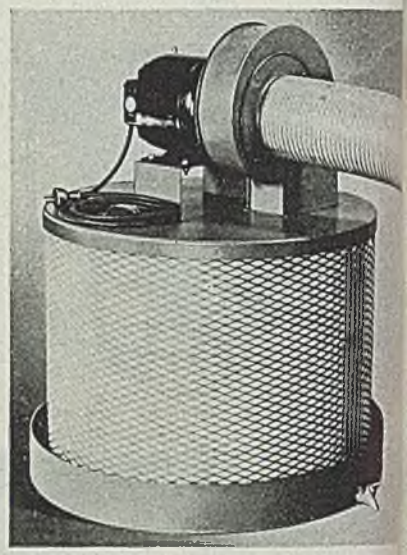
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1125 EAST 283rd ST. WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

cinity of the operator and work. Vapo laden air is sent against inside surfac of spun glass filter material where vapo condenses and is collected in pan cleaned air being recirculated in work ing space. This collected fluid is re turned to sump or reservoir of the ma chine tool through the faucet provided on pan.

Having a suction capacity rating o 500 cfm, the unit is capable of stopping all vapor from largest type of machin



tool employing cutting or similar fluid which cause vapor and mist. Installa tion is made with either ordinary she metal pipe or flexible metal hose of 5-i diameter which fits inlet flange of co lector and can be located near sour of vapor.

Standard motor to drive fan and pro vide suction is 1/3 hp, 3450 rpm, con tinuous duty type for operation on 220 3 phase, 60 cycle ac.

Magnetic Reversing Starter

A new ac magnetic reversing starte with a semi-interference type mechanica interlock, is announced by Industria Control Division, General Electric Co Schenectady, N. Y. Available in size 0 and 1, the starter is designed for full voltage starting of squirrel-cage induc tion motors. It can also be used for re versing service when combined with reduced voltage starter.

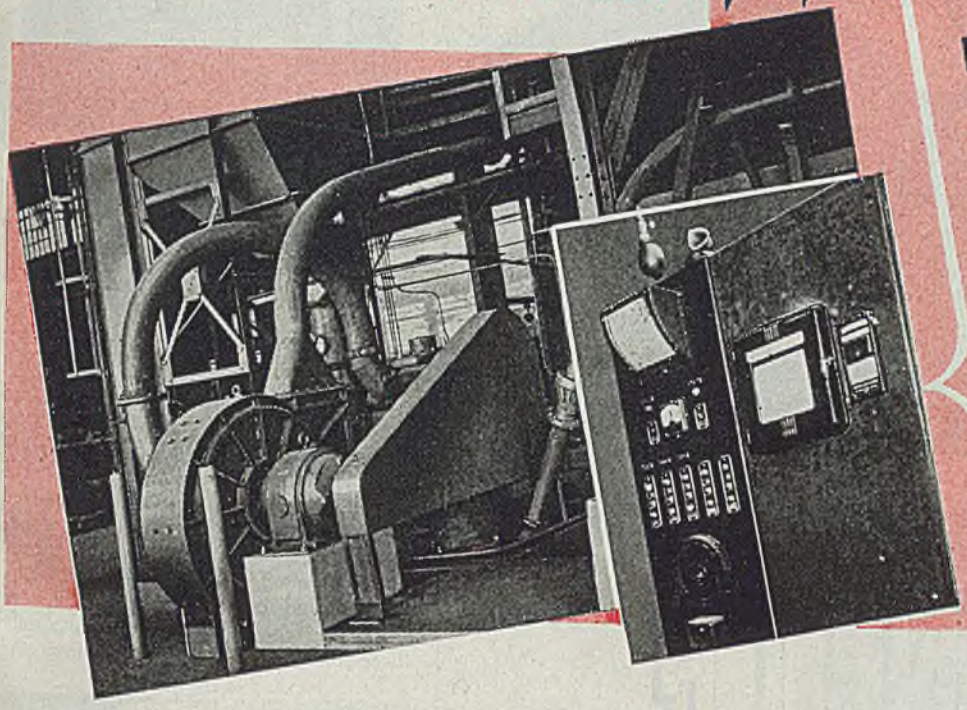
The mechanical interlock prevent closing of the one contactor while a arc is maintained on the other, th averting a short circuit through the s and the resulting burned contacts a blown fuses. In addition, the interlo arm of the closing contactor assists th interlock arm of the opening contacto in reaching its fully opened position These interlock arms are case hardened and their underside faces are buffed an polished for longer life.

Other features incorporated in this starter are under-voltage protection when used with a pushbutton station o other momentary pilot circuit device under-voltage release when used wit

B&W Direct-Firing Pulverized-Coal System for Metallurgical Furnaces

Gives You

- ONE-POINT FUEL CONTROL
- UNIFORM FURNACE TEMPERATURE
- ECONOMICAL OPERATION



Close regulation of coal-air ratio and volume—an important feature in the operation of most metal-heating furnaces—is *automatically* obtained with the B&W Direct-Firing Pulverized-Coal Circulating System by controlling the rate of coal feed to the pulverizer so that it is proportional to the primary-air flow.

Once the controller is adjusted for a specific heat, both coal and primary air are always properly proportioned for most efficient combustion and with minimum attention of the operator, the pulverizer supplies coal of proper fineness to the circulating loop at the same rate it is being used by the burners at any particular moment. A substantially constant density of coal and air is assured in the circulating line at all times.

This automatic control provides the same flexibility of multi-furnace operation as with gas or oil—burners may be turned on or off, and adjusted as desired.

Simple, dependable, and convenient, this one-point automatic control is but one of several cost-saving features that make B&W pulverizers so economical for direct-firing of metallurgical furnaces—with and without a circulating system—where high output of high-grade metal products is of prime importance.

Write for *"Pulverized-Coal Firing of Metallurgical Furnaces,"* a 14-page booklet discussing this subject in detail.

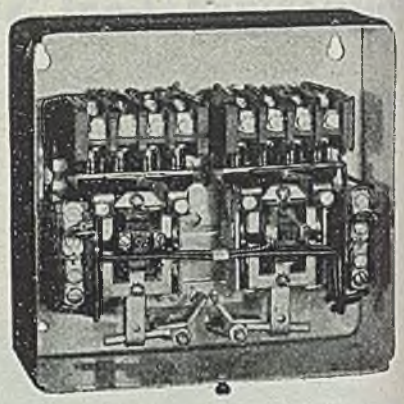
Water-Tube Boilers, for Stationary Power Plants, for Marine Service . . . Water-Cooled Furnaces . . . Superheaters . . . Economizers . . . Air Heaters . . . Pulverized-Coal Equipment . . . Chain-Grate Stokers . . . Oil, Gas and Multifuel Burners . . . Seamless and Welded Tubes and Pipe . . . Refractories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

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
85 LIBERTY STREET, NEW YORK 6, N.Y.

PM-109

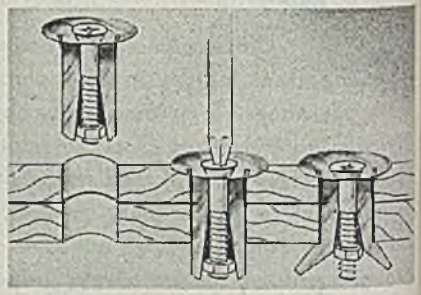
selector or limit switches, and tamper-proof, self-contained overload relays which allow the motor to operate up to its maximum safe temperature before tripping it off the line. Starter is housed in a sturdy metal enclosure 9⅞



x 13⅝ x 4⅞ in. in size, equipped with a hook-on cover and finished with smoothly rounded corners. Dust-tight and watertight enclosures are furnished where special conditions warrant.

Blind Bolt Assembly

Known as Des-Bolt, a new plastic fastening device has been developed by Victory Mfg. Co., 1105 South Faircaks avenue, South Pasadena, Calif. The complete unit is composed of a molded plastic expansion sleeve and any standard nut and bolt assembly of the correct size to match the sleeve. The sleeve is composed of three thin fingers with an inside taper extending approximately three-fourths of their length from the



flanged head. Head is a flange with a cored hole to accommodate bolt shank and countersunk to receive standard countersink type of bolts with three sharp ribs attaching flange and sleeve. These thin ribs wedge into the work and prevent sleeve from turning.

To apply, assembled unit is inserted into a drilled hole the size of the outside diameter of the sleeve, unit tapped lightly with screwdriver and the bolt tightened. Nut is restrained from turning by inside tapered surface of prongs of sleeve. As bolt is turned, the nut is drawn into the tapered prongs and begins to force prongs outward. As pressure increases by turning of bolt, work is drawn together, sleeve preventing turning of nut and as point of desired pressure is reached the assembly has securely fastened the components. Sleeve extends through work and as fas-

1ST QUARTER 1944

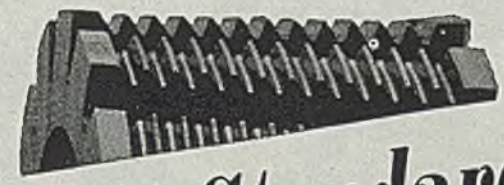
2ND QUARTER 1944

3RD QUARTER 1944

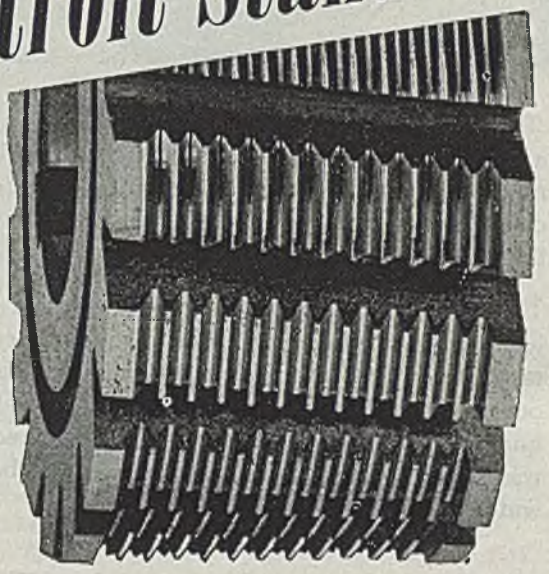
4TH QUARTER 1944

1ST QUARTER 1945

ORDERS FOR DETROIT STANDARD THREAD MILLING CUTTERS



They're Specifying Detroit Standards



Look at that quarter by quarter record of orders for DETROIT STANDARD thread milling cutters—yes, and DETROIT makes specials, too.

Those DETROIT standards—amplified by new types and sizes as needed—are becoming the accepted standards of Industry.

Many companies now simply order their thread milling cutters by DETROIT STANDARD Blank number and desired thread form. Eliminates Tool Engineering, saves delivery time.

Detroit Thread Milling Cutters, standard and special, are making unnecessary the slower more costly method of grinding on scores of precision threaded parts.

Ask for latest Bulletin giving standard sizes

• TAPPING MACHINES • TAP RECONDITIONERS •

DETROIT TAP & TOOL CO.

8432 BUTLER AVE. DETROIT 11, U.S.A.

• TAPS—THREAD GAGES • CUTTER HOOK AND SPACING CHECKER •

tening operation is completed ends of prongs are flared outward by expansive pressure on blind side of work. It is not necessary, however, that sleeve extend entirely through work since expansion of sleeve will solidly hold unit and provide strong fastening.

In installations where a flush bolt head is desired or appearance of sleeve flange would be objectionable, a sleeve is used with a head diameter smaller than bolt head. It is available in sizes from ¼ to ¾-in. in diameter by ¼ to 3 in. in length.

Grease Pump

The new Handi-Luber, offered by Lincoln Engineering Co., 5701 Natural Bridge avenue, St. Louis 14, makes it possible to convert an ordinary original grease container into a 25 lb high pressure grease gun. This unit is suited

for use on farms, in shops, mills, mines or factories and for lubricating contractors equipment.

Model 1266 is a complete high pressure grease pump equipped with a 5 ft hose assembly with hydraulic coupler for contacting all Kleenseal and hydraulic fittings. Manually operated, it dispenses either light cup grease or viscous types, develops 5000 psi.

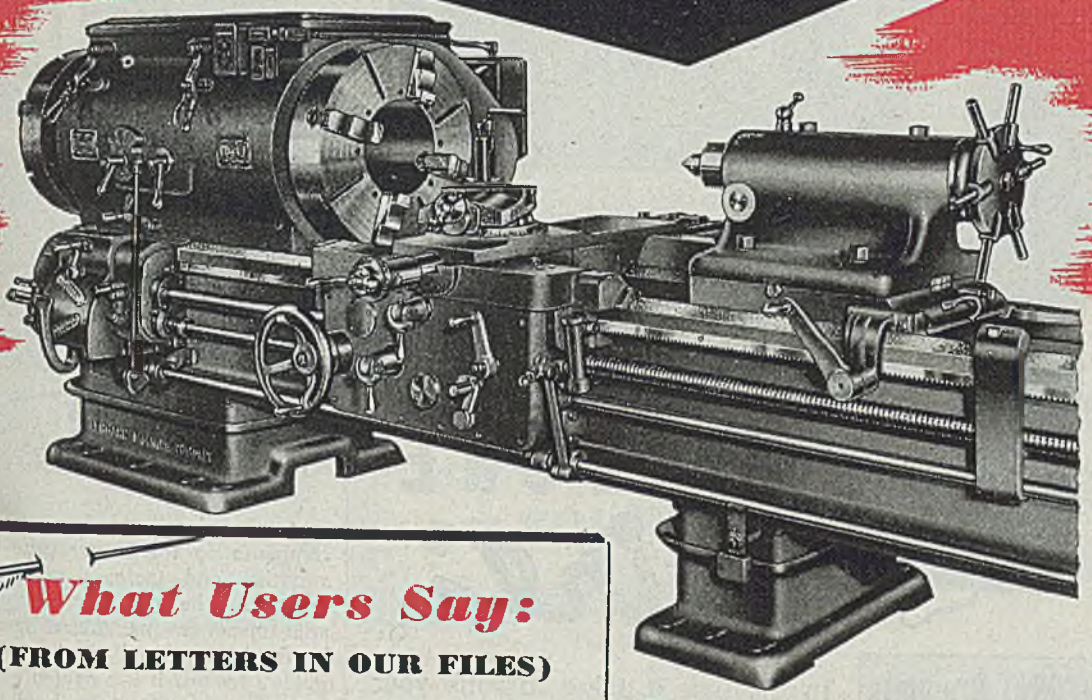
Die Cushion

Dayton Rogers Mfg. Co., 2835 Twelfth avenue south, Minneapolis, Minn., has developed a pneumatic die cushion of a bellows type design which uses a molded synthetic rubber bellows in place of a piston and cylinder air jack. Synthetic rubber bellows absorbs the die cushion travel of the hardened and ground pin pressure pad.

The synthetic rubber molding is not affected by oil in the air line, grease or other drawing compounds. Air leakage is eliminated because the balloon tire bellows are used in the construction and there is less loss of air pressure. No regulating air reducing valve is necessary. Die air jack is charged from shop air line to a predetermined pressure recorded on a pressure gage which is supplied with each installation. Such pres-

Do It BETTER!... on a HYDRATROL LATHE

Large Hollow Spindle Type



30" Heavy Duty Lathe with 13" Hole in Spindle

What Users Say:

(FROM LETTERS IN OUR FILES)

"For quite a few years we have had a large number of HYDRATROL LATHES (Large Hollow Spindle Type) in our shops here. The men working on these machines appreciate the ease of speed control afforded."

• • •

"HYDRATROL LATHES have been entirely satisfactory for turning high-strength forged tubes in record time."

LOOK around your own shop—you may find a number of machining jobs which could possibly be done *better* on a Large Hollow Spindle Type of HYDRATROL LATHE. Send us prints of these unusual, difficult, or too-costly machining jobs, for a time-and-money-saving recommendation.

Five Sizes-18" to 36"

Small . . . . . 18" up to 7 1/4" Hole
Medium . . . . . 24" up to 12" Hole
Large . . . . . 27" up to 13" Hole
Large . . . . . 30" up to 14" Hole
Large . . . . . 36" up to 16 1/2" Hole

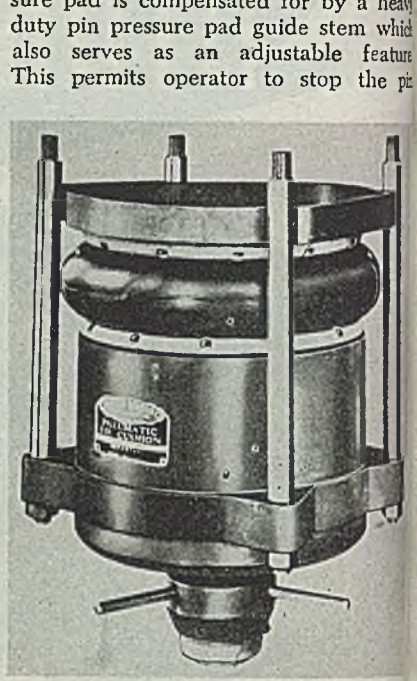
(Standard type lathes, 16" to 36")

Lehmann **MACHINE CO.**

CHOUTEAU AT GRAND ★ SAINT LOUIS 3, MISSOURI

sure can be retained over entire ru of a given part with little or no loss t pressure.

These air cushions are made in sizes from 5 to 12 in. having drawing capacities up to 5 in. and can be used on all deep drawing jobs within their capacity as well as pressure pad control on a large percentage of forming dies including ejector work. Off center loading on hardened and ground pin pressure pad is compensated for by a heavy duty pin pressure pad guide stem which also serves as an adjustable feature. This permits operator to stop the pi



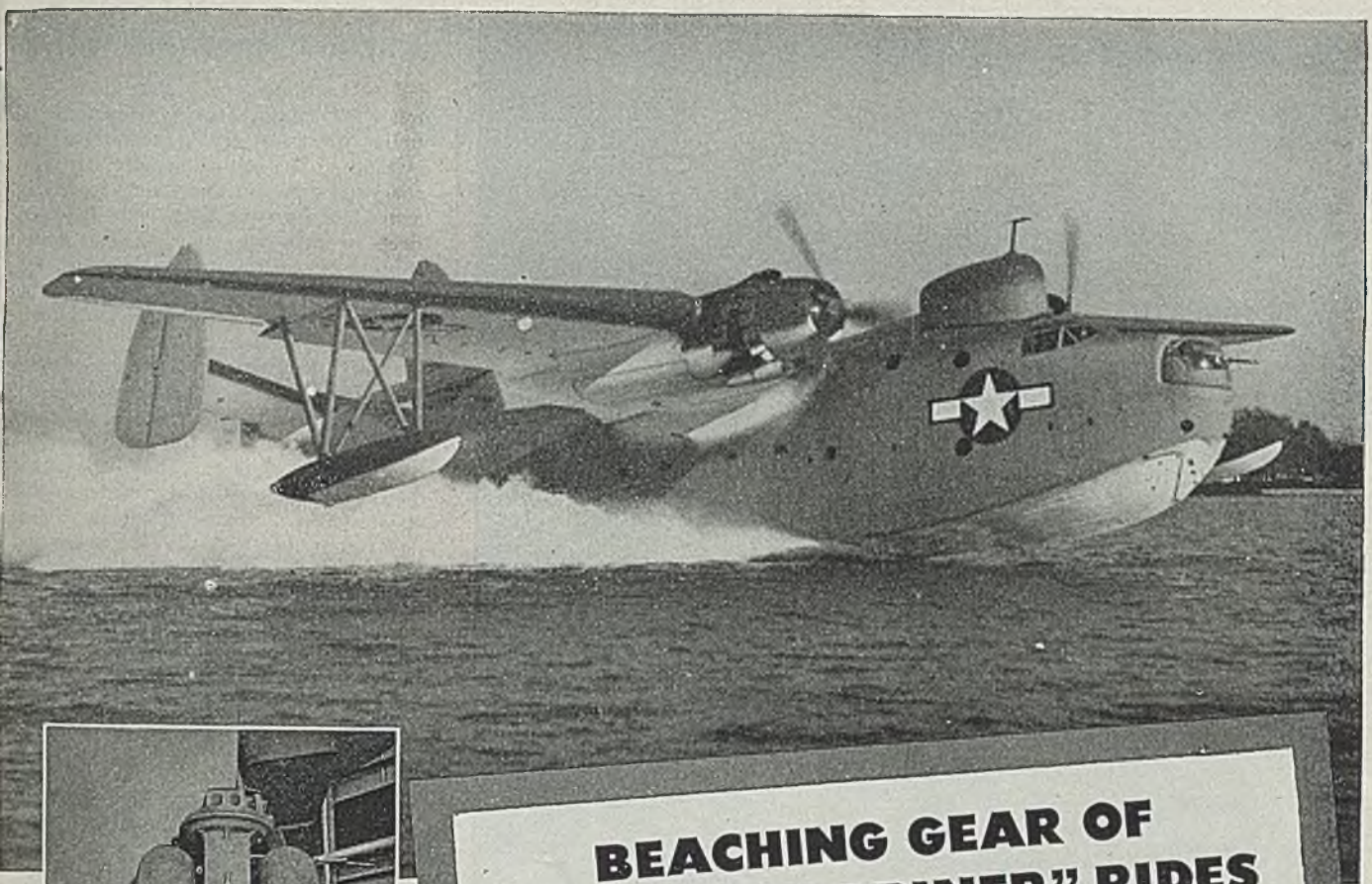
pressure pad at a predetermined heigh compensating for bolster plate thickne variation and increase or decrease i length of the pressure pad pins. Al adjustments are maintained by adjustabl hand wheel on end of pin pressure pa guide stem and it is provided with a lock ing means to maintain such adjustment i constant working position.

It can be fastened to bolster plate of average press by four suspension rods It is also designed so that a supporting structure can be provided, making it possible to fasten suspension rods to press bed and allowing bolster plate to be removed without removing die cushion unit.

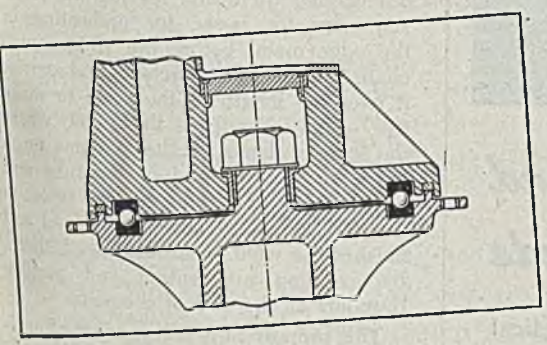
Snap Switch

Rated at 15 amp, 110 v, ac, a new small snap switch is introduced by Robert Hetherington & Son Inc., Sharon Hill Pa. Known as Junior, it is $\frac{7}{8}$-in. diameter and $1\frac{1}{2}$-in. long overall. It is complete in itself, but can also be pro vided with special over-travel adapter and mounting sockets. A pressure of 4 lb is required to operate the device.

The switch can be supplied normally open, normally closed, two circuits or single-pole double-throw. It is supplied with a nut and lockwasher, the mounting thread is ½—32. Where it is screwed into an over-travel adapter the thread on the adapter is also ½—32 although other threads can be supplied where necessary.



BEACHING GEAR OF MARTIN "MARINER" RIDES ON TORRINGTON BEARINGS



X-section shows application of Torrington Ball Thrust Bearing to beaching gear of Martin PBM Mariner. Sturdy construction and efficiency of lubrication assure the big ship complete "maneuverability" ashore.

When seaplanes "step ashore," it is on sturdy and free-moving beaching gear that assures complete safety and ease of "maneuverability."

For the beaching gear of their famous PBM Mariner, Glenn L. Martin engineers specify rugged, corrosion resistant Torrington Ball Thrust Bearings. Only 16" across, and containing 63 balls of ¾" diameter, these modern *anti-friction* bearings easily carry the full weight of the ship, enabling the wheels to pivot beneath it like giant casters. Construction of balls and bearing races of stainless steel assures freedom from corrosion due to salt water.

The beaching gear of the giant Martin "Mars" also uses special 31.625 inch diameter Torrington Ball Thrust Bearings.

Torrington's Bantam Bearings Division specializes in the design and construction of bearings to meet heavy-duty requirements. If you have a bearing problem, routine or unusual, our engineers will help you to solve it quickly and efficiently.

THE TORRINGTON COMPANY • BANTAM BEARINGS DIVISION
SOUTH BEND 21, INDIANA

TORRINGTON BEARINGS

STRAIGHT ROLLER • TAPERED ROLLER • NEEDLE • BALL

Oxyacetylene Welding

(*Continued from Page* 106)

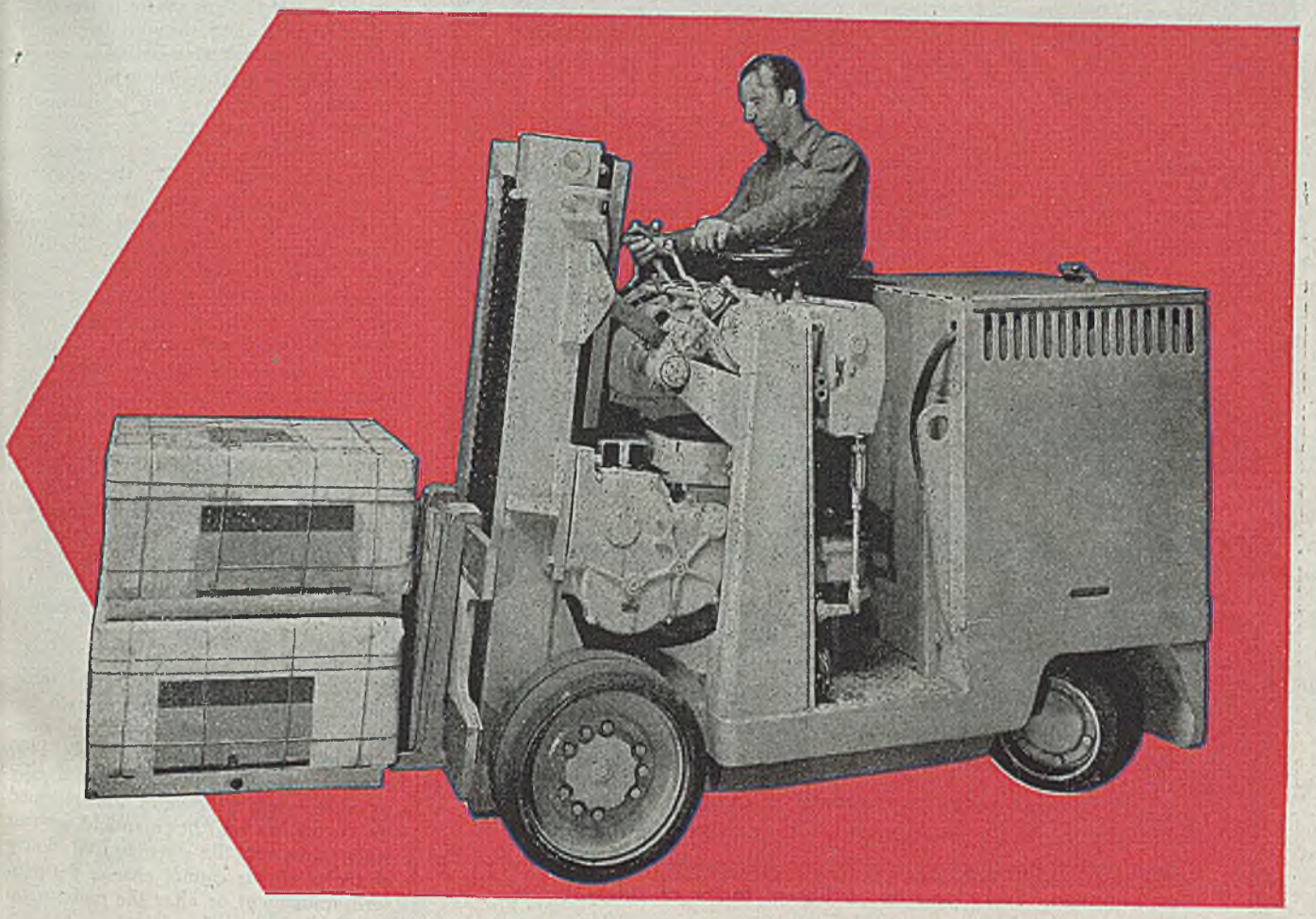
ment and removal of work, and closed under pressure by a compressed a cylinder. The central mandrel bar spans the weld zone on the underside, having a machined groove ⅜-in. wide and ⅛-in. deep beneath the seam. Tolerances inside the split clamps and between the clamps and the bar are quite close to avoid improper positioning particularly twist, of the tube in the jig.

Torch Propulsion: In noncontinuous welding there is the alternative of moving the workpiece past a stationary torch or of moving the torch over the stationary workpiece. The shape of the piece and the weld to be made, as well as the necessary size of the jig, almost invariably dictate which of these two methods is preferable. Girth welds, for example, are made by rotating the work in a fixture beneath a fixed torch, permitting flat position welding. Longitudinal welds are most commonly made by moving the torch. The set-up at Artcrest is unusual in that three changes of speed are provided in the course of torch travel.

As shown in Figs. 3 and 4, a radiagraph shell with the motor removed is used as a carriage for the torch. Propulsion is provided by means of synchronized sprocket chains on both sides of the track. Lugs on the several chains engage alternately with stops on the radiagraph, the two end chains in Fig. 4 moving it at 156 ipm while the one long chain in Fig. 3 moves at 78 ipm. In operation the rear fast chain first picks up the machine from the rear and brings it to the starting position on the seam, disengaging there and leaving the torch stationary for ½-sec for preheating of the edge metal before the 78-in. speed chain engages the machine and carries it over the length of the seam to make the weld. Then, at the point where the leading flames of the 17-flame torch have reached the end of the tube and have accordingly preheated the metal to the end, the third chain takes hold and finishes the weld at double speed, thereby avoiding overheating and possible burnouts at the end of the seam.

This propulsion is independent of operator control during welding, leaving the operator free to make minor adjustments in elevation or lateral position of the welding head as the weld is made. A small chip or tab of the same 18-gage steel is placed behind the lead end of the seam, and a bar at the finish end, to prevent burning of the corner metal. The welding head is a 3½-in., 17-flame Airco torch with a double row of flames projecting vertically downward. The relative positions of the flame orifices, the gas mixing chamber and inlet office of this torch are so designed as to provide highly oxidizing flames at the forward end of the tip, becoming progressively less oxidizing in the intermediate flames and neutral flames at the trailing end. This method promotes very rapid preheating under the oxidizing flames, while

EXIDES HELP TO KEEP MATERIALS MOVING *SMOOTHLY, STEADILY,* ALL DAY LONG...



Lifting and shifting, loading and unloading, hauling and stacking—the lowest materials handling costs are assured when unit loads are handled by electric industrial trucks.

When your electric industrial trucks are Exide-powered, you can count on *full shift availability* day after day. There is no costly down time, for Exides stay steadily on the job, delivering the same efficient performance during every working hour—a factor that makes Exide-powered electric industrial trucks the most economical of all materials handling units. When you buy an Exide you buy dependability, long-life and ease of maintenance.

Write us for a FREE copy of the bulletin "Unit Loads," prepared by The Electric Industrial Truck Association. It tells how to cut handling costs up to 50% ... covers latest developments in materials handling ... and includes actual case histories.

POWER

ARMY E NAVY

Exide BATTERIES

THE ELECTRIC STORAGE BATTERY CO., Philadelphia 32 • Exide Batteries of Canada, Limited, Toronto

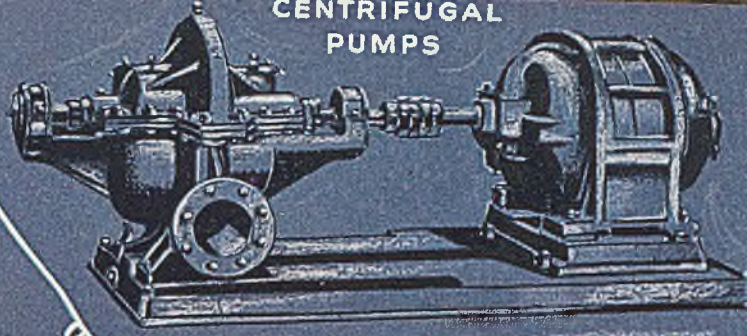
the actual melting and welding are done without danger of oxidation under the neutral flames. The torch and tip are internally cooled with slowly circulating water, using just enough flow to prevent sweating.

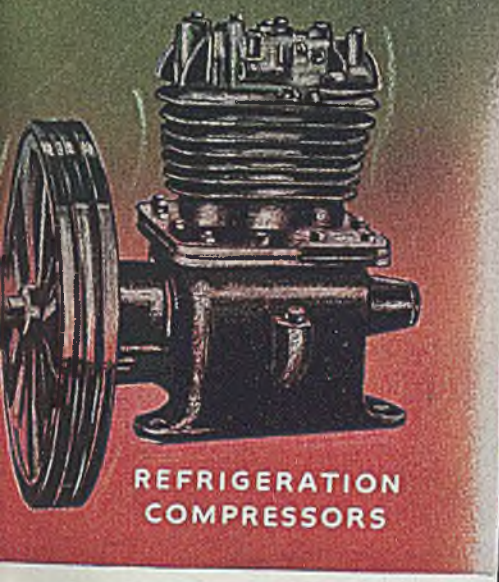
Automatic Gas Control: The opening and closing of the gas valves is also automatically controlled through the use of solenoid valves actuated by relays, everything being so arranged that the operator needs only to push a single button to set the entire train of drives and controls in motion. This switch starts a motor which drives all the sprocket chains, and at the same time, through a relay, opens the solenoid which releases the acetylene gas. A pilot flame ignites the gas while the first forward motion of the radiagraph trips a micro switch which opens the oxygen valve through a relay and solenoid. The machine is carried along the track at the speeds previously detailed, and at the completion of the weld it strikes two micro switches in quick succession, closing the two solenoids and thereby shutting off the gas flow and the main switch. The operator then brings the machine back to starting position by hand while a helper removes the welded tube and replaces it with a fresh length of tubing in the jig. The process is then repeated.

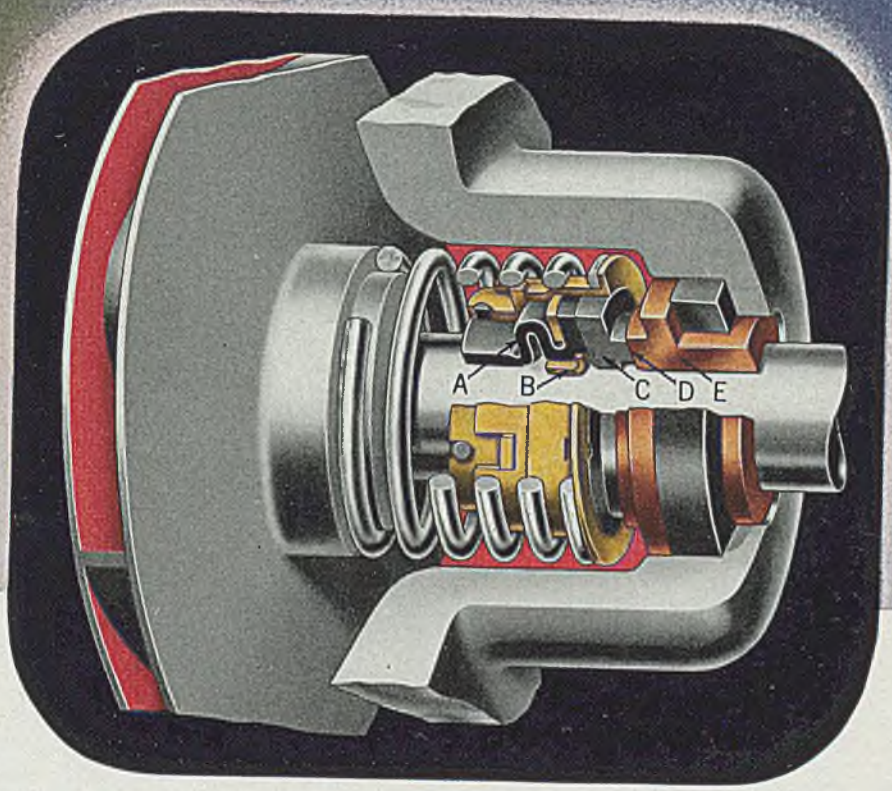
Gases are supplied by a five cylinder portable oxygen manifold and a three-cylinder acetylene manifold at each machine. These manifolds supply gases sufficient to weld approximately 140 tubes, and cylinders are changed only twice a week. Pressures are governed by regulators on the manifold so that when once set, the opening and closing of the solenoids cannot change the pressure adjustment or alter the uniform gas flows at the torch.

Production Rate and Costs: The gas welding machines are kept in operation 54 hr a week, each producing an average of 55 welded tubes per hour or about 3000 per week. The total time for both handling and welding a tube is about 1 min 5 sec, which comprises 36 sec for welding and about ½-min for handling and set-up. This welding speed was arranged to produce welds having a minimum of 80 per cent penetration, sufficient to comply with specification requirements.

As would be expected, the direct costs of production at this rate are quite low. The figures show a labor cost for seam welding of 8 cents per tube, based on the 54-hr work week, which therefore includes overtime as well as straight-time pay for both welder and helper. The cost for oxygen and acetylene averages a bit less than 3 cents per tube. Since power cost is negligible the total direct expenditure for welding a seam slightly over 40 in. long in 18-gage steel is approximately 11 cents. To this must be added overhead and depreciation costs. Neither of these represents a sizeable addition to the total, the depreciation figure in particular being unusually low for an operation of this type, for as







Investigate THIS *New* SHAFT SEAL!

The JOHN CRANE Bellows Shaft Seal is giving excellent and trouble-free service on all types of shaft sealing applications, such as found on the following:

Turbine Pumps • Speed Reducers • Refrigeration Compressors • Rotary Pumps • Agitator Shafts • Centrifugal Pumps

This precision-built Shaft Seal automatically adjusts for washer wear and shaft end play. Eliminates stuffing box leakage, gland adjustment and shaft wear. Excellent for high speeds and high pressures.

The JOHN CRANE Bellows Shaft Seal can be furnished in various metals and synthetic rubber stocks in order to best suit different operating conditions. Made in two basic types: Type I (for limited diameter) and Type II (illustrated above) for limited length.

A Synthetic Rubber Bellows—tail seals on shaft. Head is flexible; adjusts automatically for washer wear or shaft end play.

B Protecting Ferrule—prevents flexible bellows from adhering to shaft; assures free movement.

C Sealing Washer—rotates with shaft; driven through metal parts; no torque on bellows.

D Sealing Faces—both carefully lapped at our factory to insure a perfect seal.

E Floating Seat—cushioned in synthetic rubber sealing ring, eliminating stress distortion of sealing faces.

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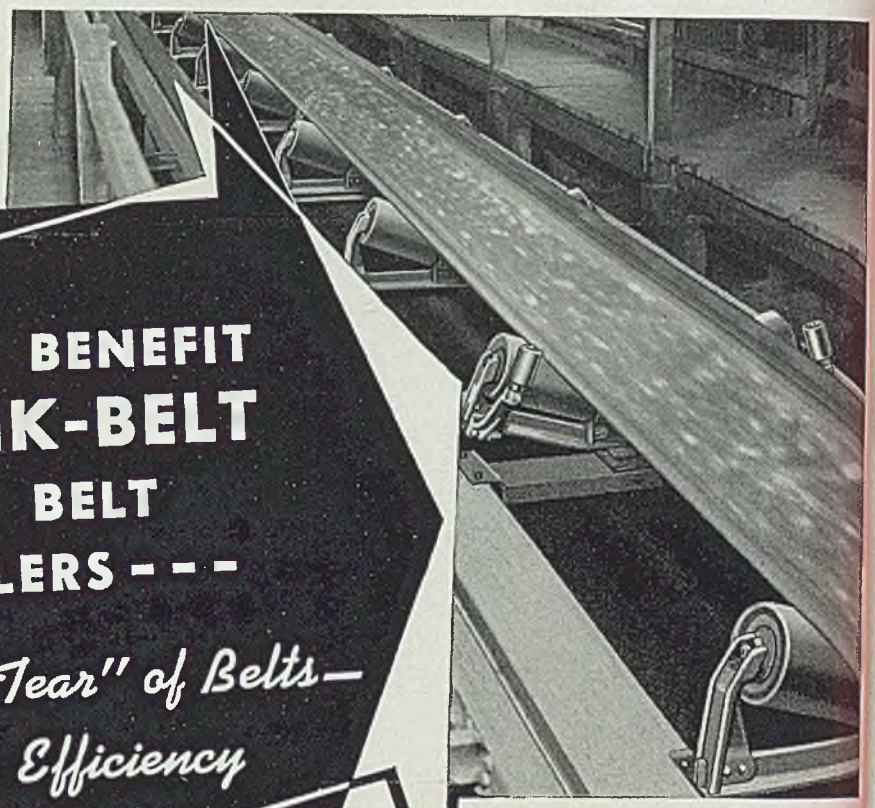


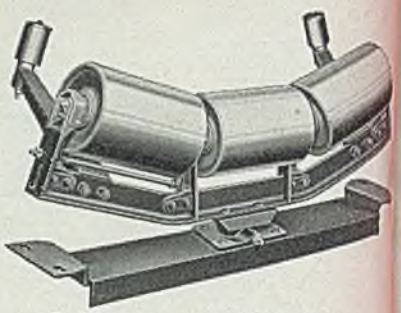
HOW YOU BENEFIT BY USING LINK-BELT SELF-ALIGNING BELT CONVEYOR IDLERS - - -

Reduce "Wear-and-Tear" of Belts— Increase Operating Efficiency

● Any slight misalignment of conveyor belts, resulting from off-center loading, strong side winds, unequal belt stretch, improper splicing, or material building up on the idler rolls, causes the Link-Belt positive-action type self-aligning idler to automatically contact an actuating roll. This swings the pivoted idler into a skewed position, thus gently but positively returning the belt to its proper running position on the conveyor idler roadbed. Actuating rolls yield easily and recede quickly from the belt so that the period of contact is short and without hard or continuous pressure which might injure the belt edges.

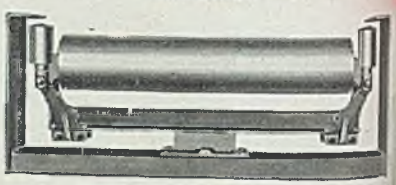
Link-Belt self-aligning idlers are made in two types, selection depending upon whether the belt travels in one direction only, or whether the belt conveyor is reversing.

Link-Belt makes all kinds of conveyors. Link-Belt Engineers have broad experience in the design, manufacture and application of conveying, materials handling and power transmission machinery, and can give you an impartial recommendation. Call or write the nearest office.



Positive-Action type Self-Aligning Idler for one-direction belt travel.

Counterweighted-Disc type Self-Aligning Idler for reversing belt travel.



Positive-Action Self-Aligning Return Idler.

LINK-BELT COMPANY

9993-A

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Toronto 8, Pittsburgh 19, Cleveland 13, Detroit 4, New York 7. Other Offices in Principal Cities.

OTHER LINK-BELT PRODUCTS INCLUDE:

Conveyors and Elevators of all types — Belt, Apron, Pan, Bucket, Chain, Bulk-Flo, Flight, Oscillating-Trough, Screw, Sidekar-Karrier, etc. . . . Feeders . . . Vibrating Screens . . . Skip Hoists . . . Silent, Roller, Malleable Iron, Promal and Steel Chain Drives . . . Speed Reducers and Increasers . . . P.I.V. Gear Variable Speed Changers . . . Gears . . . Clutches . . . Couplings . . . Base Plates . . . Take-ups . . . Babbitted, Ball and Roller Bearings . . . Grease Cups . . . Safety Collars . . . Shafting, etc. — everything from one source to make your materials handling and power transmission machinery operate at peak efficiency. Send for Catalogs.

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for Marine, Railroad and Stationary Applications in

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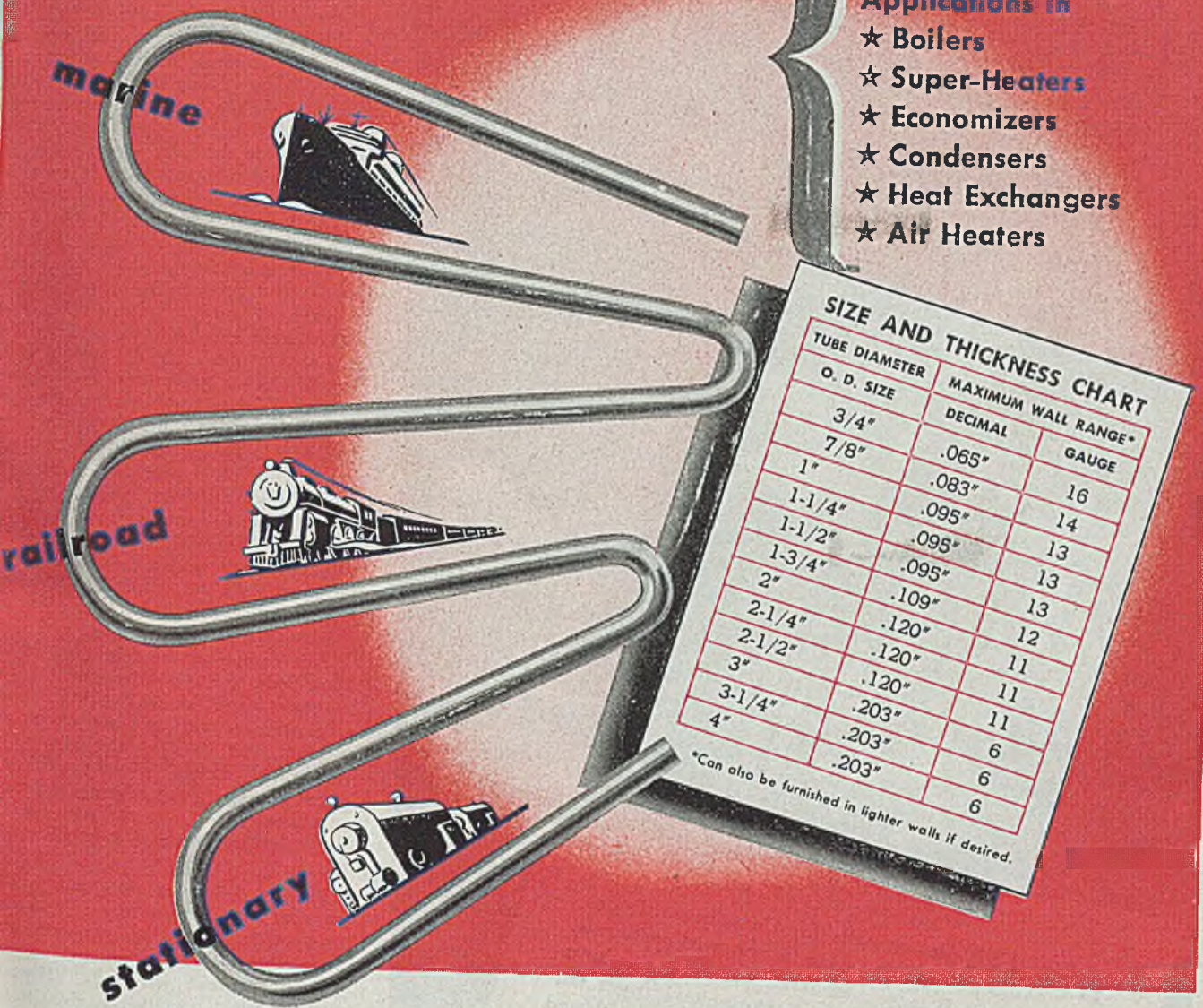

SIZE AND THICKNESS CHART

TUBE DIAMETER O. D. SIZE	MAXIMUM WALL RANGE* DECIMAL	GAUGE
3/4"	.065"	16
7/8"	.083"	14
1"	.095"	13
1-1/4"	.095"	13
1-1/2"	.095"	13
1-3/4"	.109"	12
2"	.120"	11
2-1/4"	.120"	11
2-1/2"	.120"	11
3"	.203"	11
3-1/4"	.203"	6
4"	.203"	6

*Can also be furnished in lighter walls if desired.

WHEN you specify "Standard" ELECTRIC WELDED STEEL RESSURE TUBING, you can be re of getting the best the market ords. Every production run of is superior tubing is held to pre-se limits of uniformity—in wall ickness, roundness, diameter and actility. It is tested and inspected r freedom from scale, scale pits d other visible or invisible im-rfections. It is uniformly strong because the electric resistance welding process gives a welded seam as rugged and durable as the unwelded section of the wall.

We are prepared to furnish ELECTRIC WELDED STEEL PRESSURE TUBING in the diameters and gauges listed above, in lengths up to 36 feet. We'll be glad to work with you on special problems or problems involving sizes other than those shown. For information without obligation, contact our representative in your area, or write us direct.

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THE STANDARD TUBE CO.

Detroit 3, Michigan

Welded Tubing — Steel Forgings

machine welding equipment goes th initial cost of this set-up is remar ably low. Maintenance is also an i significant factor.

Subsequent Operations: The welde tube as it comes from the machine ap pears as shown in Fig. 5. Those th show incomplete fusion at the extrem ends of the seam are touched up wi a hand torch and filler rod, since o must have a perfect edge to be air tig against a gasket. The tube is then place in a crimping machine and a compou shoulder is rolled into the metal arou one end. This of course subjects th welded seam to severe cold worki but few failures have occurred. slotted collar is then spot welded to th end to hold the removable cap in po tion, and two reinforcing rings of th same outside diameter as the collar a spot welded to points 6 in. in from th other end, and at the middle of the tub

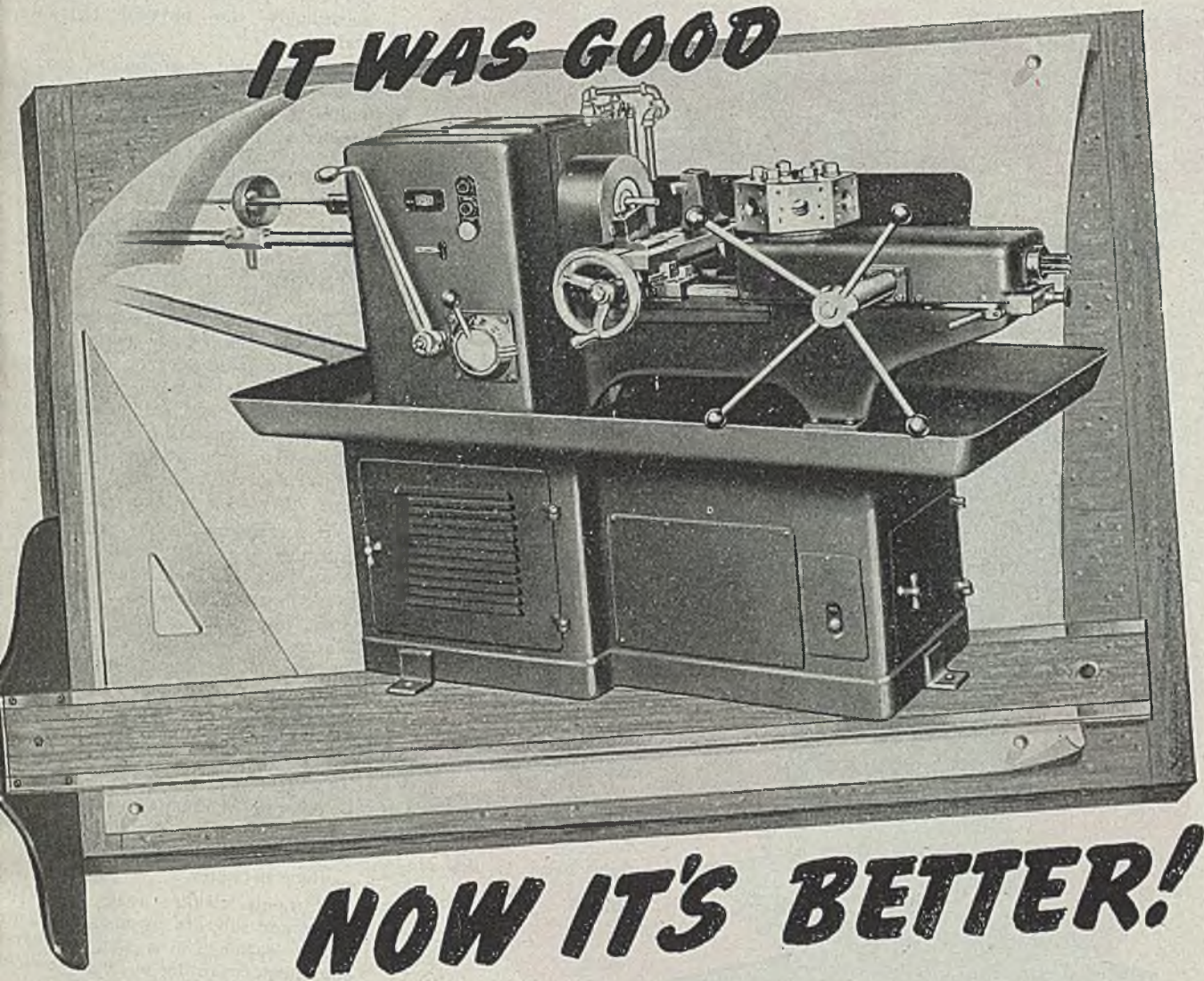
The bottom cap, stamped with a ri flange, is then set in, resting on the thr crimped indentations which were ma on the first press brake operation, me tioned previously. This brings th flange edge to the same height as th end of the tube. An edge weld is ma by the electric arc process as illustrat in Fig. 4 to join these adjacent edge using 5/32-in. diameter 78E electrodes 175 amp. This operation is made ea by the use of a small motorized tur table set on the floor, governed to gi the tube one full rotation in 20 sec wh the lower end of the tube is set on t turntable. One operator can thus ea keep up with the output of both se welding machines. A close-up of finished edge welds is given in Fig.

This completes the fabrication of main body of the powder container. T separate caps, shown in Fig. 7, fabricated by both spot and electric welding, and have a three-point spi handwheel which, when applied, gages in slots in the tube collar, force a rubber gasket over the open edge the tube and making it proof agai salt air.

Tests and Inspection: Originally bo physical and pressure leakage tests we conducted, but the Army physical te have since been discontinued not on at Artcrest but nationally. Howeve every finished container is given an im mersion test under 7½ lb inside pressure to discover any leaks. Spe ifications call for only 3 lb inside pressure. The rejection rate is low this test, most of the leaks occurring the edge weld, and a number at juncture of this weld and the lo tudinal welded seam. These are paired by welding and the test repeat No leaks have occurred in the automa ally gas welded seams.

During the time when specimens from the welded seams were given te sion tests the partial-penetration we broke under strains of 40,000 to 50,0 lb, while the parent metal show strengths ranging variously from 50,0 to 59,000. Over a period of mon none of the welds failed to meet the

IT WAS GOOD



NOW IT'S BETTER!

Again, the Oster *SIMPLIFIED* No. 601 "RAPIDUCTION" lathe steps ahead with these additional developments:

1. New 4-speed motor permits four speed changes without change of sheaves. (2-speed motor optional.)

2. Motor is mounted on oil-resistant rubber to insure smooth, quiet operation.

3. Individual ⅛ H. P. motor now operates coolant pump to provide uniform flow of lubricant, independent of spindle speeds.

4. New electrical controls have speed selector switch located conveniently for the operator.

5. Increased rigidity of the machine is insured with longer base of heavier construction.

★ ★ ★

The Oster No. 601 "RAPIDUCTION" lathe is equipped with either WORM drive or DIRECT drive, as required. Other options include automatically indexed six-position turret or plain saddle. Capacity of machine: 1½" round bar. Ask your nearest Oster dealer or write us for complete details.

OSTER "Rapiduction" LATHES

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per cent specification requirement, a accordingly the physical tests we waived.

Upon passing the pressure test, th finished containers are bonderized, spra painted, dried in a gas furnace, i spected and packed in boxcars for shi ment. Upwards of 2000 containers a stacked in each boxcar.

Recommend Precautions To Prevent Skin Injury

Unless precautions are taken, skin i juries may result from constant handl of many organic solvents, including ga line, naphtha, benzene, turpentine, t chlorethylene, and carbon tetrachlori Injuries usually consist of local redden of the skin, followed by wheals, blist and, later, chronic sores. With prop care, they may be prevented.

It is recommended by Safety Resea Institute Inc. 420 Lexington aven New York 17, that, whenever possibl work be arranged so that workers do n come into direct contact with solve otherwise, gloves, sleeves, and other p tective clothing should be provided. U of gloves may be objectionable, eit because they are inconvenient or b cause they irritate the skin. In this ca hands should be covered with a prot tive cream before work.

After work, hands should be clea with mild soap containing if neces a synthetic detergent and an abrasive softens in water.

Strongly alkaline soaps, sharp a sives and solvents never should be u After washing, it is well to apply ointment consisting of 50 per cent c cream and 50 per cent lanolin.

Some persons seem immune to act of certain solvents, while others may so sensitive to a specific solvent slightest contact with it causes skin flammation. It is also possible for work who originally were normal or immune become sensitive during the course their work, the institute states. Appare sensitivity of a worker toward a gi solvent can be verified by a patch t made by a physician, and persons normally sensitive to solvents should n be given work involving their use.

Meehanite Heads Used In Rebuilt Diesel Engines

Diesel engine cylinder heads for and truck engines are being cast in hanite by Umgeni Iron Works Natal, South Africa, according to *neer and Foundryman*, Johannesb publication. Resulting improvemen performance of vehicles recondition with these cylinder heads is attribu by local foundrymen to more rapid h transference, with close grain of m reducing local "hot spots" which te to cause pinking. Patterns for c and heads are produced in Umgeni c pany's own works.

Get your steel "without cost"!

MEIER ELECTRIC & MACHINE CO., *of Indianapolis*
REPORTS *SPEED CASE* STEEL SAVES ENOUGH IN PRODUCTION COSTS TO EQUAL THE COST OF THEIR COLD DRAWN BARS . . . .

MEIER ELECTRIC & MACHINE CO.

Meier Nu-air Fans

3523 E. WASHINGTON ST.
INDIANAPOLIS, INDIANA

July 17, 1945

Monarch Steel Co
545 W. McCarty St
Indpls, Indiana

Att: S.W. Terry

Dear Sirs:

We feel that you perhaps would be interested in a statement from us as to our appreciation of your X1515 Speed Case steel.

In the manufacture of our propellers we have a hub which is produced on a screw machine. This operation is performed outside our plant. A small shoulder in this hub is rolled over a spider which secures the spider to the hub.

We have used a 1020 CR steel bar in this operation which, of course, is lower in price as far as the original material cost is concerned.

However, we find that in the few instances when we used 1020 that the screw machine company which did the work on these hubs always charged us from 6¢ to 7¢ more per hub for the machine operation than their regular charge when we furnished them your Speed Case bars. As this hub weighs approximately one pound we are actually saving the entire cost of the material when we use Speed Case. This is a very nice little saving. We thought you might be interested.

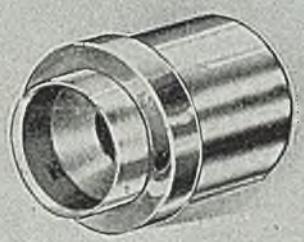
Very truly yours,

MEIER ELECTRIC & MACHINE COMPANY

R.D. Stump

rds/zn

R.D. Stump



This is the Part! Read the Facts!

(Shoulder on the propeller hub is rolled over a spider which secures spider to hub.)

- When using 1020 CR steel it costs from 6c to 7c *more* per hub for machining than when Speed Case Steel is used. This saving pays for the Speed Case used in each hub!

Write for SPEED CASE and SPEED TREAT CATALOG
Our Metallurgists are at your service

Licensor
MONARCH STEEL COMPANY
HAMMOND · INDIANAPOLIS · CHICAGO
PECKOVER'S LTD., Toronto, Canadian Distributor

MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

Licensee for Eastern States
THE FITZSIMONS COMPANY
YOUNGSTOWN, OHIO

Mold Preparation

(*Concluded from Page 107*)

coated, the crane picks up the set of thre and returns them to their positions on th ingot buggy, the stools having bee blown clean while the molds are bein sprayed.

Air is blown into the bottom of th hopper to agitate the powdered pitch which otherwise tends to pack, and a sures a constant supply of powder to th suction line leading to the mold bein coated. A screen just above the suctio intake serves to remove any dirt or lum that might clog the spray system.

Provision is also made to prepare bi end-up molds by means of a hand spra also connected to the pitch hopper. Afte the molds have been dipped in wate they are suspended over the coating pla form and a gooseneck spray pipe with cone-shaped nozzle inserted between th cover plate and the mold. A foot ped operated valve near the coating platfor controls the compressed air to the siphon and hopper and the shape of the nozzle serves to distribute the pitch evenly ove the mold walls.

Experience shows a substantial de crease in scrap and scarfing required since the new mold preparation system wa placed in operation and the coating considered superior to any previously se cured with tar, fuel oil, graphite or brea

Nonferrous-Clad Steel Bids for Recognition

Ampco-clad, a veneered metal whi combines Ampco's resistance to acids a corrosion with the strength of its b rolled steel backing, is said to make material suitable for fabricating such par and assemblies as hot water tanks, wate softener units, ship hulls, acid-resistan tanks, oil well and chemical processin equipment. The clad sheet is made fo these applications by Ampco Metal Inc Milwaukee, in thicknesses from 0.30-i to 3½ in. A harder grade, Ampco 21, i reported to be showing good wear re sistance as gibs and slides in certain ma chine tools.

Actual bonding is done under heat an pressure in an atmosphere controlled fu nace, process making it possible to clad steel billet (generally SAE 1010) and the roll it to required gage with thickne tolerance of 0.075-in., plus or mi 0.004-in.

Company states material in so annealed condition can be worked to the same ease as standard Ampco allo (an aluminum-bronze alloy) and pla stock. Material can be clad on one su or two, as desired, percentage of cladd material may vary from 10 to 40 pe cent. Physical properties will vary slight according to proportion of clad to ba metal.

Company reports it is feasible to cl to such alloys as manganese steel, moly denum steel, and to some of the chr mium-nickel alloys.

All are flexible . . . yet each is designed to do a SPECIFIC JOB

EACH OF THESE flexible metal assemblies has successfully solved a particular problem of vibration, misalignment or movement of parts.

All possess adequate strength and flexibility and are constructed of materials well able to withstand the abrasive and corrosive conditions encountered.

A similarly "tailor-made" assembly can be developed to meet *your* needs. American Flexible Metal Hose or Tubing is made in a wide range of sizes, metals and types of construction. In addition, the broad, practical experience of our Technical Department is at your disposal.

Take advantage of these facilities. For detailed information write for Publication SS-50.

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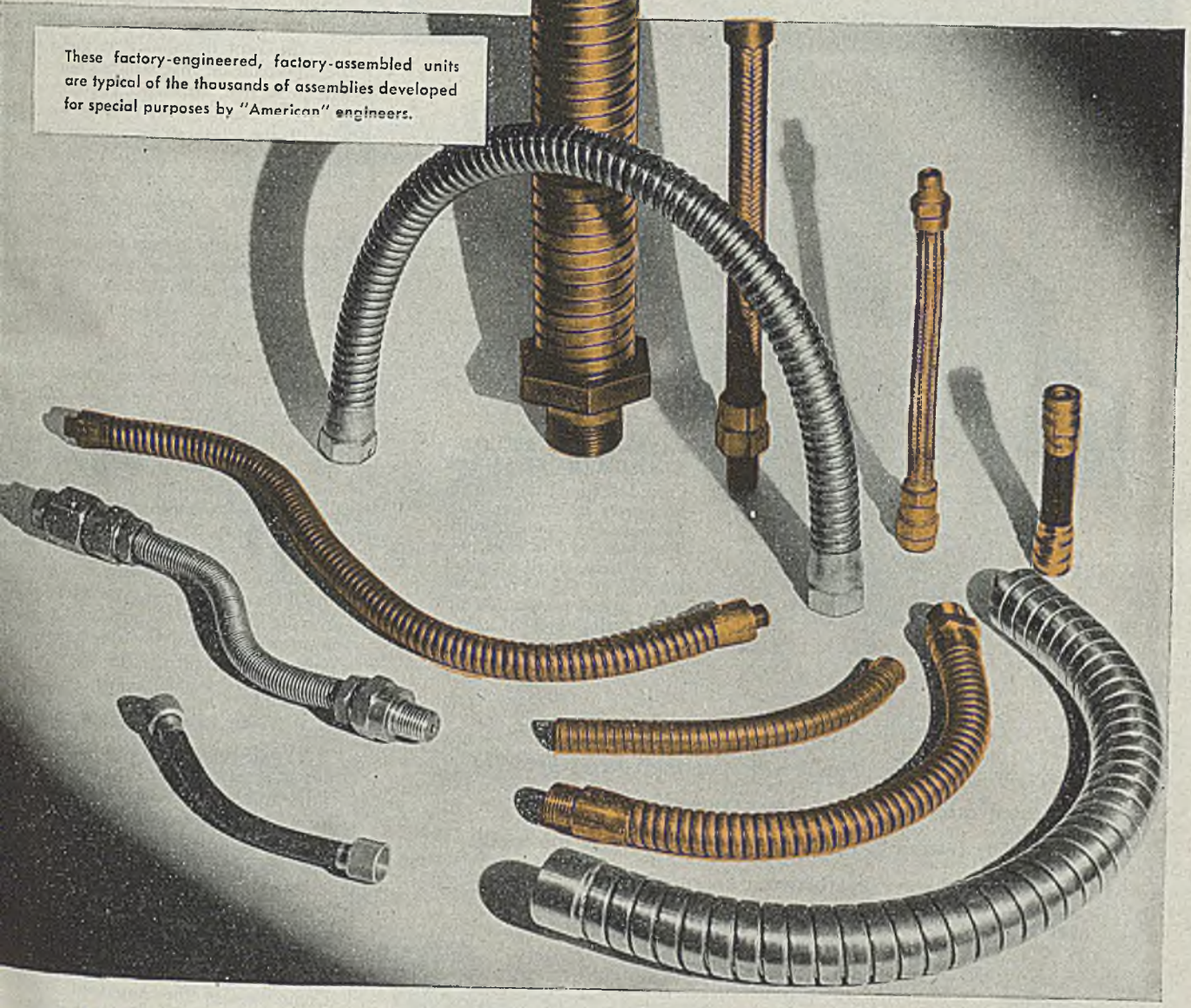

These factory-engineered, factory-assembled units are typical of the thousands of assemblies developed for special purposes by "American" engineers.

ANACONDA
From mine to consumer

American Metal Hose

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Subsidiary of Anaconda Copper Mining Company • In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

Zinc Electroplating

(*Continued from Page* 109)

the atmosphere in industrial localities to gether with humidity and rainfall are a the greatest importance. The chlorid content of sea air is believed to have mild accelerating effect on the corrosio of zinc coatings, particularly in temperat climates. It has also been found that th life of zinc coatings is appreciably longe in tropical marine locations than in te perate locations of the same type. Th best outdoor performance of zinc coatin has been found in air of the open inlan country. In locations where the climat is dry even light coatings furnish prote tion to ferrous materials for long period of time. In humid rural sections ga vanized products of 1.0 oz/sq ft (0.001 in. thickness) have been known to la a generation[6]. Table I[7] has been prepare to give an estimate of what appears t be reasonable values for the expected li of zinc coated products under variou conditions of exposure. It should, how ever, be kept in mind that these value are approximate in character and that i actual service, exposure conditions ma not be the same as those considered typ ical of the atmosphere recorded in thi table.

The corrosion of zinc coatings indoor is of the same general character as woul be expected from outdoor exposures pr tected from rain. Variations in humidit and temperature are less extreme an there is no rainfall to dissolve and remo soluble corrosion products. Thin por zinc coatings exposed to relatively indoor humidities have in general be found to protect ferrous articles and so doing must undergo slow, althou not very visible, sacrificial action. It h been stated that the protective life of zi coatings indoors is at least fivefold greate than that of coatings of the same thick ness exposed to outdoor atmosphere in th same locality[8]. The darkening of ordinar zinc coatings with time does not appea to affect their protective value. Th "bright" zinc coatings produced fro cyanide baths have provided a marke improvement from the standpoint of ap pearance particularly for use in indoo exposure.

Wide Range of Thicknesses

A wide range of zinc coating thick nesses is used on steel and wire. Wher only limited corrosion protection is re quired such as on box strapping and co pling wire thin inexpensive coatings zinc are applied usually around 0.000 0.0005-in. thick. Wire cloth or screen most generally protected with zinc de posits 0.0002 to 0.0004-in. thick. wh is frequently coated with varnish fo additional protection[9]. The Galvaniz Committee of the American Zinc Ins tute specifies 2 oz/sq ft for the best gra of hot galvanized sheet for general ou door use. This is an average weight 1 oz per sq ft on each side of the she and corresponds to an average thickne of 0.0017-in[10]. In general, for outdo service of zinc electroplates 0.001-in. m imum thickness is probably satisfact

Yes, the Kidde Water Extinguisher eliminates the fuss and bother of annual recharging. It gets its power—not from the reaction of chemicals that may deteriorate—but from a *hermetically sealed* cartridge of carbon dioxide that retains its full water-propelling efficiency for years... and when used does no more harm than water.

And when recharging *is* needed, after use, it's a quick, safe, simple operation. No chemicals to handle...no risk of acid burns. Just refill with water and slip in a replacement cartridge!

For locations where low temperatures are encountered, the Kidde Anti-Freeze Extinguisher — identical in construction with the Water Extinguisher — offers the same freedom from need of annual recharging, *plus* ability to function at temperatures as low as —40° F.

Get the facts *today* on Kidde Water Extinguisher and Anti-Freeze Extinguishers.

Walter Kidde & Company, Inc.
1054 Main Street, Belleville 9, New Jersey

How much would you save _IF YOU ELIMINATED RUST?

RUST COSTS AMERICAN INDUSTRY WELL OVER THE WHOPPING SUM OF $100,000,000 A YEAR!

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Two proved, effective Cities Service products will do the job:

Cities Service RUST REMOVER clears metals of rust or tarnish. Works quickly . . . easy to apply.

• • •

Cities Service ANTI-CORRODE, in many forms, is available for every industrial need . . . Provides an impenetrable film that protects parts against rust or corrosion.

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Gentlemen: Please send me full information on Cities Service Rust Prevention Plan.

Name .....

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City ..... State .....

Rust can be eliminated . . . and Cities Service can help you. Call our nearest office or —

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except for unusual conditions or some industrial atmospheres. Sheltered outdoor exposures require a minimum thickness of 0.0005-in. and for indoor or temporary use a minimum of 0.00015-in. will usually suffice.

Continuous processes are employed for acid zinc plating of wire and strip. In plating steel castings, larger hardware, and parts, racking followed by tank plating is the method commonly used. Plating barrels are employed for plating small hardware such as bolts, nuts, rivets, washers and nails. As has been pointed out the cyanide bath is widely used in still tank and barrel plating because of the good covering power at low current density, good throwing power, and uniformity of deposits produced.

Acid Baths vs Cyanide Baths

The choice between acid and cyanide zinc electroplating baths depends upon a number of factors including the high plating rate and low operating cost of the acid zinc bath contrasted with the superior throwing power of the cyanide baths of decided advantage for deep angles, recesses, etc. The advantages and disadvantages of the cyanide type bath as compared with the acid type bath are summarized below:

Advantages of Cyanide Type

1. Exceptional high throwing power of cyanide baths resulting in deposits of uniform thickness; acid type has poor throwing power.
2. Ability to plate semi-bright to mirror bright deposits. Acid zinc deposits are whiter, dull and sometimes coarse grained.
3. Adaptability to low-cost equipment; steel tanks may be used.

Disadvantages of Cyanide Type

1. Somewhat slower speed of deposition than acid type.
2. Generally higher initial solution cost and maintenance cost than common acid baths.
3. Not applicable for coating certain types of base metals *e.g.*, malleable and cast iron; acid baths satisfactory for this purpose.

Acid Zinc Plating

The most extensive use of acid zinc baths is in electrogalvanizing wire and strip steel. As has been pointed out acid zinc electroplating baths are characterized by a somewhat higher rate of deposition and lower operating cost when used at high current densities in large scale production. Their main disadvantage is poor throwing power which limits application to relatively simple forms. The commercially important baths for electrogalvanizing from acid zinc solutions are the zinc sulfate system and the zinc chloride system. The chloride type zinc bath although possessing advantages in increased conductivity over the sulfate type bath appears to have found more limited industrial application. Chloride type zinc plating baths have also been noted to be more corrosive to equipment than sulfate type baths. Atmospheric and salt spray

tests have shown that zinc deposits produced from chloride baths show the same protective value as deposits from sulfate type baths[11].

Sulfate-Type Acid Zinc Baths

Given below are four approved bath formulas for acid zinc plating from the sulfate bath[12]:

Formulas

No. I

Constituent	Concentration g./l.	Concentration oz/gal
$ZnSO_4.7H_2O$	240	32
NH_4Cl	15	2
$Al_2(SO_4)_3.18H_2O$	30	4
Licorice	1	0.13

No. II

Constituent	Concentration g./l.	Concentration oz/gal
$ZnSO_4.7H_2O$	360	48
NH_4Cl	30	4
$NaC_7H_5O_2.3H_2O$	15	2
Glucose	120	16

No. III

Constituent	Concentration g./l.	Concentration oz/gal
$ZnSO_4.7H_2O$	410	54
$AlCl_3.6H_2O$	20	3
Na_2SO_4	75	10

No. IV

Constituent	Concentration g./l.	Concentration oz/gal
$ZnSO_4.7H_2O$	240	32
$NaC_7H_5O_2.3H_2O$	15	2
$Al_2(SO_4)_3.18H_2O$	30	4
Licorice	1	0.13

To furnish metal ions zinc sulfate is used, and as is noted from the above compositions relatively high zinc sulfate concentrations are employed (240-410 g./l.—32 to 54 oz/gal). The commercial grade of zinc sulfate is usually of sufficient purity. As contrasted with the cyanide baths to be discussed subsequently, complex ions are not common in acid zinc baths. Baths containing high concentrations of glucose may tend to form some zinc complex; likewise these baths may be operated at relatively high pH values. Zinc sulfate is only a moderately good conductor. Increasing the free sulfuric acid concentration or addition of chlorides will increase the conductivity of the bath. Aluminum salts and acetates used in the acid zinc bath probably are effective as buffers in the solution.

Addition agents that are commonly used in acid zinc plating are dextrin, licorice, glucose and gelatin. Others which have been used are molasses, B-Naphthol, goulac, cresylic acid, sulfonated cresols and phenols, sodium bisulfite, silicic acid, caffeine and glycerine. In addition numerous other substances have been suggested and claimed to promote smoother, brighter deposits and to widen the general operating range. However, it should be remembered that most addition agents are quite critical as to concentration and if added in excess may lower the cathode efficiency and otherwise seriously interfere with the operation of the bath.

Operating Conditions

The *current densities* used in acid zinc electrogalvanizing to a large extent depend upon the degree of agitation of the solution and the character of the work being plated. In still solutions current density is limited to 10 to 30 amp/sq ft. In plating of round wire in special baths

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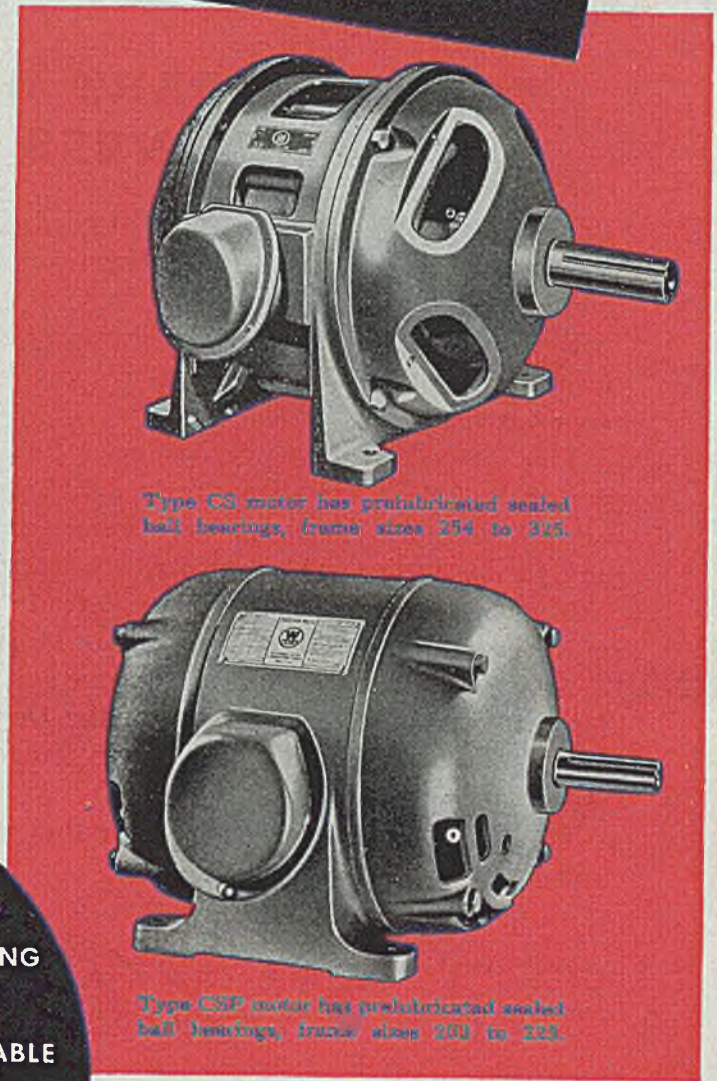
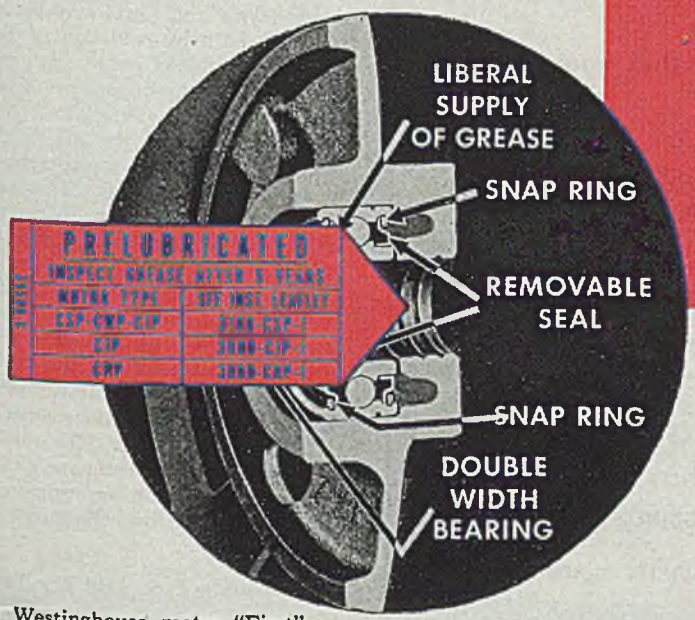


Type CS motor has prelubricated sealed ball bearings, frame sizes 254 to 326.

Type CSP motor has prelubricated sealed ball bearings, frame sizes 203 to 225.



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current densities up to 2000 amp/sq ft have been used. Bath temperatures should be maintained within 75°–85° F (24° — 30° C) as deposits become duller, darker, and coarser above 100° F (38° C). When high current density is used, it often becomes necessary to employ artificial cooling. The operating *pH range* for acid zinc solutions is 3.5 to 4.5, as determined by electrometric methods. To obtain uniform results the pH should not fluctuate more than 0.3 unit. Both anode and cathode *current efficiencies* in acid zinc baths at normal current densities are very high usually 99+ per cent by actual measurement. The *resistivity* of the zinc sulfate type plating baths at recommended concentrations is of the order of 18-23 ohm-cm at 25°C[14]. The *throwing power* of acid zinc baths is poor as compared with cyanide baths. Measurements in the Haring-Blum cell with a 5:1 ratio show a throwing power of from minus 3 to plus 4 per cent[15]. In general, additions to the bath do not much improve the throwing power.

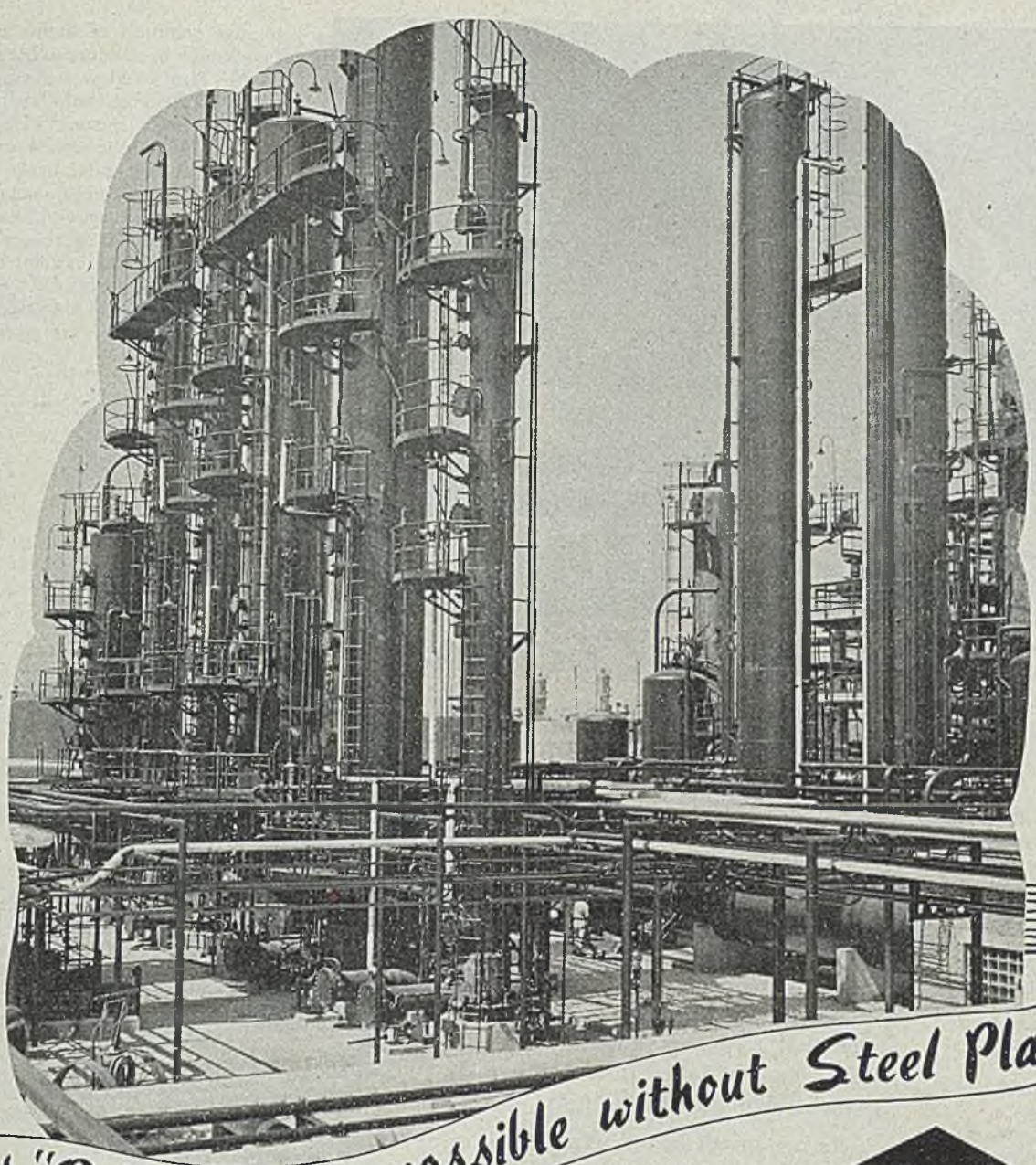
Bath Maintenance

Roughness, pitting, and discoloration of deposits may result from suspended matter in the plating bath. Constant filtration is practiced in large continuous plating installations. Oils and organic impurities are removed from acid zinc baths by treatment with activated carbon; organic addition agents may also be removed by this procedure. Most of the troublesome metallic impurities are plated out from the bath by displacement on the anodes during idle periods. The anodes should be taken out of the bath at intervals, treated with acid, and scrubbed in order to remove these deposited impurities. Small amounts of iron may be introduced into the bath as a result of incomplete rinsing of work after pickling. Most operating acid zinc baths contain a small amount of iron which is not considered objectionable; however, higher concentrations may contaminate the zinc deposit with iron. Iron may be removed from the bath by oxidation to the ferric state by bubbling air through the bath or by adding hydrogen peroxide, manganese dioxide or persulfates[16].

During operation the pH of the acid zinc bath has a tendency to increase due to reaction between the free acid and zinc anodes, and it is usually necessary to add sulfuric acid in order to maintain the optimum pH to 3.5 to 4.5 The sulfuric acid used for this purpose should be relatively free from arsenic, otherwise the character of the deposit may be affected[16]. The control of acid zinc sulfate baths is usually limited to pH measurements and zinc content determinations either by specific gravity or titration. The quinhydrone or glass electrode is recommended for pH determinations, but approximate values may be obtained by colorimetric procedures.

Chloride-Type Acid Zinc Baths

In a systematic study of acid zinc plating baths Thompson[17] proposed that chloride type zinc baths could be used



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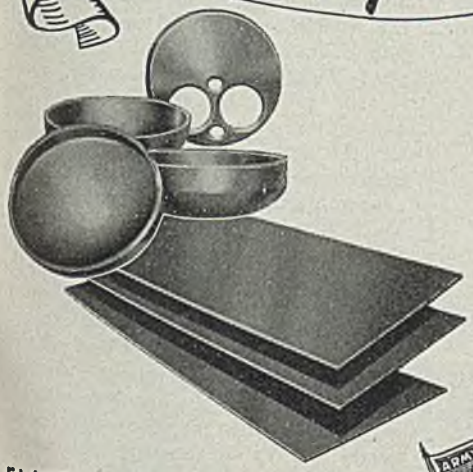

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to give solutions of higher conductivity than could be attained with sulfate type baths. Also noted was the fact that satisfactory deposits could be produced at relatively high current densities. Such baths contain a moderate concentration of zinc chloride, a relatively higher concentration of sodium or ammonium chloride and a small concentration of aluminum chloride. As is the case with the zinc sulfate type system these baths operate best at a pH of 3.5 to 4.5. Specific formulas of chloride type baths proposed by Thompson are given below:

Formulas

No. I

Constituent	Concentration g./l.	Concentration oz/gal
$ZnCl_2$	136	18
NaCl	234	31
$AlCl_3.6H_2O$	20	3

No. II

Constituent	Concentration g./l.	Concentration oz/gal
$ZnCl_2$	136	18
NH_4Cl	214	29
$AlCl_3.6H_2O$	20	3

The resistivity of baths of the above composition at 25°C (77°F) is 3 to 5 ohm-cm as compared with the resistivity of 18 to 23 ohm-cm for sulfate type bath which has already been noted. However, as previously pointed out the chloride type bath may appear somewhat more corrosive to equipment and fittings than the sulfate bath.

A commercial chloride type bath[18] has recently been proposed consisting of a solution of zinc chloride and sodium acetate. The bath is used without addition agents at relatively high current density and claims of extremely ductile coatings have been made, even in the case of thick coatings on steel.

In general, operating conditions and methods of control and maintenance discussed for the sulfate type baths apply equally well to the chloride systems.

Zinc Anodes

Anodes for acid zinc plating are available in three grades of zinc: Prime western spelter (up to 98.5 per cent zinc); intermediate (99.5 to 99.8); and high purity (99.95 to 99.99 per cent). Usually, the purer the anode the less the amount of sludge formed and the better the color of the electroplate is. Considerable difference of opinion exists concerning the type of anode to use. Much work is being done with the intermediate grades and some even with prime western. Undue quantities of lead in the anode may dissolve in the bath up to two or three times the amount expected from the water solubility of lead sulfate. There have been some reports[20], also, that lead if present in the anode to extent of over 0.02 per cent may form a film on the anode and cause excessive polarization.

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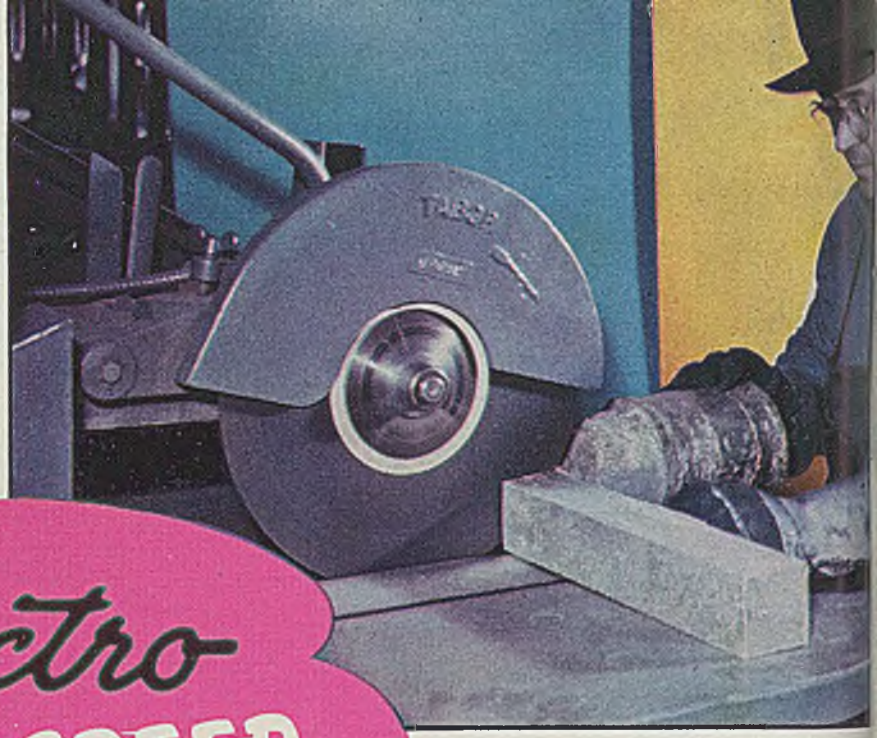

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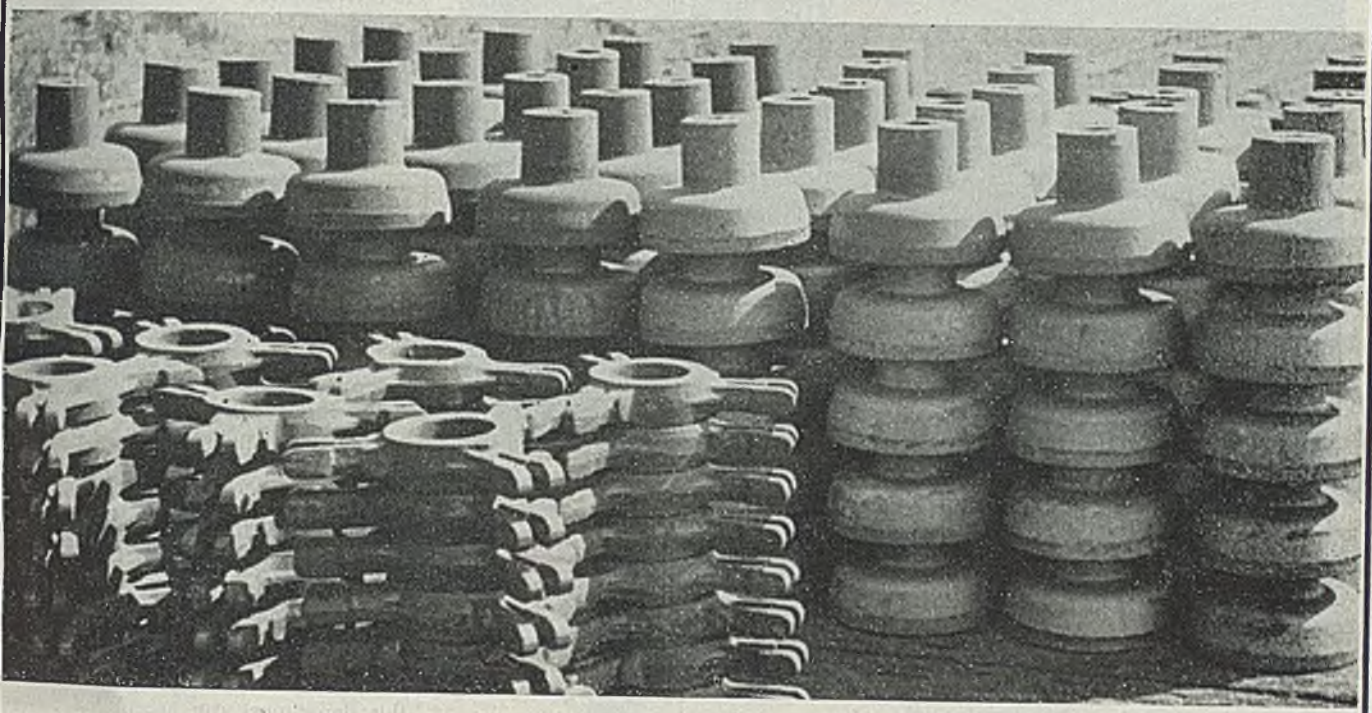

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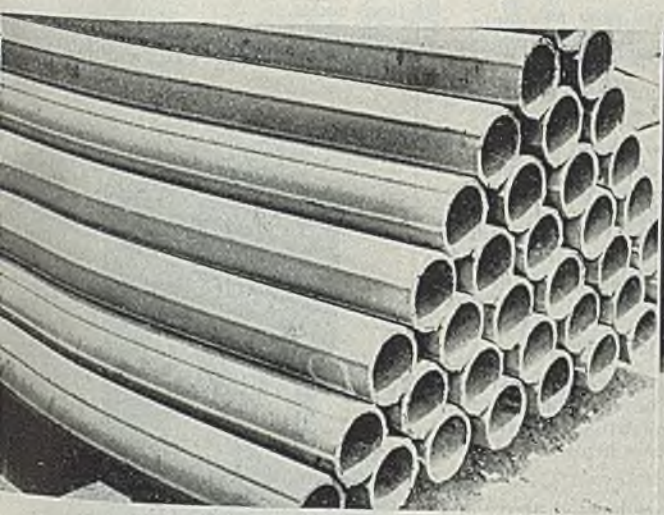

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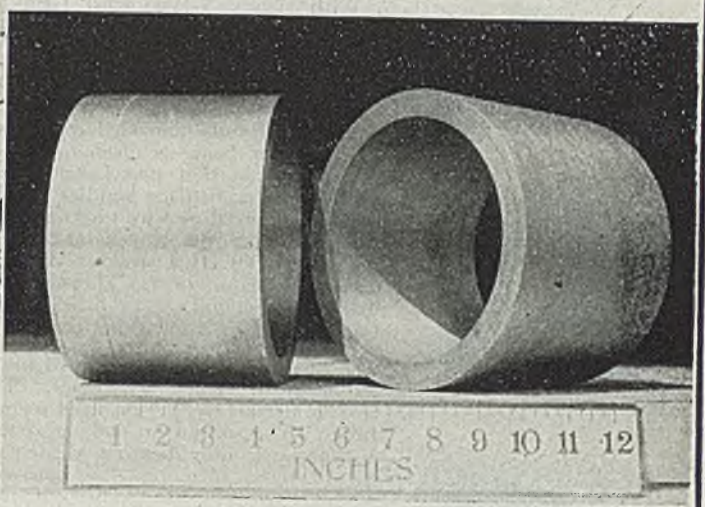

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Metals" p. 108-110, Reinhold Pub. Co., N. Y. (1939).

[8]Passano, Am. Soc. Testing Materials, Pt. I 167 (1935); also see Burns and Schuh "Protective Coatings For Metals", p. 107 Reinhold Pub. Co., N. Y. (1939).

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[20]See Reference 9, p. 352.

(Continued next week)

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Topflight Tool Co., Towson 4, Md. has started a new identification tape printing service. The chief feature of this service is the speed with which this department can accept and deliver orders for imprinting new identification codes.

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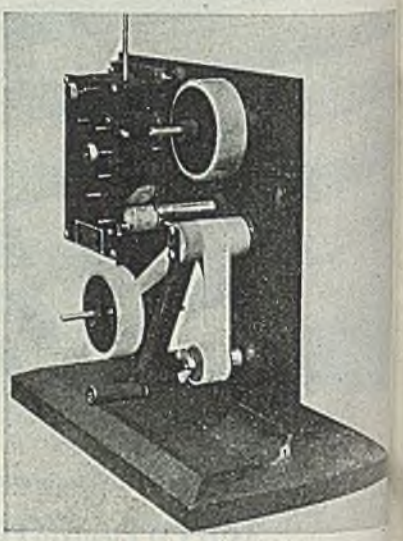

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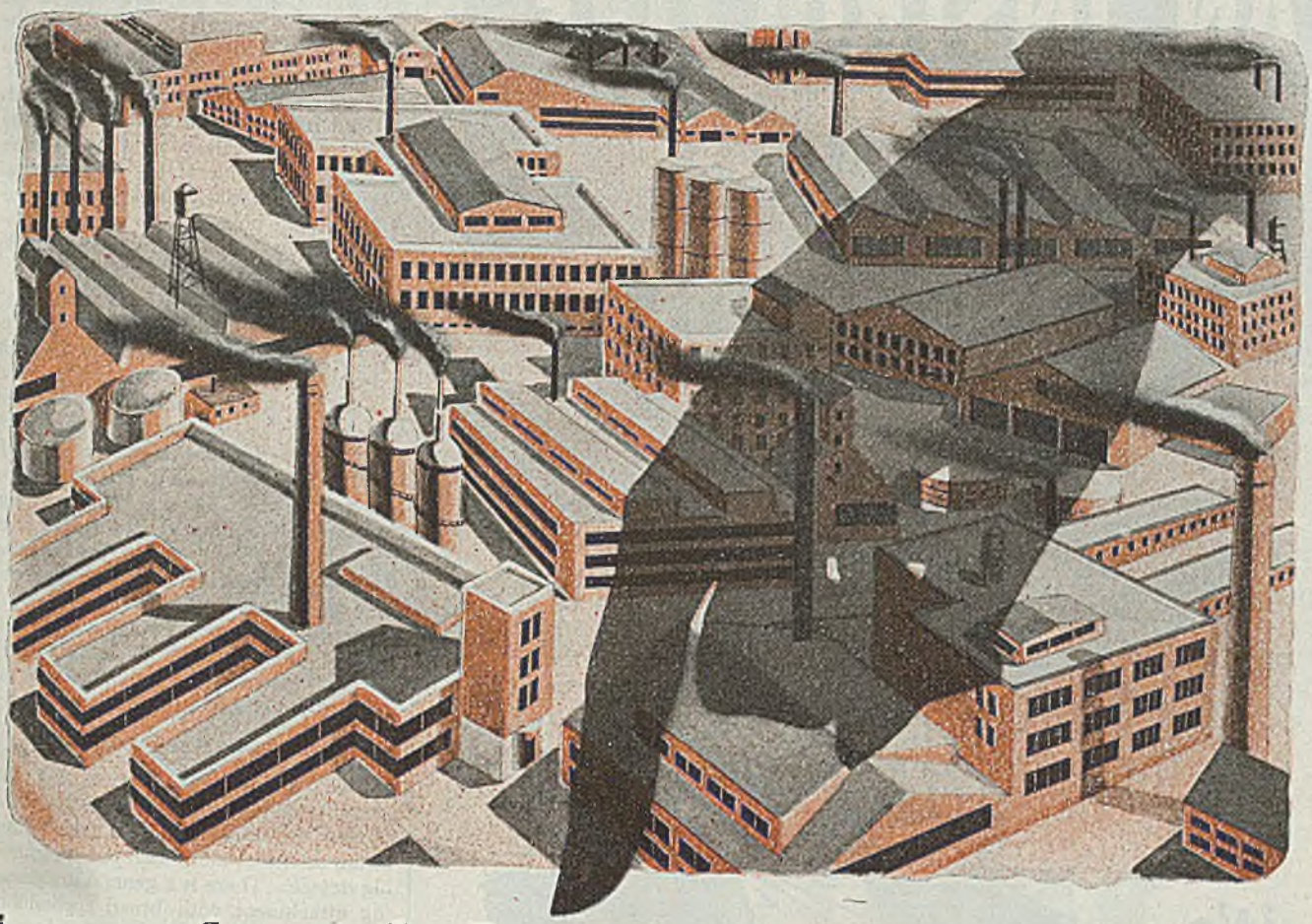

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Straightening Operations

(*Continued from Page* 111)

ing press designed for mounting on the lathe[13]. The unit is hydraulic, can be mounted on virtually any lathe, builds up a pressure of 80 tons in a few seconds, and allows easy straightening of a shaft without removing it from the lathe. The shaft can be revolved right in the lathe to check the truth of the straightening. Yet, by a simple wheel change, this straightening press can be used throughout the plant as a convenient portable unit.

Combination blocks and test rolls are provided for shaft straightening by some firms. The operator spins the shaft to be straightened on two sets of hardened test rolls, so that high spots can be located either with a dial gage, or by means of chalk. Pressure then is put on the shaft at the points indicated, without taking any trouble to change it to another setting. The pressure coming on the shaft causes the rolls to recede or give back, letting the work take a bearing directly between the two steel vees which are set in proper relationship to receive it. As pressure is released, the rolls return, lifting the work from the vees sufficiently for another direct test by spinning.

Nonremoval A Time-Saver

This nonremoval feature for the straightening of shafts saves a great deal of time and trouble, and has been utilized in the design of more than one straightening device. There is a general straightening attachment with broad applicability which can be used for straightening practically any kind of shaft under a power press. The operator of this device not only can revolve the shaft for testing purposes, but can also move it in either direction desired, to bring the high spot directly under the ram of the press. Such attachments[14] are highly useful in plants where there is not enough shaft straightening to warrant the installation of a straightening press as such.

Heavy shafts and axles require presses with large capacity for straightening. One hydraulic axle and shaft straightening press[15] has a lathe-type bed of great strength as its base, and this bed carries a pair of centers in head and tailstocks which can be adjusted to any point along the bed. The two bending blocks, that are placed between the centers and in direct alignment with a hydraulic ram overchanging the work, also can be moved to any desired point on the machine bed. The hydraulic ram is carried in a frame which has two massive strain rods, and this frame can be traversed along the bed longitudinally, being carried on rollers which run on flanges on the lower part of the bed. Thus, the ram can be spotted precisely over the high point on any shaft or axle, regardless of the position of the centers and the bending blocks. The ram has a vertical movement of 4½ in., and 125 tons of pressure can be applied. This is sufficient to bend or to straighten 6-in. shafting in nearly any

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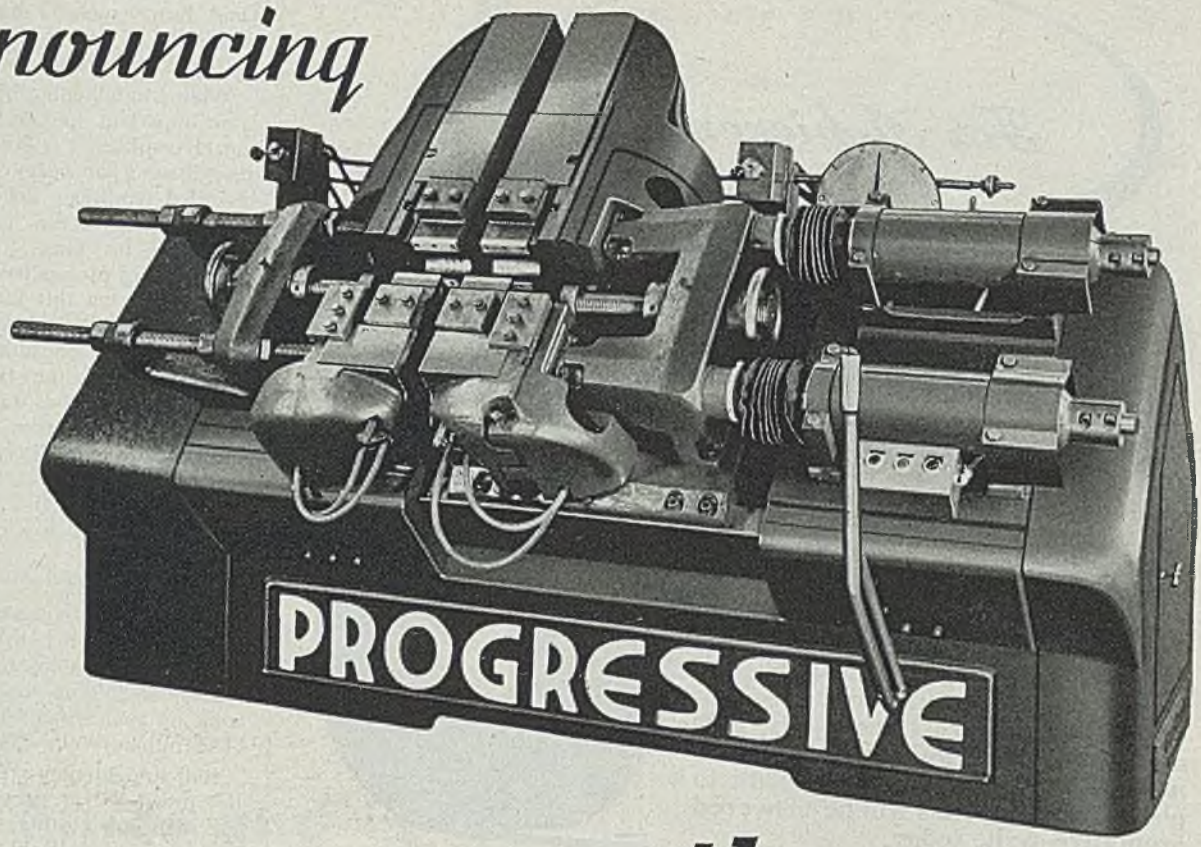

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case. There are, however, some hydraulic shaft straighteners even more powerful. One firm[17] makes shaft straighteners in a full line of capacities ranging from 70 to 200 tons and over.

While straightening of ordinary shafts is an important operation, the straightening of crankshafts is even more so. The straightening of heavy crankshafts is a task that requires a delicate touch, even though many of the "touches" must be measured in tons. Some hydraulic straightening presses have been observed in operation on this kind of work, and having facilities for closely regulating the amount of ram pressure delivered, by a mere touch of the fingers, anywhere from a few pounds to the full 35-ton capacity of the press. The control of ram pressure is infinitely variable in proportion to the amount of control lever movement. Fast and accurate work is the natural of such a control[17].

Gun Barrel Straightening

Hydraulic straightening presses are used for this job both before and after machining operations on the barrels. Fig. 3 shows a 250-ton straightening press at work on rough gun barrels at the plant of Struthers-Wells Co., Titusville, Pa.

Rail straightening presses[18] and hydraulic presses[19] for straightening forgings and malleable castings also are provided. In the case of malleable castings, not only are losses through rejected castings much reduced, but the accuracy of the casting is much improved. It is true that drop hammers are used by some for straightening warped castings which require only one straightened surface, but most of the drop-hammer straightened castings must later go through a checking and hand-straightening process also. In straightening castings with dies in a hydraulic press. the dies usually are closed gradually, and the steadily increasing pressure is applied without the least bit of shock. This allows the use of such closely-fitted dies that all burrs are removed from the castings during the process.

Wire and Small-Rod Straightening

Manufacturers of straightening machinery usually build units for straightening wire and small diameter rods. In other cases, equipment for this purpose is developed as the only straightening machine made by a given firm. One machine is used widely for handling wire and rod that has been bent to various shapes in previous application for foundry core reinforcements[20]. Machines of this kind will handle wire in any length from 6 in. upward. They have four feed openings for wire and small rods, that are identified by trial in gage slots conveniently provided, before running the material into the machine. Three different machine sizes may be had. One handles materials from 1/16 to ¼-in., another takes stock from 3/16 to 1/2-in. and the third will work materials from 1/4 to 3/4-in.

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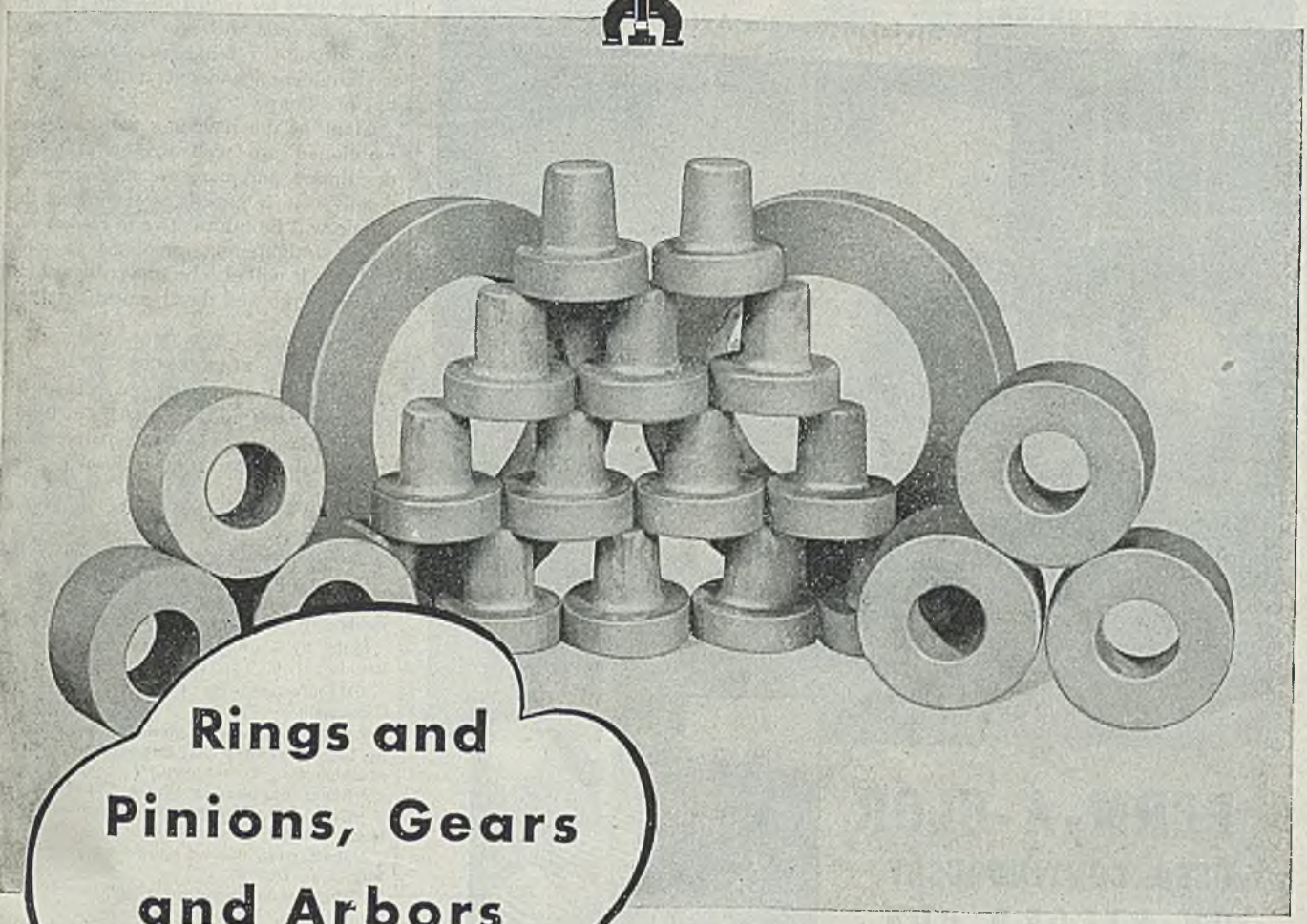

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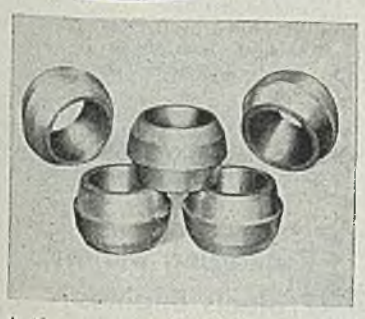

Above:—Group of Forged, Rough Turned and Bored Rings Weighing About 200 Pounds Each. *Below:*—Forged-to-Shape, Swaged, Sawed, Centered, Straightened, and Shot Blasted Milling Machine Arbors. ∀

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and rod straightening machines that tak the materials from coils, straighten it, an cut it into specified lengths. One of th leading builders[21] provides high-produc tion models for both round and flat wir and in several different sizes. Citing a case in point, 1/2-in.bessemer screw stee is straightened and cut at the rate of ton per hour.

Many of the machines that have bee mentioned are well worthy of furthe description, and many are not described detail[22]. It is hoped, however, that th article will be informative to readers wh have straightening problems to solv and that it will also be provocative of fu ther research and development along th line.

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[5]Product of Alamo Iron Works, San Antonio Tex.

[6]Kane & Roach, Syracuse, N. Y.

[7]Sutton Engineering Co., Pittsburgh, make

[8]Product of Artos Engineering Co., Mil waukee, Wis.

[9]Sold by Carter Products Co. Inc., Gran Rapids, Mich.

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[15]Shaft straightening press by Watson-Stillma Co., Roselle, N. J.

[16]Logemann Brothers Co., Milwaukee, Wis. which produces full line of straighteners.

[17]Hannifin Mfg. Co., Chicago.

[18]R. D. Wood Co., Philadelphia, and Cham bersburg Engineering Co., Chambersburg, Pa. manufacturers.

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[20]Federal Foundry Supply Co., Cleveland maker.

[21]F. B. Schuster Co., New Haven, Conn.

[22]Straightening machines and equipment fo variety of materials, designed and built b Kane & Roach, Syracuse, N. Y., and F. B. Schuster Co., New Haven, Conn.

Packaging Material Protects Engines

A new packaging material for mois ture protection of airplane engines an replacement parts is composed of alu minum foil laminated on both sides wi Vitafilm, a plastic base film manufactur by Goodyear Tire & Rubber Co., Akro Aluminum foil increases moisture res tance of plastic. Designated as Metals No. 140, material is sealed easily an quickly with heat. It is said to prote engines and replacement parts for as long as 9 months when coupled wi the moisture-absorbent properties of si ca gel. Material is being developed b Dobeckmun Co., Cleveland, and fabri cated into envelopes for packaging b Kennedy Car Liner & Bag Co., Shelby ville, Ind.

Improved Tooling

(*Concluded from Page* 118)

at the point of assembly on one sid with two 3/16-in. holes; the screw being stainless steel and the nuts of magnesium bronze and SAE-4140. The mechanism is produced for use as right and left-hand units.

The jig designed to accomplish this Fig. 9, locates the screw and three nuts in relative position to each other, aligning the two end nuts and the center nu parallel to the axis of the screw and also locates them endwise within a tolerance of 0.010-in. to a predetermined dimension between the end nuts. There is stop at the end of the mechanism and the gage and stop screw rejects the pa if it doesn't enter the fixture.

End nuts are placed against a floating stop in the fixture. Center nut is placed between spacing blocks. Side clamps are used. The stop face end gage screw locates the endwise, giving proper spacing between the three nuts. The wide tolerance on the nuts is the reason for locating by floats. The holes are drilled 7/32-in., being counterbored for rivets. Cam clamps are used to hold the work to the drill on either side.

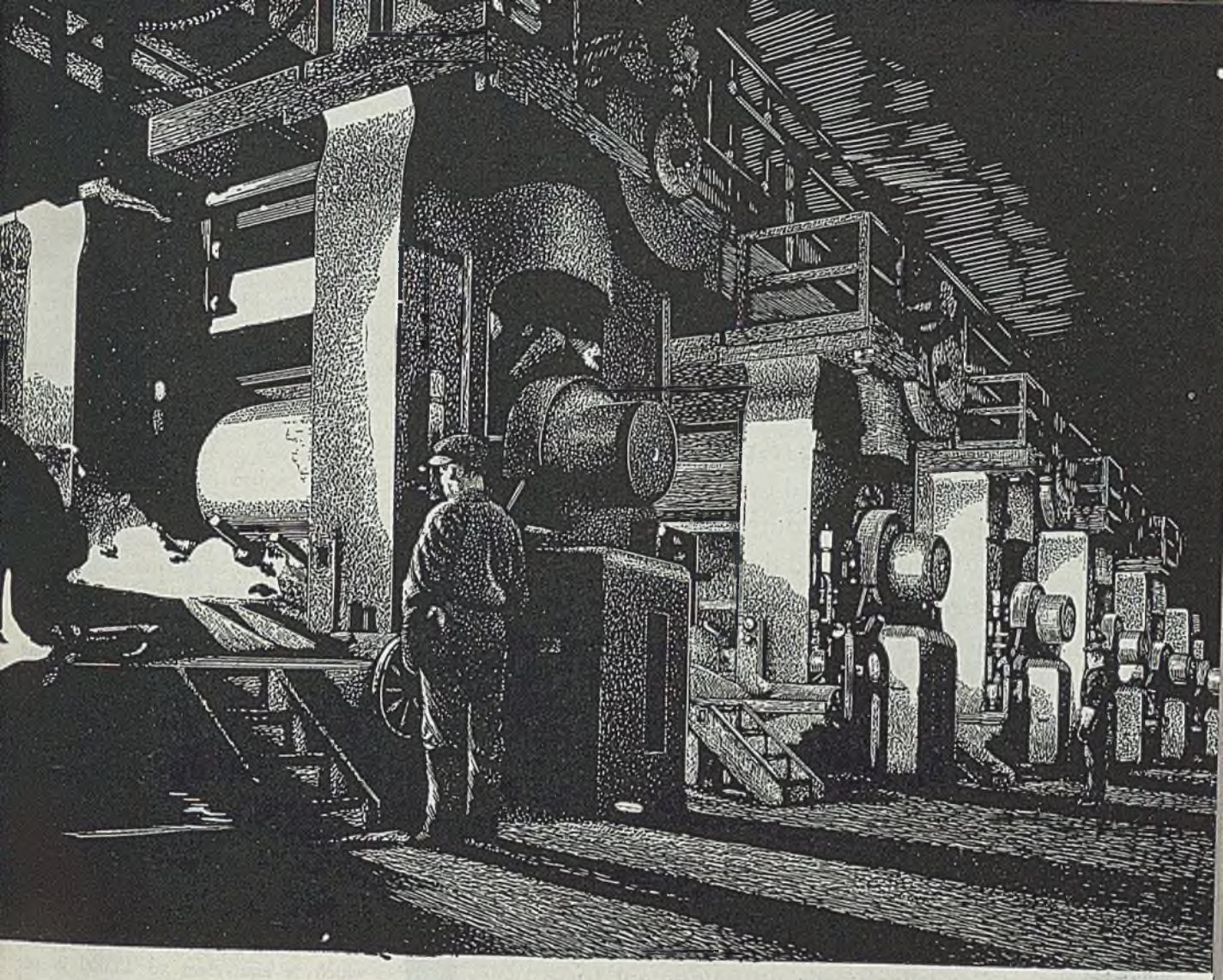
Busy in much research, Auto-Soler is going deeply into negative rake cutting possibilities of nitriding in heat-treating certain parts, use of electric case-hardening furnaces, and some advanced methods for machining magnesium.

Power Shovel Frame Salvaged by Welding

A 4-ton cast steel side frame for a yard power shovel with more than years' service, has been salvaged by welding at the Mesaba Chief mine of the Hanna Ore Mining Co., Keewatin Minn. Fracture in the power shovel side frame occurred during night shift operations and was not detected until the 2-ft, 3-in. thick walls of the casting cracked through all except the bottom portion.

In preparing for welding, the crack was vee'd out to an approximate 60° angle with an acetylene torch, and the casting was cleaned and scraped to remove oxide and foreign matter. Bottom side of the unit was heated thoroughly, enabling repair crew of Lincoln Electric Co., Cleveland, to realign the entire casting. Back-up strips of ½-in. plate were positioned at the base of the crack and initial weld beads were applied in sequence in which the beads were deposited alternately on either side. The top side was welded first; contraction of the weld metal in cooling assisted by pulling the side frame back in true alignment.

Electrode used was AWS specification E-6012, with large size ¼-in. rod being employed except where the gap was small, when ⅛-in. diameter was used. The fractured main center frame also was repaired with the same procedure employed on the side frame.



HOW TO KEEP THEM *Rolling*

Thermit welding provides steel mills and other plants with a complete repair service capable of restoring broken rolls, pinions, machine frames and many other heavy-duty parts to active service.

Three major factors account for Thermit welding's growing use. First, the low cost of Thermit repairs in contrast with the cost of new parts for replacement. Second, the speed with which Thermit repairs can be made compared with the length of time required to obtain and install new parts. And third, the strength and permanence of Thermit welds.

Thermit welded repairs are as strong as a forging of the same cross-section. No machining is required, unless the weld collar interferes with operation of the part, and stress-relieving is unnecessary. Both castings and forgings may be repaired with Thermit welding—and there is no limit to the size of a Thermit weld. Send for new booklet, "Thermit Welding" which explains the applications of the process for both repair and fabrication. Metal & Thermit Corporation, 120 Broadway, New York 5, N. Y., Albany, Chicago, Pittsburgh, So. San Francisco, Toronto.

Thermit Welding

Drawing of Metals

(*Continued from Page* 125)

served for the more general application to all extreme pressure lubrication.

Methods of Testing Extreme Pressure Lubricants

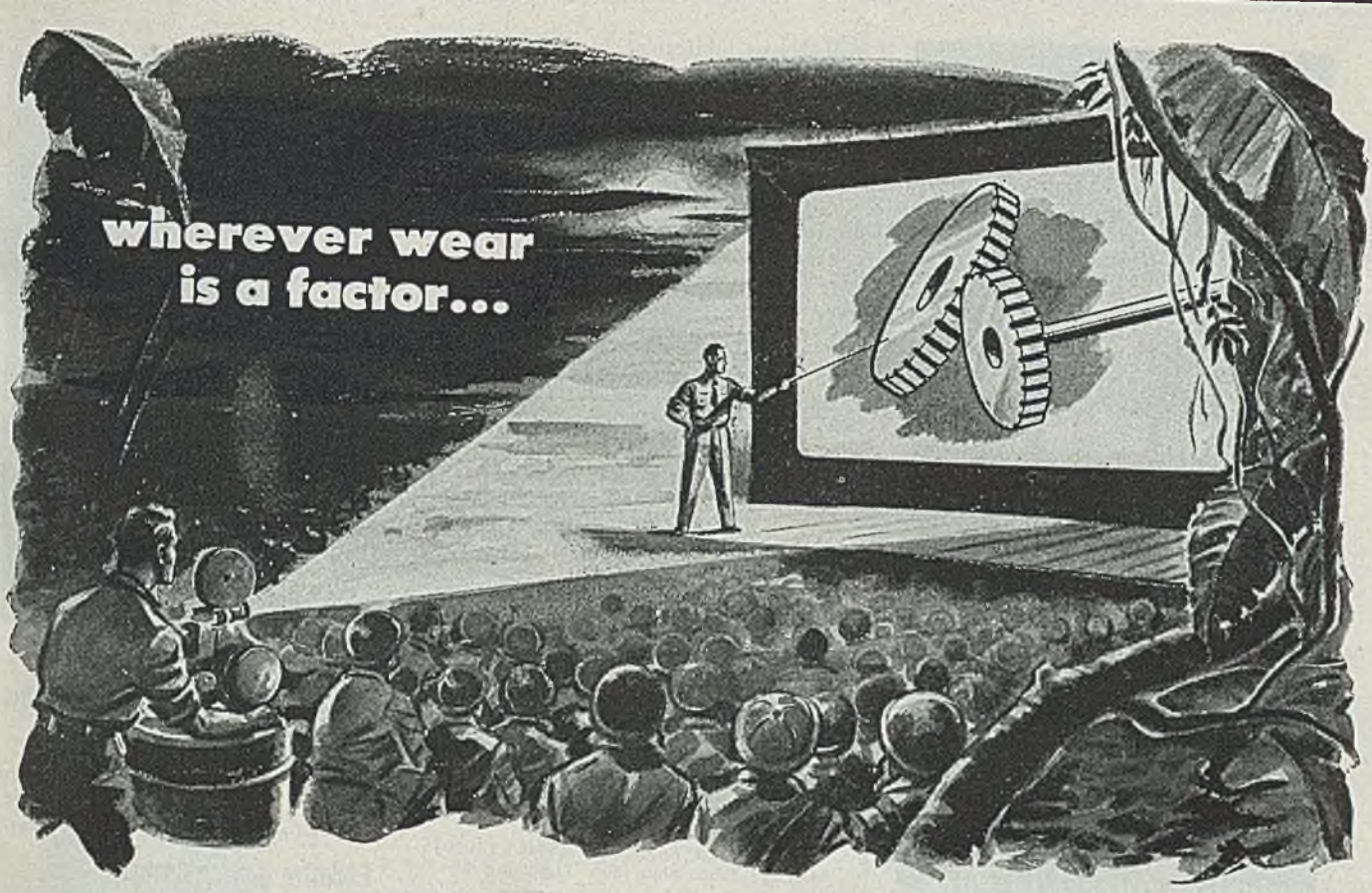
A—Timken Machine[32] (Fig. 6). In this machine a polished steel block is pressed against a revolving steel ring by means of a lever system to which weights are added. The polished, standard, steel ring is placed on a rotating mandrel and oil is flowed continuously over the test parts from a reservoir equipped with a circulating pump. After the test, the block is examined with a small microscope such as is used to measure Brinell hardness. From the size of the scar and the applied load, the unit pressure at the point of failure or stopping the test can be calculated [33,34]. In the test recommended for extreme pressure lubricants, a new set of parts is used for each load. The rate of loading is important with this machine and special devices for applying the load have been designed. The lever weight at which scoring is first evidenced is called the OK value[34] or Timken Film Strength. Frictional readings may also be obtained.

B—The Almen Machine[35]. This consists of a ¼-in. drillrod journal rotating in a split bushing, such that 0.007-in. clearance is provided. Pressure is applied to the split bushing, through a mechanical and hydraulic loading system. Following a running-in period, the load is applied through a lever system at the rate of 2 lb per 10 sec intervals until 30 lb have been applied which is equivalent to 15,000 lb per in.^{2}, unless failure (seizure) has occurred prior to this. Frictional readings are also obtained.

C—Four Ball Tester[22, 37] (Fig. 7). This machine is similar to the 4-ball top except that higher loads, different procedures, and different criteria of performance are used. The commercially produced model also includes the features of the 4-ball top[37] and permits determination of many of the lubricant characteristics mentioned in the above discussions. It is claimed that the machine can be used to test frictional force, seizure prevention, seizure intensity (anti-weld), and normal wear characteristics. Clayton used this device for testing some cutting lubricants.

D—Falex or Faville-LeVally Machine[38]. In this machine, two V-shape blocks are placed against a rotating steel pin immersed in lubricant by means of two nut-cracker jaws. The rate of wear and the jaw load at which an increase in wear occurs is used as a criterion of performance. Since this machine has been specifically utilized in testing drawing lubricants, it will be described more completely in a later section.

E—The SAE Testing Machine[39] (Fig. 8). This was designed because of the lack of consistency in the results obtained with the other instruments in evaluating



Nitralloy *fits into the picture*

In giant crankshafts for 1600 hp. diesels, taking the thrust of pistons 8½ inches in diameter—or in the hair-spring pressure gate of a movie projector passing 86,000 frames per hour—Nitralloy *stands up*, for Nitralloy is the hardest steel surface known.

Nitrided Nitralloy has an approximate Brinell value of 900 to 1100—estimated from the *Herbert Pendulum Test* . . . for testing Nitralloy with Brinell ball or Rockwell diamond point merely results in the shattering of the ball-case or point!

Parts made from Nitrided Nitralloy *maintain* this extreme hardness too—even at temperatures as high as 750°F. Moreover, Nitralloy ranks with the best rustless materials for resistance to atmospheric, and fresh or salt water corrosion.

Find out how Nitrided Nitralloy can help put extra life and dependability into your coming peace-time products. Write for your copy of "Nitralloy and the Nitriding Process" and "Wear".

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Manufacturers of Nitralloy Steel Castings

Milwaukee Steel Foundry Div.
Grede Foundries, Inc.....Milwaukee, Wis

Warehouse & Stock

A. Milne & Co.....New York, N. Y.
Joseph T. Ryerson & Son, Inc.....Chicago, Ill.

hypoid gear lubricants. In this machine, two rings similar to those used in Timken machine rotate over one another in opposite directions and at slightly different speeds so as to provide some slippage. The lower ring dips into the lubricant. The load on the rings is indicated on a spring dial scale, and is increased until the surfaces are scored. The end point is evidenced visually upon scoring or sparking of the test pieces. This is a very severe test.

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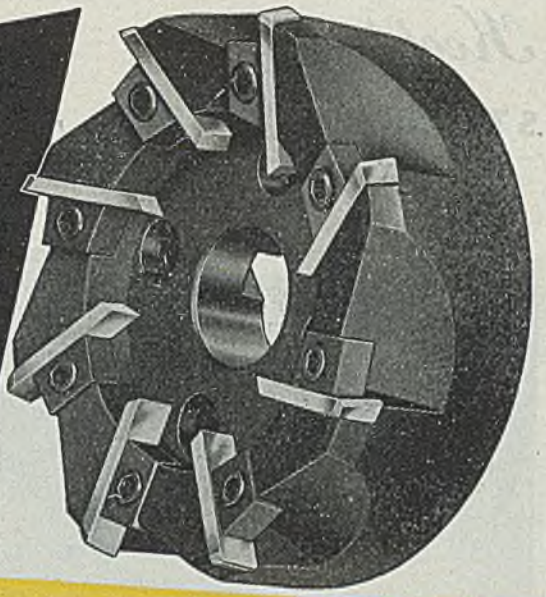
Designed to meet requirements of those whose duties involve figuring the weights of metals, a weight slide rule is available from Warren-Knight Co., 136 North 12th street, Philadelphia 7. Common fractions are used where needed instead of decimals. Length, width, and thickness can be read in feet and inches. Double slide permits two operations in one.

The New KENNAMILL "UNIVERSAL" FACE MILL

WITH WEDGED-IN, SOLID KENNAMETAL BLADES



Reduces

- ✓ PRODUCTION COSTS
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- ✓ OFF-THE-JOB TIME
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ADAPTABLE FOR HIGH RATE MILLING ON ALL TYPES OF METAL

"Universal" Cutters for milling different materials vary only in the grade of Kennametal used in the blades, and the cutting angles. Kennametal blades are wedged into the body at fixed angles of 14° positive radial and 7° negative axial. Before being inserted, they are ground to provide a radial rake suitable for the material to be milled—7° negative for steel; 5° positive for cast-iron, brass, and bronze; 14° positive for aluminum and magnesium alloys. Only the blades are ground—the steel body is a permanent tool holder.

BLADES ARE RESHARPENED ON SURFACE GRINDER

Kennametal blades are reground uniformly to proper angles on a surface grinder, while being held in a simple jig. Illustration shows Kennametal blade in jig having top land ground, which, in conjunction with fixed blade angle in body, provides proper radial rake. Jig rests on another face for grinding clearance angle, and on a third face to grind face cutting edge angle. For finish cuts the face of the cutter is touched up on a cutter grinder. Reconditioning consumes much less time than is required for conventional cutters. Additional time is saved by having resharpened spares ready for quick replacement.

The Kennamill "Universal" Face Mill can be used for milling different materials, at high rates of metal removal, simply by interchanging blades having the right grade of Kennametal and proper cutting angles. Advanceable, solid Kennametal blades are wedged into the sturdy steel body at fixed angles, after having been ground on the edge to provide an effective cutting angle—negative radial rake for steel; positive radial rake for cast-iron and non-ferrous materials.

All design features of this cutter contribute to the possibility of removing a large volume of metal between regrinds. Radially set blades, rigidly supported, maintain their edge longer; and, because the blades are wedged-in instead of brazed-on, brazing strains are eliminated, either initially or during grinding. Hogging cuts, up to a depth of ⅛", are entirely feasible. Ample chip accommodation is provided for all depths of cuts.

The solid Kennametal blades can be reground on a surface grinder, as described at the left, thus eliminating need for special cutter grinders, and greatly reducing off-the-job-time required for reconditioning cutters having brazed-in tips. Blades can be resharpened many times, then used in smaller "Universal" Cutters.

The Kennamill "Universal" Face Mill is available in four sizes—4", 6", 8", and 10". Prices and particulars are yours for the asking.

KENNAMETAL

SUPERIOR CEMENTED CARBIDES

KENNAMETAL Inc., LATROBE, PA.

Nozzles and Stoppers

(*Concluded from Page* 126)

seat, so a gentle pressure followed by firm, patient pressure is advisable. Not even dribbles should be tolerated. While the effect on steel quality may be negligible, anything short of a perfect shut-off indicates careless pouring and the lightly leaking stream too frequently causes progressive erosion to the extent that a dribble subsequently becomes a heavy leaker that cannot be stopped. Stop the dribbles and the leakers will take care of themselves.

Selection of nozzles and heads on the basis of modern technical knowledge plus the development of proper techniques will aid greatly in meeting the strict pouring requirements imposed upon the manufacturer by the high quality standards of the steels produced today.

Lightweight Material Handled by Truck

Large bins mounted on dollies, constructed to handle light-weight material in bulk, utilize high-lift platform trucks manufactured by Elwell-Parker Electric Co., Cleveland, to perform operation. Method is said to be faster, less expensive and more satisfactory than when done by manual labor. As shown in

accompanying illustration, loaded bin can be elevated to any height, and, when hinged front is dropped, most of the load slides of its own weight into body of road truck. Method is being used by paper manufacturers and is expected to aid in handling other light-weight materials in bulk.

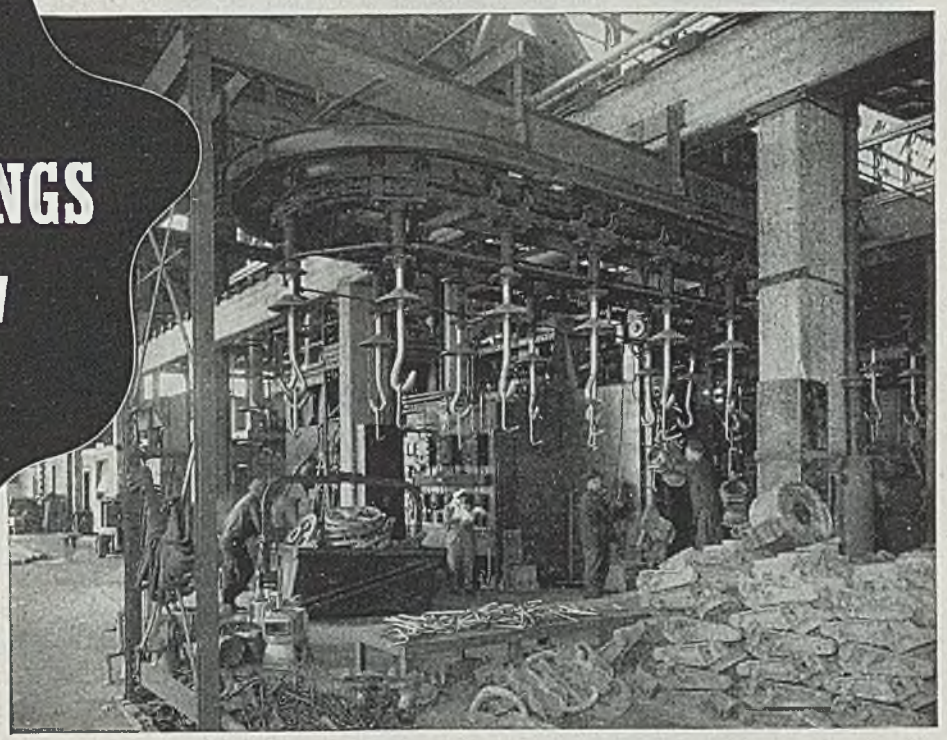
Functions of Rubber Bearings Described

When the rubber in rubber-type bearings is stretched between inner and outer walls and then seeks its original state, forces exerted create a mechanical rather than a chemical bond between rubber and metal, according to a recent statement of Harris Products Co., Cleveland.

The company manufactures vibration-eliminating units used on automobiles, tractors, industrial equipment and, during the war, on combat tanks, etc. Vibration and shock-absorption capacity of such bearings is said to be about 150 psi axial load.

220 TONS of STEEL CASTINGS *Wheelabrated in* 8 HOURS

One of two Special Wheelabrator Cabinets used by Crucible Steel Castings Co. Each machine will clean up to 80 tons of heavy steel castings in 8 hours.



When Crucible Steel Castings Co. of Milwaukee was getting into heavy production of electric steel castings for war equipment, it was found that the majority of the work was too large and bulky for standard blast cleaning machines, and individual handling in blast rooms would be both slow and uneconomical with the available labor supply.

The answer to this problem was found by installing two Wheelabrator Special Cabinets for cleaning the heavy castings and two 48" x 72" Wheelabrator Tumblasts for the smaller work.

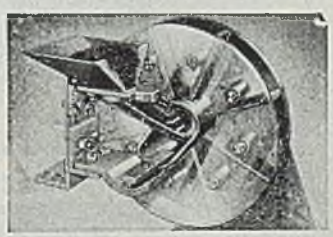
The heavy green castings, with gates and risers attached and many containing cores, are cleaned in a special 3-pass Wheelabrator Cabinet, where they are carried on hooks in an S-shaped path before three Wheelabrator units and rotated for a predetermined time within each blast stream. The position of each Wheelabrator is staggered to assure complete blast coverage of all sizes of work.

A 2-pass Wheelabrator Cabinet is utilized for finish blastings after annealing, while the smaller castings, which can be tumbled, are cleaned in two Wheelabrator Tumblasts—green castings in one and annealed work in the other.

American's solution to this problem has provided efficient cleaning on a mass production basis—220 tons in 8 hours.

BRIEF FACTS ABOUT WHEELABRATING

Airless Wheelabrating, in which abrasive is thrown in a continuous, controlled stream from a centrifugal wheel, is synonymous with high-speed, low-cost cleaning performance. Compressed air, with its costly power and equipment requirements, is entirely eliminated. Three hundred pounds of abrasive per minute, hurled by the standard 19½" diameter wheel, completely scours heavy loads brilliantly clean in a few minutes.



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If you are planning further modernization of your plant, write us for a copy of "The American Line". It gives information on: Airless Wheelabrator and Airblast Equipment, Wheelapeening (shot peening) equipment, Dust Collectors, Sandcutters, Core Rod Straighteners and Metal Washing machines.

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

New Literature

DC VARNISHES

By Dow Corning Corp., P. O. Box 592, Midland, Mich.

(Booklet)

Describes properties of DC 993 varnish and outlines recommended procedures in applying this silicone product for insulating electrical equipment. Silicone varnishes and resins are said to offer remarkable heat and moisture resistance. Inquiries may be referred to general offices, Midland, Mich.

—o—

"ARRIVED O. K."

By Minnesota Mining & Mfg. Co., St. Paul 6, Minn.

Contains detailed information on adhesives made to meet government specifications for rough treatment, extreme temperatures and high humidity. Utilizes photographs to illustrate step-by-step operations in sealing fibreboard and V-board shipping containers and waterproof case liners for export.

—o—

GAGES

By Federal Products Corp., 1144 Eddy street, Providence 1, R. I.

Described are a new micrometer-comparator, model 120B-1, and a dial indicator snap gage, model 1330P-100. The first type comes with 3-wire thread attachments, and snap gage has retractable anvil indicator.

—o—

ACID-PROOF CEMENTS

By Quigley Co. Inc., 527 Fifth avenue, New York 17.

Describes three types of cement produced to cut down time where acid-resistant masonry structures must be bonded or repaired and put into service as quickly as possible.

—o—

HIGH SPEED BLIND RIVETING

By Explosives Dept., Nemours Building, Wilmington 98, Del.

(Manual.)

Entitled "High Speed Blind Riveting with du Pont Explosive Rivets," it tells of wartime use of explosive rivets by the aviation industry and of many possible applications in automotive refrigeration, air-conditioning and other industries.

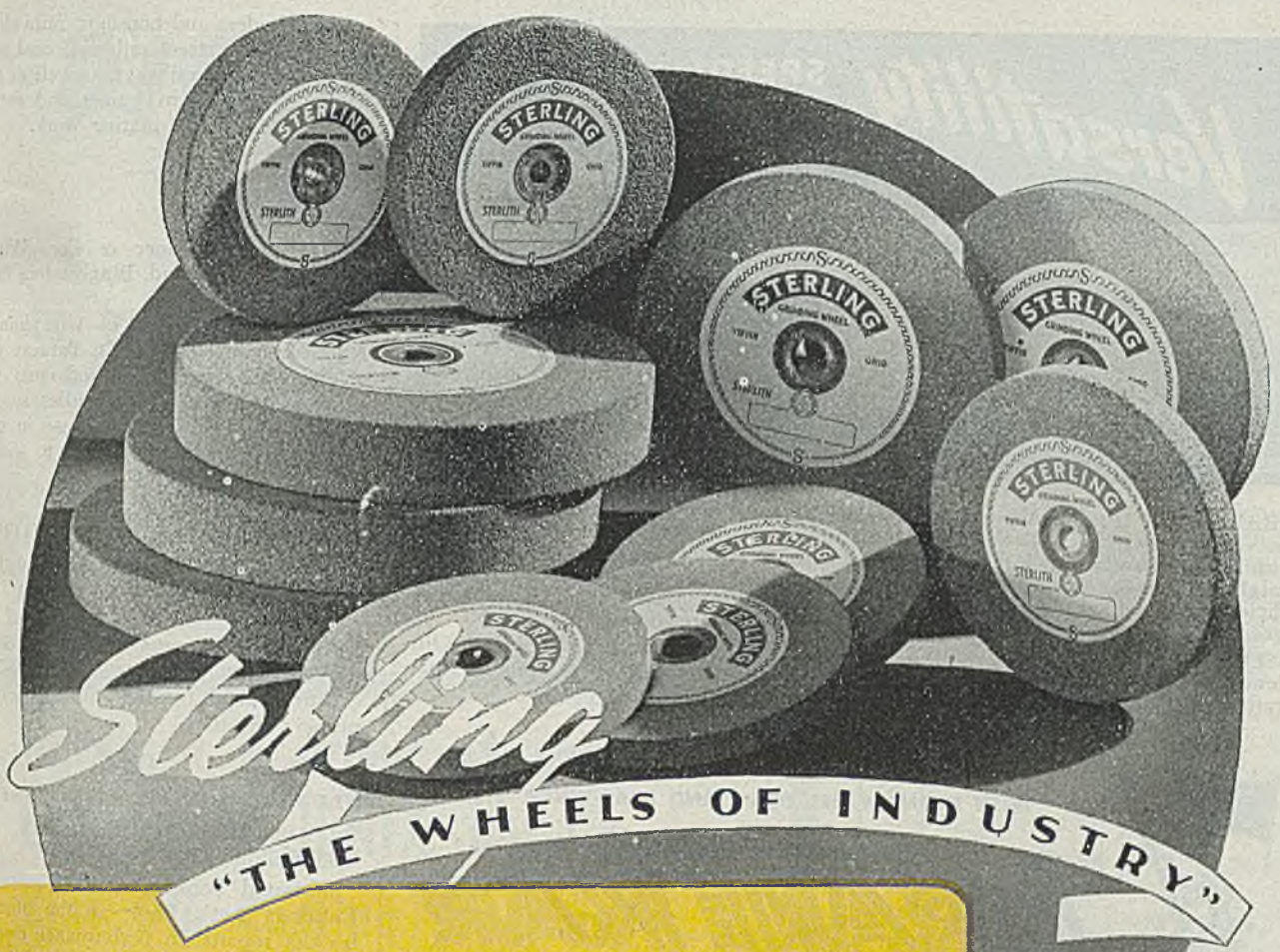
—o—

THERMIT WELDING

By Metal and Thermit Corp., New York.

(A 32-page illustrated booklet, with charts.)

Describes process for fabricating and repairing, illustrating in cross-section formation of a weld. Includes information relating to general fabrication, repairs to heavy equipment such as crankshafts,



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The success others have enjoyed by using Sterling Grinding wheels can be yours. May we show you how your post-war production can be speeded up by putting them on your machines? No obligation—write today!

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THE WHEELS OF INDUSTRY

axles, cylinders and housings, railwel for steam and street railways, coal track, and crane railways, as well as for fabricating stern frames and rep ing heavy parts in marine work.

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WIRE HANDLES

By E. H. Titchener & Co., Wa street at Erie railroad, Binghamton, N (Bulletin.)

Lists types and sizes of wire han featuring concentric ends, flatness single plane, parallelism of ends plane of handle in offset handles, smo ness of ends where they bear in c and swaging of welded joints to size

—o—

DIESEL-ELECTRIC LOCOMOTIV

By H. K. Porter Co. Inc., Pittsburgh (A 44-page catalog, No. L-45-A.)

Gives specifications for narrow and st dard gage locomotives ranging from to 100 tons. Includes engineering construction data and information proper selection.

—o—

ALUMINUM IN ARCHITECTURE

By Aluminum Co. of America, 2 Gulf Building, Pittsburgh 19.

(Illustrated booklet.)

Entitled "Let's Look at the Reco booklet reports on performance and plications of aluminum in architec under varying climatic conditions.

—o—

PORCELAIN ENAMELING

By Enamelist Publishing Co., 4150 46th street, Cleveland 5.

(A 120-page book with 34 illustrati at $1.)

Entitled "A Manual of Porcelain E meling—Abridged and Revised for fresher Use," it describes latest porce enameling practices and covers ess tial phases of process.

—o—

ALLSPEED DRIVE

By Worthington Pump and Machine Corp., Harrison, N. J.

(Bulletin)

Describes Worthington Allspeed D for mechanical equipment. Drive i instantaneously variable speed contro simple, sturdy and compact design providing peak production speed for changing speeds quickly, smoo and positively.

—o—

X-RAY UNIT

By Picker X-Ray Corp., 300 Fourth nue, New York.

(Bulletin)

Describes an industrial X-ray unit use in spot weld control, microra graphy, and inspection of materials w relatively low density such as plasti plywood, etc. Machine operates at 5 50 kv.

Advertisement

DIECASTING DIGEST

IX—Zinc Die Casting Process Takes Step Forward With New Machine

Smooth-surfaced zinc die castings with greatly improved physical characteristics can be produced faster with the new Lester-Phoenix Model HP-2 SF die casting machine. Principal improvements are (1) frame is a solid, *one-piece* alloy steel casting; (2) new double-toggle die actuating linkage provides die opening with limit switch controls to a desired minimum opening; and (3) the central die-height adjusting screw has been increased in diameter to eliminate possibility of deflection of the movable die plate.

The new one-piece cast steel frame provides a die locking pressure of 300 tons to resist the impact of molten zinc injected under high pressure and speed. Flash is practically eliminated. Cross-sectional area of the frame is far greater than that of similarly rated bar-type frame die casting machines, being equivalent to 4 bars each of 6 inches diameter. All fitting of joints, all wear and weaving which might occur at such joints, and all concentrated stresses are eliminated by the one-piece cast steel construction. Die alignment is fixed, die plates are and remain parallel with no possibility of distortion. Die plates are unobstructed by bars; there is plenty of space for lowering dies down through the top of the frame, for core pulling devices and for long dies.

Increased die opening permits the production of deeper castings and limit switch control shortens die opening movement to the minimum required, thus increasing production.

Hydraulic injection of the hot metal is rapid and positive; pressure is held on the casting as it chills in the die, an exclusive feature which produces stronger, sounder castings. Furnace and pot are round, with tangential flame for aster, more uniform heating.

Other improvements are as follows: the hot metal injection system has a one-piece cylinder and gooseneck of heat and corrosion-resistant alloy semi-steel casting, with a high-speed steel cylinder liner and plunger. The closed die is positively supported by 4 metal-to-metal columns through new rotary wedge locks on the toggle links. Die height adjustment is made by means of a single hand crank. Header valves can be supplied for automatic actuation of hydraulic core pulls.

Factors to be Considered When Designing Die Castings

If you are now making die castings or planning to do so, you may find Herbert

Chase's excellent treatise on designing for high production die castings extremely useful. You may have a copy with our compliments. — Lester - Phoenix, 2629 Church Avenue, Cleveland 13, Ohio.

Ball Mill Fitted With Drying Compartment

A combination drying and grinding mill, incorporating a short drying compartment in front of the drying section in conventional ball mill, will make it possible to employ the ball mill effectively in all dry grinding applications without addition of a separate dryer, according to Allis-Chalmers Mfg. Co., Milwaukee. An arrangement of a dam and lifter pocket produces a concentration of material which is showered many times. Hot air drawn into the mill by a fan, continues through the mill with the material and then is put through dust collectors. Material is fed into grinding section by means of a cone discharge.

Nazis' Reclaimed Rubber Inferior to U.S. Product

There seem to have been no large outstanding manufacturers of reclaimed rubber in Germany although there were a few small firms which sold chiefly to small rubber manufacturing companies. Makers of rubber goods produced some of their own scrap and purchased additional supplies. Germany did not produce neoprene and no effort was made to reclaim their perbunan.

Findings of a group of technical representatives from United States, Canada and Great Britain investigating production and use of reclaimed rubber in Germany are published in a report issued jointly by the Rubber Bureau of WPB and the Office of Rubber Reserve of RFC.

Every manufacturer interviewed stated all of his stocks of tires and other scraps had been burned by bombing and they knew of no accumulations of domestic supplies nor had any sort of comprehensive idea of the scrap situation. However, at no time during the war did any manufacturer suffer from insufficient scrap supplies.

No new techniques were developed nor any outstanding plasticizers found by the Germans for use in reclaiming Buna S scrap. Reclaim was used in relatively few rubber formulas or compounds, and was generally not accepted for use in tires.

No effort was made to keep the crude and synthetic tires separate at the reclaiming plant and, as a consequence the quality of German reclaim deteriorated. It can be said that German reclaim was generally inferior to the American product.

Conventional two roll refiners were found to be in general use, but many plants favored, and their latest installations included, a three roll vertical refiner. These refiners were relatively short, top and bottom rolls fixed and in line, middle roll offset and adjusted against top and bottom rolls with large friction ratio between rolls.

A fine grinder was used which con-

REDUCE TURNINGS TO CHIPS *for Compact Storage!*

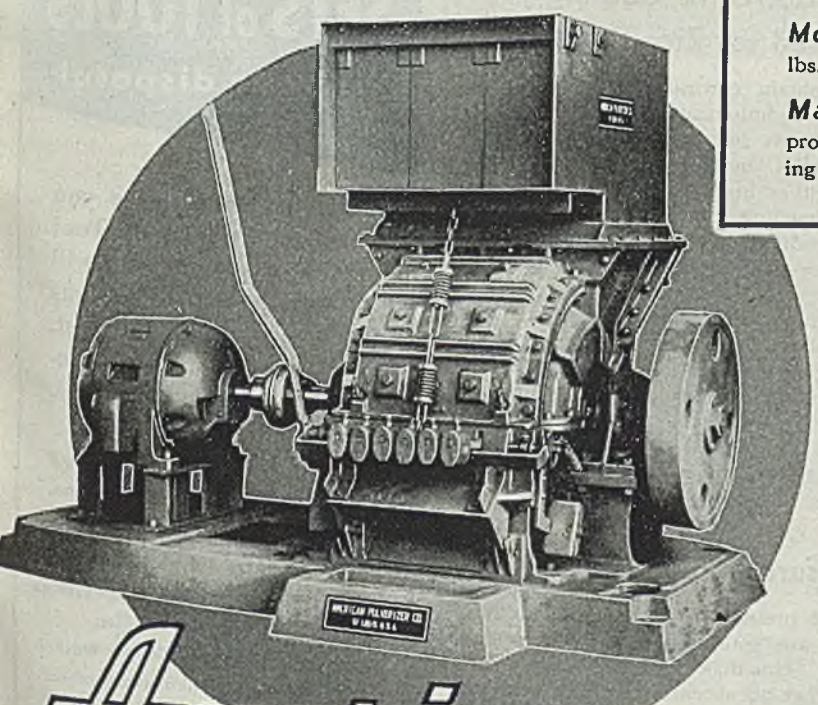
-with the AMERICAN *Ring* TURNINGS CRUSHER

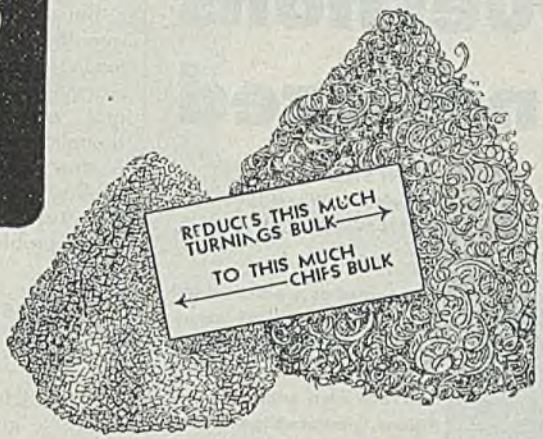
American's large capacity makes it highly profitable to reduce metal turnings to short shovel size. Regular capacities up to 8 tons per hour through 1" grate bar openings—and larger capacities with wider openings.

Americans rapidly shred turnings of high or low carbon steel, alloy steel, aluminum, brass or bronze from lathes, planers, boring mills and automatic screw machines.

Americans are ruggedly constructed to withstand severe demands with low operating cost. Easily dismantled for moving to new locations.

There is an American Ring Turnings Crusher to fit your operation—Americans pay for themselves in return on performance.





Bulk Reduced By

30% to 80%

according to chip size desired

Easier Handling and Storage—Turnings reduced to shovel size by Americans save time and labor in shoveling and are readily handled on conveyors and chutes.

More Cutting Oil Reclaimed— Turnings properly reduced by Americans *increase* cutting oil yield to 30 to 50 gal. or more per ton.

More Turnings per Carload: Load 100,000 lbs. per car compared to 30,000 lbs. of turnings.

Makes Scrap More Valuable: Americans produce proper size chips for blast furnace charging and of proper fineness for briquetting.

Only American Ring Turnings Crusher offer the shredder rings which split instead of crush the turnings. They deflect from tramp iron unharmed. Non clogging.

Send for descriptive literature and detailed specifications

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1539 Macklind Ave.
St. Louis 10, Mo.

Grinding Questions Answered

By ALLEN STEELE
Manager, Dayton Grinding Wheel Division
SIMONDS WORDEN WHITE COMPANY

Presented as a practical aid in the solution of many common grinding problems. Readers are invited to send in their own grinding questions, without obligation. All questions will be answered by mail or in this column.

Continued from Previous Issues

29 Q. *"What are the advantages and disadvantages as between 'dry' and 'wet' cutting-off operations?"*

A. As between "dry" and "wet" cut-off operations, the "dry" is generally considered the much faster method, due to the fact that a faster wheel speed can be used and therefore, the rate of cut is faster.

The advantages of the "wet" cut-off operation are: (1) reduces wheel wear by about 50%; (2) practically eliminates burr and discoloration provided the wheel is properly selected; (3) leaves the cuts bright and clear; (4) permits a more frequent use of rubber bonded wheels, thus effecting a saving in wheel costs.

30 Q. *"If it is dangerous to operate a grinding wheel at a speed faster than the speed recommended by the wheel manufacturer, is there any reason why it shouldn't be operated slower than the recommended speed?"*

A. The wheel speed recommended by the manufacturer not only takes the safety factor into account, but is also the most efficient speed for a given job. If it is operated considerably slower than the recommended speed, there is a wastage of abrasive without getting much useful work in return.

31 Q. *"When centerless grinding pieces with a very small diameter, what blade material do you recommend?"*

A. A high speed steel blade is perhaps best adapted for grinding pieces of very small diameter on a centerless machine.

sisted of two horizontal disks operating in opposite directions with rows of circumferential graduated intermeshing teeth. Nothing outstanding was noted in the strainers, apron mills, cracker mills nor in the debeading equipment.

Buna S reclaims looked about as smooth and tacky as domestic reclaims made of natural rubber scrap. Lower elongation was secured than with all natural rubber tires but the Germans thought that in all other respects Buna S tire reclaims about equal to natural rubber. They did not consider mixture of natural rubber and Buna S too serious a problem.

"Movies Go to Work" Title of Brochure

A booklet entitled "Movies Go To Work" gives industry reasons for adopting motion pictures as a management tool and tells what steps to take to get started. Chapter headings include: "Training Salesmen," "Selling Your Product," "Increasing Production," "Improving Personnel Relations," and "Interpreting Your Material."

Under the last heading, Bell & Howell Co., Chicago, producers of motion picture equipment, offers the services of its organization in selecting commercial production facilities for script writing assistance, technical aid in actual shooting of film, and other film production work.

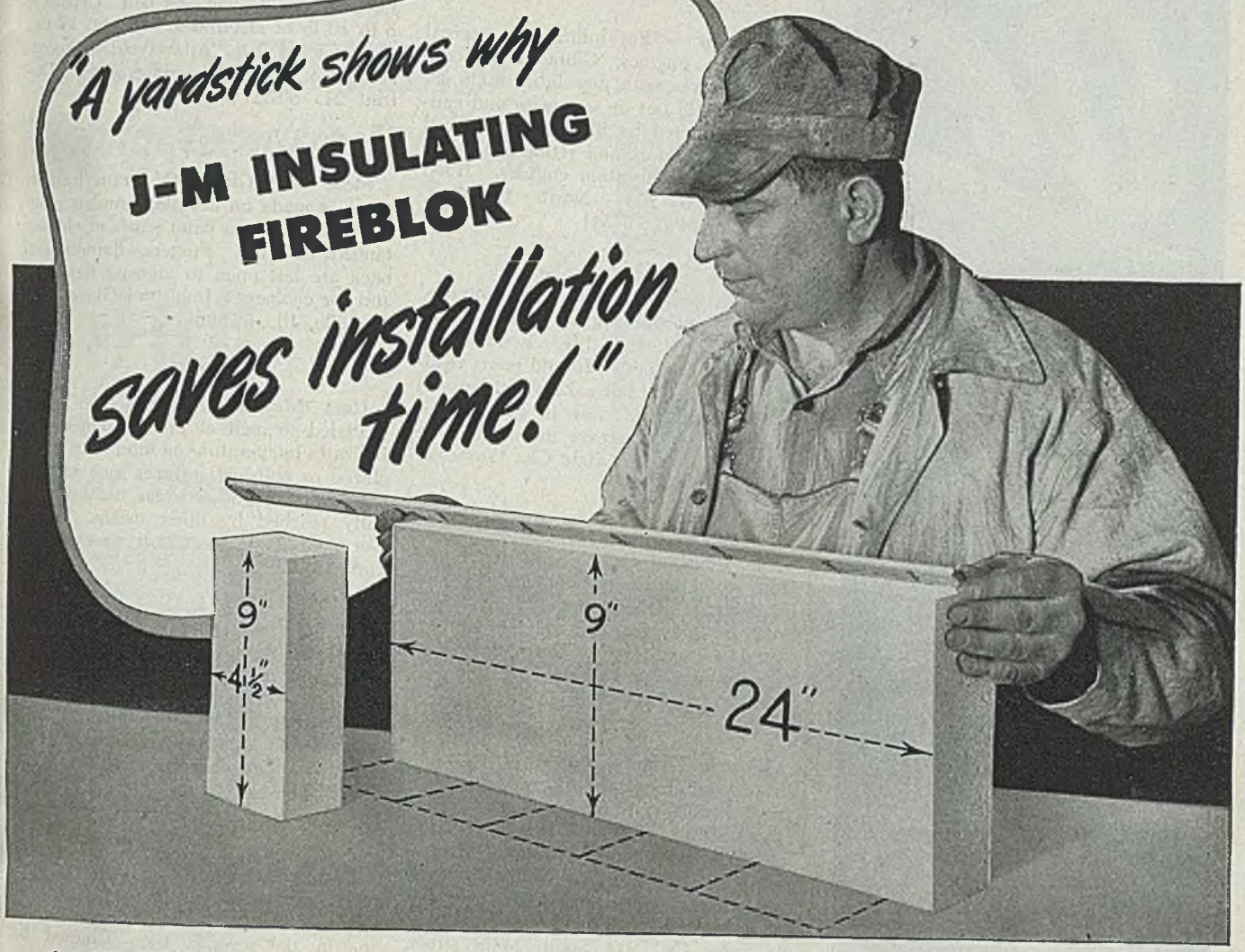
Non-Corrosive Coating Offered for Zinc Parts

To obtain corrosion protection coatings on cadmium and zinc, a new process converts surface to chemically inert compounds, making it possible to produce either black or olive drab finishes for preventing formation of white corrosion products and also to obtain a good base for paint or lacquer. Among advantages of Unichrome Dip, a product of United Chromium Inc., 51 East 42nd street, New York 17, are: Parts require only a single immersion for 2 to 5 min; no special equipment, racking, or current is required; parts are handled in bulk and treated at room temperature; and maintenance and control of solution is easy and inexpensive.

Pressure Sealing Zipper

Two pressure doors of a new military plane are sealed by a pressure sealing zipper. One door is a special curtain, and the other an access door to an ammunition shelf. In the ammunition shelf, the zipper is applied flat around a curved surface. Zipper may be used any place where a hinged door swings out of a bulkhead, according to B. F. Goodrich Co., Akron. Use of a special construction seals the application against as much pressure as structural strength of the metal zipper will stand.

"A yardstick shows why J-M INSULATING FIREBLOK saves installation time!"



• *One* Johns-Manville insulating Fireblok has more surface area than *five* ordinary fire brick. The saving in installation time is apparent . . . as is the reduction in costly furnace down-time.

The four types of Johns-Manville Insulating Fireblok (lightweight insulating refractory linings in block form) are suitable for the same service and temperature ranges as the four well-known J-M Insulating Fire Brick. The only difference is size . . . an installation of the much larger Fireblok can be completed in much less time than with standard size brick.

In addition to its larger size, J-M Fireblok also has these important advantages:

Easy Cutting and Fitting—can be cut with a saw and shaped with a rasp. Most special shapes can be cut from standard slabs, reducing the inventory of special shapes.

Minimum of Joints—the large size, compared to standard fire brick, materially reduces number and length of joints, resulting in thermally more efficient construction.

Economical Bonding — with reduced joint length, Fireblok requires a minimum of airset cement for bonding. (J-M 1626 Cement was especially developed for this use.)

Uses—use Fireblok wherever insulating Fire Brick is recommended, as for industrial furnaces, flues, stacks, etc. Fireblok is particularly suitable for the lining of doors, for suspended arches, and when tapered, for sprung arches of exceptional stability.

By having J-M FIREBLOK applied by J-M Technical Service Units or Johns-Manville's construction forces you assure a thorough, speedy and economical installation. In this way you get the utmost in insulating efficiency and length of service.

Installing J-M Fireblok on a suspended arch-type furnace, using convenient J-M hanger supports. Despite the large size of Fireblok, it is light in weight . . . easily handled.

4 Types Available:

JM-1620 Fireblok for exposed temp. to 1600°F. As back-up to 2000°F.

JM-20 Fireblok for use up to 2000°F. Exposed or back-up.

JM-23 Fireblok for use up to 2300°F. Exposed or back-up.

JM-26 Fireblok for use up to 2600°F. Exposed or back-up.

Johns-Manville
22 East 40th Street, New York 16, N. Y.

INDUSTRIAL INSULATIONS
for every temperature—for every service

NEW PRODUCTS

Lubricant — For lubricating internal combustion engines, Gibraltar oil concentrate mixes with any lubricating oil, will not settle out or segregate and cannot be extracted by filter. Cuts oil feed on air compressors and reduces oil consumption in combustion engines. Hood Refining Co., 253 North Hamilton, Greensburg, Pa. ST 341

—o—

Leather Belt Dressing—Oils contained in Grako belt dressing are "nutritive" to leather and prolong life. Regular use keeps belting pliable. Liquid pours readily at 32° F, will not cake or gum-up on pulleys and belts, and is suitable for conditions where steam and water are present. Graton & Knight Co., Worcester 4, Mass. ST393

—o—

Fire-Resistant Paint — Ri-Repel protects wood and other materials against fire hazards. It can be applied with a brush or spray gun to surface to be protected. General Detroit Corp., 2270 East Jefferson avenue, Detroit 7. ST388

—o—

Electric Heating Flux—For restoring burned out electrical appliances and electrical heating equipment, a new alloy, Chanite Flux, is a replacement for vital metals not available. Powdered flux requires no priorities, no welding or soldering equipment, is not a strategic material, and can be applied quickly. Chanite Sales Co., 914 South Main street, Fort Worth, Tex., ST 358

—o—

Stop-off Lacquer—For covering plating racks either by itself or with oroseal Tape RX, Korolac RX solution is made in white instead of the original clear color. It provides a corrosion resistant, tough, inert coating with good insulating properties. B. F. Goodrich Co., Akron, O. ST359

—o—

Photo-Stencil Film—For silk screen printing process, photo-stencil film is pre-sensitized and requires no treatment before exposure, permitting a high degree of standardization in exposure times and stencil film depth. Sensitive coating is protected from finger marks, scratches, etc., by a thin laminated cover film which also absorbs actinic light and serves as an antihalation backing during exposure. Craftint Mfg. Co., 210 St. Clair avenue, N. W., Cleveland. ST361

—o—

Electrode Case — Suspended from welder's belt with extra division for carrying a weld cleaning tool, so both electrodes and chipping hammer are conveniently at hand. Long life afforded by heavy harness leather construction, riveted for permanence, and broad loop for attaching to welder's belt. Capacity, 8 to 10 lb of electrodes. Height, 12 in., diameter 3 1/2 in. Atlas Welding Accessories Co., 14824 Wyoming avenue, Detroit 21. ST327

—o—

Steel Grip Glove—Of grain leather, glove is made on flexible, seamless palm pattern with extra palm patch of chrome tanned cowhide. Fingers, thumbs and back are left open to increase flexibility and for coolness. Industrial Gloves Co., Danville, Ill. ST360

—o—

Heat Measurement — Lacquer compounded to melt at predetermined heat indicates temperature on interior of tubes, glazed or polished surfaces such as glass or plastics, or other areas not conveniently reached by other means. Tempil Corp., 132 West 22nd street, New York 11. ST332

—o—

Pickling Agent—Troxide, a dry, inert compound, removes rust, scale, tarnish, and incrustations of cement and lime from metals, and is noneruptive and noninflammable. Waverly Petroleum Products Co., Droxel building, Philadelphia 6. ST 384

—o—

Planing Attachment—For curved surfaces, device is said to be capable of finishing surfaces to tolerances of 0.001 in. in one-seventh time required by hand. Turchan Follower Machine Co., Detroit. ST 329

—o—

Carbon Remover—Carbo-Blitz, a nonflammable, nontoxic and noninjurious product, is used cold in any container and is safe for all types of metals and alloys. Phillips Chemical Co., 3431 Touhy avenue, Chicago 45. ST399

—o—

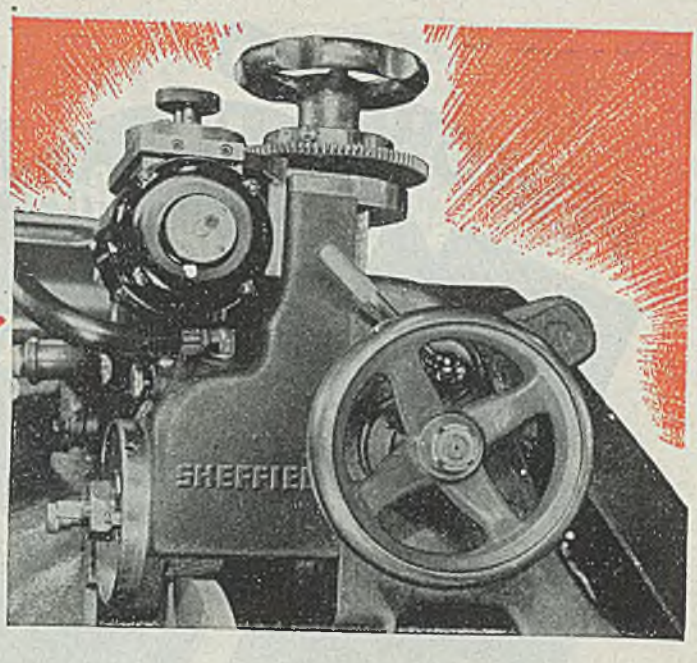
Steel Blacking—Process features simplicity of technique in finish and functions at temperatures ranging from 100 to 300°F. The controls are simplified to a periodic check once or twice daily. Protective Coatings Inc., Box 58 Detroit 27. ST 354

—o—

Die Holder — Holds marking dies in exact position ready for stamping. Face of each die is protected in holder so that it may be quickly placed in marking position without danger of scratching the work. Each die is properly balanced with marking arranged so that impression may be made by a single hammer blow on each die. Each die is supported so that bounce or chatter marks are practically eliminated. Indi-

with **SHEFFIELD**
Semiautomatic Crushing

290
of these



GROUND ACCURATELY WITH ONE WHEEL DRESSING

Sheffield's semiautomatic crushing device with motorized feed brings new advantages to the use of crush dressing.

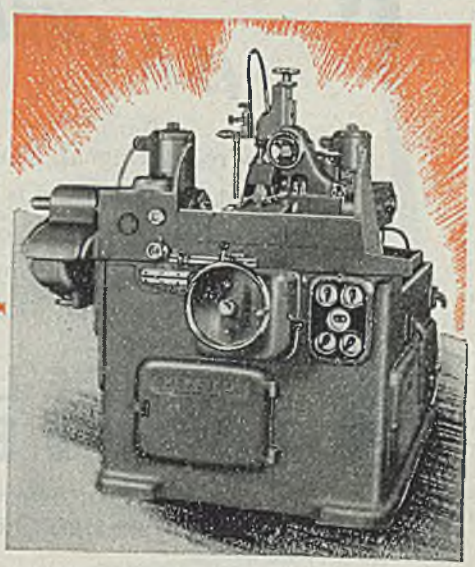
The human element of irregular rate of feeding crusher into the wheel is eliminated. Each dressing operation is uniform.

Crushing is semiautomatic and is done in half the time of manual crushing.

The life of both crusher rolls and grinding wheels is substantially increased because of uniform rate of infeed and pressure.

A typical case history of the advantages of the motorized crusher is illustrated at the left—290 thread elements were plunge ground between wheel dressings on these stainless steel ordnance parts. Threads are 5/8"-18 N.F. 3 having a length of .563". Grinding time, 20 seconds per thread element. Plunge grinding was performed on a Sheffield Thread and Form Grinder.

Write for Bulletin M-100-145.



CHEK WITH SHEFFIELD

Headquarters for crush dressing thread and form grinding equipment

THE SHEFFIELD CORPORATION

Dayton 4, Ohio, U.S.A.

MACHINE TOOLS • GAGES • MEASURING INSTRUMENTS • CONTRACT SERVICES

SHEFFIELD MASTER CRAFTSMEN

vidual sections of marking may changed as required. Markings cannot placed in wrong position or invert after holder is set in place. Engineer Department, Acromark Co., Mor street, Elizabeth, N. J. ST325

—o—

Relay—Redesigned for applicati where lower cost and ease of adjustm are important factors, all parts of s action relay, type 79XAX, are access and sensitivity adjustments may be m easily and quickly. Struthers-Dunn 1321 Arch, Philadelphia 7. ST343

—o—

Artist's Board—On a base adjusta to angle, height, and working posi desired, board swivels on a strong st center pin. Friction inserts assure p tion at any point of a 360° arc. Stro steel bracket gives positive adjustm and locking to work angle requir Spring action clamp permits a shift range of 8 1/2 in. up or down of worki table on base. Unit folds compactly easy portability. Engineering Mfg. C Sheboygan, Wis. ST326

—o—

Safety Glove—Made from high g chrome-tanned cowhide, glove can worn for welding and for hand protec in other heavy-duty operations. G piece back construction prevents sp or molten metal from catching on se Vulnerable seams are welted. Ame Optical Co., Southbridge, Mass. ST

—o—

Cover Glasses—For welding shi are treated with a protective coating guard against heat breakage and dam from metal spatter. Completely cove on both sides with IPCO, a tough, bak on protective coating which will not peel or rub off. Size: 2 x 4 1/8 in. dustrial Products Co., 2820 North For street, Philadelphia 33. ST324

—o—

Metal Cleaning Materials—A lin detergents is available in alkaline, ac solvent and emulsion types. Proper tergent used with correct cleaning m od, is recommended for best results timus Detergent Co., 176 Church s Matawan, N. J. ST389

—o—

Plastic Sheets—Processed from V lite, various grades of plastic sheets available for accurate drawings and t tolerance reproduction. Standard siz 51 3/4 x 144 in. Direct Reproduc Corp., 22 East 40th street, New Y 16. ST391

PROTECTING AUTO PARTS
Since the Horseless Carriage

Products *must* be good to merit year-after-year acceptance in the fast-moving automotive field—an industry that pioneered in modern production methods and whose engineering achievements are almost legendary.

The automotive industry has been served since its beginning by Hanson-Van Winkle-Munning equipment and supplies for *protective* plating and finishing of many working and ornamental parts.

Our proved ability to work in close cooperation with the automotive industry in developing special plating and finishing equipment to its own requirements is one reason for our position in the field. Another reason is our readiness to cooperate at all times in the design and layout of new plating and polishing departments. This H-VW-M engineering counsel is available to *all* industries. We are ready to work with you on plating and finishing problems you may have today.

Why not write us about them?

HANSON-VAN WINKLE-MUNNING CO.

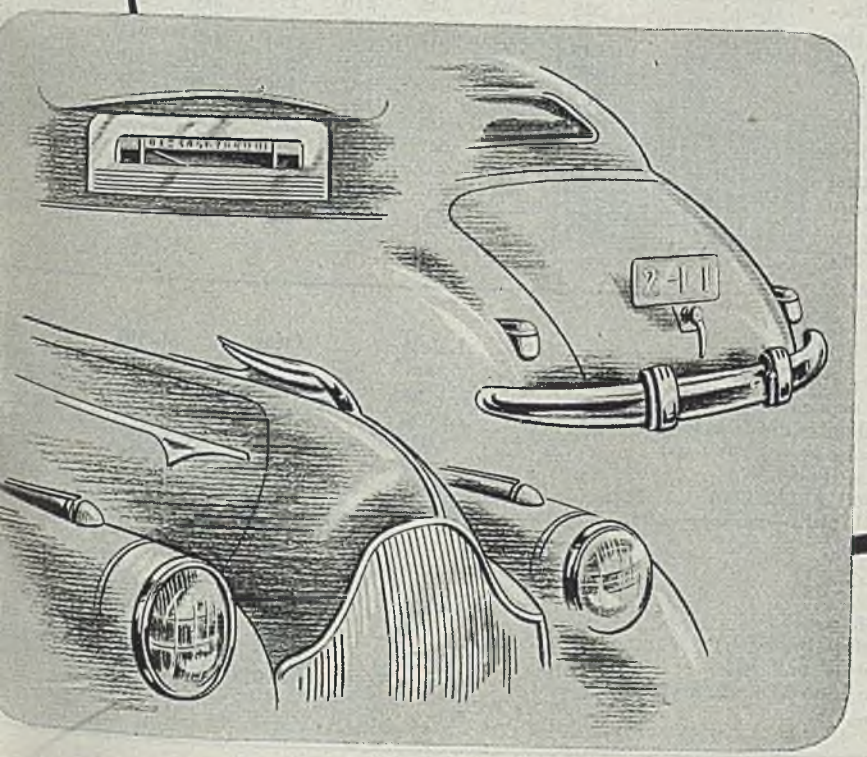
MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing equipment and supplies

Plants: Matawan, New Jersey • Anderson, Indiana

Sales Offices: Anderson • Chicago • Cleveland • Dayton • Detroit • Elkhart Matawan • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh Springfield (Mass.) • Syracuse

ABRASIVES
ANODES
BRUSHES
BUFFS
BURNISHING BARRELS
CENTRIFUGAL DRYERS
CLEANERS
COMPOSITIONS
CONVEYORS (Semi-Automatic)
CONVEYORS (Full-Automatic)
DIPPING BASKETS
GENERATORS
MICROSCOPES (Electroplater's)
PLATING BARRELS
RECTIFIERS
RHEOSTATS (Tank)
TANKS
WHEELS (Polishing)
WRAP-RAX



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THE BUSINESS TREND

Labor Troubles Handicap Reconversion Progress

LABOR PROBLEMS, principally strikes, are handicapping the progress of reconversion. Steel ingot production, one of the basic barometers of industrial activity, is feeling this retarding action. Also affected are bituminous coal output which in the week ended Sept. 22 declined 4.7 per cent from the preceding week and automobile production which continued to recede in the week ended Sept. 29 by declining 1.3 per cent from the previous week.

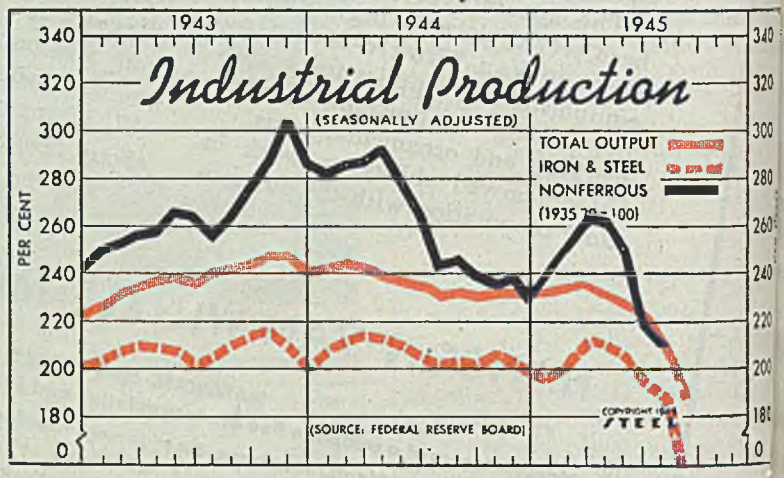
STOCK MARKET—Despite labor unrest in some industries, Wall Street has considered the overall business outlook promising, for in the latest week the Dow-Jones industrial-share stock average closed 2.22 points above the previous week, the railroad-share average was up .79 point, and the utilities average rose .65 point.

CONSTRUCTION—From stepped-up activity in industrial building which in the week ended Sept. 27 was at the highest point since Oct. 17, 1940 the total civil engineering construction volume in the week ended Sept. 27 was the highest weekly total reported since July 15, 1943. This performance of industrial building was following the pattern of August, when the volume of construction of buildings for manufacturing expanded 46 per cent over July and 88 per cent over August, 1944. Residential building in August declined 8 per cent from July's total.

PRODUCTION INDEX — Cessation of war cut the Federal Reserve Board's seasonally-adjusted August industrial production index 11 per cent from July, the greatest fluctuation since the United States declared war in December, 1941. At 188 per cent of the 1935-1939 average, the August industrial production index is down to the April, 1942, level. The largest part of the decline was in the machinery and transportation equipment industries, where activity in August averaged 20 per cent below July.

NATIONAL INCOME—Latest reports of the U. S. Department of Commerce predict that total national income for the second half of 1945 will drop 11.4 per cent below the first half and that the entire year of 1945 will be 2.3 per cent below 1944. Salaries and wages for the second half of 1945 will total 13.5 per cent under those of the first half of the year and for all of 1945 will be 4.3 per cent less than for 1944. Meanwhile net corporate profits in the second half of 1945 will drop 15 per cent from the first half of the year, and for the year 1945 will be 6 per cent less than for 1944.

PRICES—Influenced by increased prices of agricultural and industrial commodities, the Bureau of Labor Statistics primary market price index for the week ended Sept. 2 was 0.2 per cent above the previous week, the first rise since late July.



Federal Reserve Board's Production Indexes
(1935-39 = 100)

	Total Production			Iron, Steel			Nonferrous		
	1945	1944	1943	1945	1944	1943	1945	1944	1943
January	234	243	227	197	208	204	240	281	
February	236	244	232	202	212	208	257	285	
March	235	242	235	210	214	210	265	286	
April	231	239	237	206	213	209	264	292	
May	226	237	238	204	210	203	251	279	
June	220	235	236	192	204	201	219	264	
July	211	231	240	187	202	204	210	243	
August	188	232	242	152	203	210	...	245	
September	...	231	244	...	202	214	...	239	
October	...	232	247	...	206	215	...	236	
November	...	232	247	...	201	209	...	239	
December	...	232	241	...	198	200	...	229	
Average	...	236	239	...	206	208	...	260	

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	83	83	75	98
Electric Power Distributed (million kilowatt hours)	4,039	4,019	4,137	4,3
Bituminous Coal Production (daily av.—1000 tons)	1,933	2,029	2,000	1,9
Petroleum Production (daily av.—1000 bbls.)	4,357	4,528	4,875	4,7
Construction Volume (ENR—Unit $1,000,000)	$88.8	$55.2	$35.3	$30
Automobile and Truck Output (Ward's—number units)	10,430	10,570	13,845	20,9

*Dates on request.

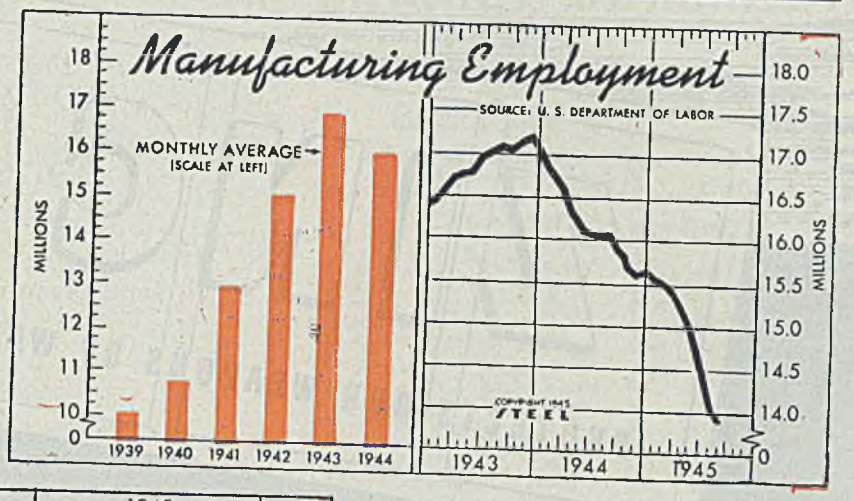
TRADE				
Freight Carloadings (unit—1000 cars)	830†	837	860	91
Business Failures (Dun & Bradstreet, number)	10	23	16	1
Money in Circulation (in millions of dollars)‡	$27,729	$27,777	$27,600	$23,65
Department Store Sales (change from like wk. a yr. ago)‡	+14%	+9%	+6%	+

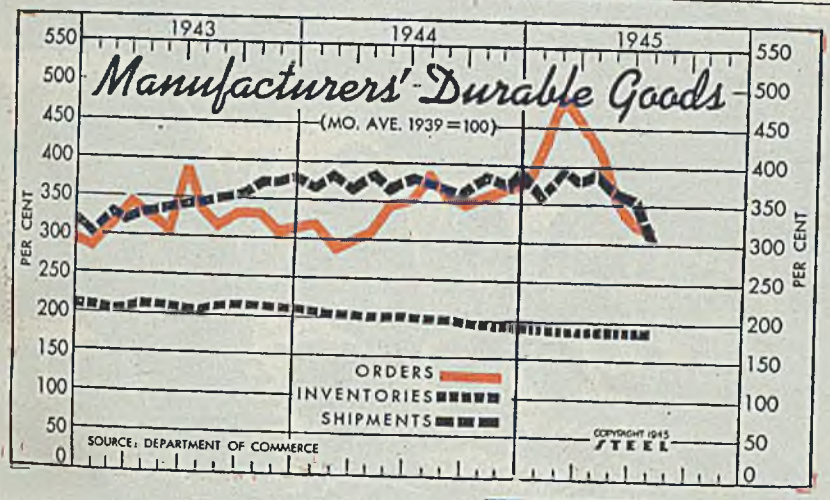
†Preliminary. ‡Federal Reserve Board.

Factory Employment

(000 omitted)

	1945	1944	1943
January	15,555	16,825	16,423
February	15,517	16,735	16,599
March	15,368	16,559	16,747
April	15,102	16,309	16,774
May	14,811	16,122	16,753
June	14,538	16,093	16,908
July	14,136	16,013	17,059
August	13,813	16,023	17,182
September	.....	15,843	17,136
October	.....	15,692	17,194
November	.....	15,607	17,238
December	.....	15,632	17,080
Monthly Ave.	.....	16,121	16,924





Index of Manufacturers' Durable Goods

(Mo. Ave. 1939 = 100)

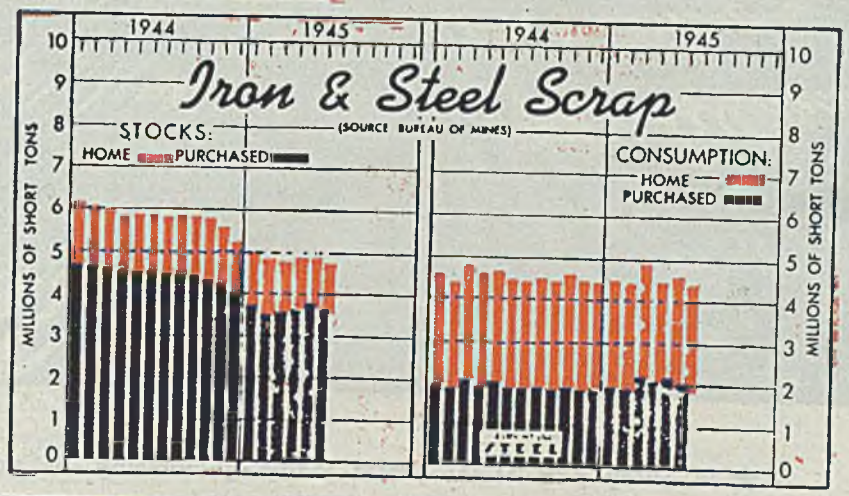
	Orders		Shipments		Inventories	
	1945	1944	1945	1944	1945	1944
January	427	332	354	364	190	212
February	484	294	394	384	189	209
March	463	310	382	377	189	207
April	422	325	389	389	189	205
May	350	352	361	371	189	204
June	340	359	355	383	189	204
July	325	393	304	373	187	202
August	...	367	...	366	...	201
September	...	346	...	372	...	199
October	...	367	...	380	...	197
November	...	372	...	374	...	195
December	...	378	...	390	...	192
Average	...	350	...	377	...	202

Iron and Steel Scrap

Bureau of Mines

(Gross Tons—000 omitted)

	Consumers' Stocks			Total Consumption		
	1945	1944	1943	1945	1944	1943
Jan.	5,023	6,214	6,877	4,507	4,616	4,492
Feb.	4,901	6,134	6,871	4,209	4,414	4,178
Mar.	4,873	6,027	6,850	4,889	4,827	4,787
Apr.	4,907	5,932	6,918	4,668	4,629	4,642
May	4,902	5,966	6,905	4,774	4,683	4,723
June	4,847	5,991	6,916	4,414	4,460	4,493
July	....	5,909	6,860	....	4,423	4,670
Aug.	....	5,975	6,778	....	4,533	4,686
Sept.	....	5,953	6,613	....	4,471	4,657
Oct.	....	5,832	6,456	....	4,684	4,830
Nov.	....	5,624	6,391	....	4,527	4,581
Dec.	....	5,355	6,448	....	4,487	4,449
Mo. Ave.	....	5,908	6,740	....	4,563	4,599



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$11,553	$11,446	$9,944	$10,041
Federal Gross Debt (billions)	$262.5	$262.6	$263.4	$210.8
Bond Volume, NYSE (millions)	$33.1	$30.1	$22.2	$33.5
Stocks Sales, NYSE (thousands)	6,505	7,064	5,767	3,764
Loans and Investments (billions)†	$61.6	$61.8	$62.7	$54.8
United States Gov't. Obligations Held (millions)†	$45,473	$45,823	$46,455	$40,860

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	104.9	104.7	105.5	103.7
Industrial Raw Materials†	115.5	115.0	116.9	113.3
Manufactured Products†	101.8	101.8	102.1	101.1

†Bureau of Labor Statistics Index, 1926=100.

Galvanized Metal Buildings for Troops in Iceland

★ In every part of the world today, galvanizing, or zinc coating, protects our fighting men and equipment . . . for the U. S. Bureau of Standards has pronounced zinc "by far the best" metallic coating for the protection of iron and steel against rust. Tomorrow zinc will play an equally important part in the protection of America's peace-time products.

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AMERICAN ZINC, LEAD & SMELTING CO.

COLUMBUS, OHIO CHICAGO ST. LOUIS NEW YORK

Steel Demand Heavy as Production is Threatened

Caution appears in future buying . . . Coal strike most disturbing factor . . . Blast furnaces bank as coke fails . . . Scrap holds strength

ALTHOUGH steel demand still is heavy, increasing labor disturbances spread widely over the country have a definitely deterring effect on buyers.

In addition to a greater number of suspensions by steel consumers because of strikes in their own organizations or in others on which they are dependent for supplies and services, greater caution is being shown by many buyers in making future commitments, pending possible clarification in general wage policies during the next several weeks, possibly as a result of management-labor conferences early in November.

Caution is being exhibited not only by consuming manufacturers but in even greater degree by building contractors, who want a much clearer idea than they have at present as to what labor costs will be six to nine months from now. They also need more definite assurances as to deliveries of materials than are possible under present disturbed conditions.

Steel production, as well as demand, also is being adversely affected, a major threat at the moment being increasing disturbances in the soft coal industry. Some large steel producers have less than a week's supply of coal on hand and more blast furnaces are being forced to suspend. Consumers of foundry coke are being given drastic cuts in coke shipments. A large eastern by-product coke producer has been compelled to reduce foundry shipments 50 per cent, at a time when foundry labor supply was beginning to show some improvement.

In spite of these adverse factors demand for steel is active and there is increasing disposition among producers to put customers on a quota basis to assure all a reasonable fair share of available material. This is noted particularly in sheets, where pressure is heaviest. Many mills, however, are booked so far ahead that such rationing will not be felt for some time. Some producers set up their schedules on such a basis shortly after the end of the war and in some cases have not yet formally opened books for first quarter, although assuring regular customers they will be given at least as much as they were allotted for the current quarter.

The poor outlook in pig iron production has given some strength to scrap, which in some instances recently showed some easing. However, should steel ingot production be sharply reduced, with much dependent on oil workers' reaction to government control of plants, some strength in scrap might be lost.

Because of untoward influences affecting steel production the estimated national rate for last week was down 1 point to 82 per cent of capacity, with indications shortage of coke will cause a further drop next week. Pittsburgh lost ½-point to 74½ per cent, Youngstown 4 points to 76, Cincinnati 9 points to 77 and Detroit 1 point to 84. Chicago gained ½-point to 91½ per cent, Cleveland 3 points to 86 and New England 2 points to 82. In the other five districts rates were unchanged, as follows: Birmingham 95, Wheeling 88, Buffalo 86, eastern Pennsylvania 78 and St. Louis 68.

Currently the scrap situation shows no weakness, ceiling prices prevailing with few exceptions and consumers pressing hard for further tonnage, which is difficult to find. Melters apparently are looking further ahead than the present and seek to build reserves for winter, when perhaps conditions will be better in steel production and difficulty in obtaining scrap tonnage may be great. Instances have occurred recently where electric furnace grades were bought for open hearths.

Iron ore shipments in September, at 10,543,099 gross tons, is short by 785,930 tons of the movement in the corresponding months last year. Cumulative shipments to Oct. 1 totaled 61,671,771 tons, 4,231,413 tons less than to the same date last year.

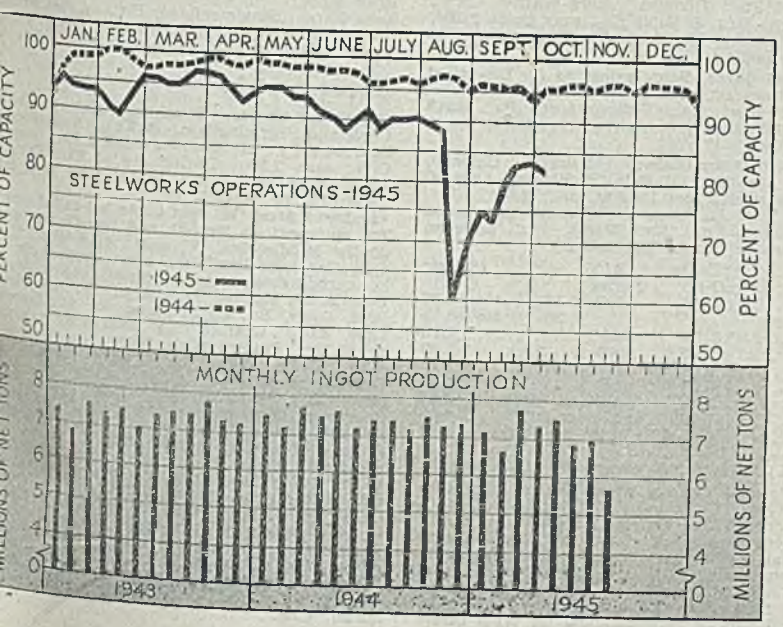
Average composite prices of steel and iron products are unchanged, finished steel composite at $58.27, semifinished steel at $37.80, steelmaking pig iron at $24.05 and steelmaking scrap at $19.17.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Oct. 6	Change	Same Week 1944	Same Week 1943
Pittsburgh	74.5	—0.5	92	100
Chicago	91.5	+0.5	99.5	99.5
Eastern Pa.	76	None	93.5	95
Youngstown	76	— 4	87	97
Wheeling	88	None	92	104
Cleveland	86	+ 3	92.5	94.5
Buffalo	86	None	86	90.5
Birmingham	95	None	95	95
New England	82	+ 2	89	90
Cincinnati	77	— 9	87	91
St. Louis	68	None	75	93
Detroit	84	— 1	89	86
Estimated national rate	82	— 1	95.5	99.5

*Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	Oct. 6	Sept. 29	Sept. 22	One Month Ago Sept., 1945	Three Months Ago July, 1945	One Year Ago Oct., 1944	Five Years Ago Oct., 1940
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$56.73	$56.73
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	24.05	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	16.50	20.20

Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelmaking Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; other gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material	Oct. 6, 1945	Sept., 1945	July, 1945	Oct., 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.57	2.47
Steel bars, Chicago	2.25	2.25	2.25	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.25	2.10
Plates, Philadelphia	2.30	2.30	2.30	2.15
Plates, Chicago	2.25	2.25	2.25	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.70	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.90	2.53

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	36.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	36.00	34.00
Wire rods, No. 5 to ½-inch, Pitts.	2.15	2.15	2.15	2.00

Pig Iron	Oct. 6, 1945	Sept., 1945	July, 1945	Oct., 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19	$25.19
Basic, Valley	24.50	24.50	24.50	23.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69	24.69
No. 2 foundry, Chicago	25.00	25.00	25.00	24.00
Southern No. 2, Birmingham	21.38	21.38	21.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30	24.30
No. 2 fdry., del. Philadelphia	26.84	26.84	26.84	25.84
Malleable, Valley	25.00	25.00	25.00	24.00
Malleable, Chicago	25.00	25.00	25.00	24.00
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$16.50
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.45	14.50
Heavy melting steel, Chicago	18.75	18.75	18.75	17.50
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$7.50	$7.50	$7.50	$7.50
Connellsville, foundry ovens	8.25	8.25	8.25	[illegible]
Chicago, by-product fdry., del.	13.35	13.75	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 2, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00. (Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bil) $38; Pac. Ports, (bil) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54. (Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.60; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.ob. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, 5—⅝ in. inclusive, per 100 lbs., $2.15 Do., over ⅝—47-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3 : Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division. Borg-Warner Corp., and Joslyn Mfg. & Suply Co., may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons. (Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100	(.15-.25 Mo) 0.70
			(.20-.30 Mo) 0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.25c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c; hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.50c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City base 3.80c; New York del. 3.95c; Phila. del. 3.87c; Pacific ports 4.25c. (Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.30.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron, 3.90c; pure iron 3.85c; zinc coated. hot-dipped, heat-treated, No. 14, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 2.85c; Granite City, base 2.95c; Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer 72	6.25c	7.00c	.....
65	7.25c	8.00c	.....
58	7.75c	8.50c	.....
52	8.55c	9.30c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.35; 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65; Granite City, $4.45, $4.60, $4.75, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 4.30c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c; Gulf ports, 2.45c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports; Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Piling

Pittsburgh, Chicago, Buffalo 2.40; Pacific ports, 2.95c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.75c
Spring wire 3.35c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pac. ports ..... $3.40 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.20c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.55c

Woven fence, 15½ gage and heavier, per base column ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	¼	24	3½
¼ & ⅜	59	40½	⅜	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½,3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., base, cents per lb.; Reg. carbon 14.00c, extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Base, per lb
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3.75c

⅞-inch and under ..... 65-5 off

Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ... $2.75-3.00 off

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65¼ off
Do., ⅞ and ⅝ x 6-in. and shorter .... 63¼ off
Do., ¾ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extra mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. Governing basing point is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

*Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1943. †14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha:

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[21]	4.715	6.012[23]	6.01[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.172[21]	4.772	5.816[23]	5.860
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.152[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.141[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.265[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.85[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.75[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[12]	4.40[24]	3.85[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[12]	4.30[24]	3.75[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[12]	4.40[24]	3.85[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.75[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.900[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.885[1]	4.215[1]	4.215[1]	5.608[19]	5.443[24]	4.543[12]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.111[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[12]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.85[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.987[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	4.08[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[3]	3.81[3]	3.81[3]	5.41[3]	3.51[3]	3.86[3]	3.86[3]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.131[21]	4.931	6.131[23]	6.231[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.64	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.70[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[26]	4.10[10]	3.75[22]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[6]	5.683[22]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.433[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.80[27]	5.75[15]	6.60[15]	5.633[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.883[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.05[15]	5.883[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharge; dry basis, subject to penalties & guarantees are not met.)

Indian and African	
48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transval)	
44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (seller's nearest rail)	
48% 3:1 less $7 freight allowance	52.80

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo. 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 240, effective as of May 15. Price basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	‡21.38	‡20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
§Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Sterlton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa, base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. §For Mstead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)	...$30.50		
6.51-7.00	$31.50	9.01- 9.50	36.50
7.01-7.50	32.50	9.51-10.00	37.50
7.51-8.00	33.50	10.01-10.50	38.50
8.01-8.50	34.50	10.51-11.00	39.50
8.51-9.00	35.50	11.01-11.50	40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base $1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos. f.o.b. furnace, Lyles, Tenn, $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn 33.00
(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: .Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky	54.40
Alabama, Georgia	54.40
New Jersey	59.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases 63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick
(Pa., O., W. Va., Mo.)

Dry Press	52.90
Wire Cut	50.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk 22.00
net ton, bags 26.00

Basic Brick

net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded Magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.00 war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% l. gross ton, duty paid, $135; add 5 for packed c.l., $10 for ton, 13.50 less-ton, f.o.b. cars, Baltimore. Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is seller; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is seller; $1.70 for each 1%, or fraction contained manganese over 78% or under 78%; delivered Pittsburgh, $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 17.75c and 17.20c; f.o.b. shipping point, freight allowed.

Ferrosilicon: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, 5 ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil.4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c. 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less, $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .066c, .0685c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l. and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 36.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferro titanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern contract basis, carloads in bulk, package, per lb. of alloy 14.0c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ¼ cent higher.

Siminal: (Approx. 20% each Si, Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 1 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn	12.50-13.00
Short Shovel Turnings	15.75
Cast Iron Borings	12.50-13.00
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00
(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)	

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Dealers' buying prices.)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	8.00- 9
Shoveling Turnings	9.00-10
Rerolling Rails	21
Steel Car Axles	21.50-22
Steel Rails, 3 ft.	21
Steel Angle Bars	21
Cast Iron Wheels	2
No. 1 Machinery Cast	2
Railroad Malleable	2
Breakable Cast	1
Stove Plate	1
Grate Bars	1
Brake Shoes	1
(Cast grades f.o.b. shipping po	
Stove Plate	

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$1
No. 2 Heavy Melt. Steel	1
No. 1 Comp. Bundles	1
No. 2 Comp. Bundles	1
Machine Turnings	9.50-10
Shoveling Turnings	11.50-12
Cast Iron Borings	11.00-11
Mixed Borings, Turnings	10.50-11
No. 1 Cupola Cast	2
Breakable Cast	1
Low Phosphorus	21.00-21
Scrap Rails	20.50-21
Stove Plate	16.00-16

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$1
No. 2 Heavy Melt. Steel	1
No. 1, 2, Deal. Bundles	1
Machine Turnings	
Mixed Borings Turnings	
No. 1 Cast	

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$1
No. 2 Heavy Melt. Steel	1
No. 1 Busheling	1
No. 1, No. 2 Bundles	1
No. 3 Bundles	1
Machine Turnings	
Billet, Forge Crops	2
Bar Crops, Plate	2
Cast Steel	
Cut, Structural, Plate, 1", under	1
Alloy-free Turnings	1
Tin Can Bundles	1
No. 2 Steel Wheels	1
Iron, Steel Axles	1
No. 2 Cast Steel	1
Uncut Frogs, Switches	1
Scrap Rails	1
Locomotive Tires	

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 o.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers, sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, $93-$98 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs or more; del; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c. del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 202

Sheet mills continue to increase backlogs, new business exceeding production. Deliveries on most grades now extend into second quarter, with some producers filled past midyear. Some heavy gages of plain hot-rolled and galvanized can be booked for December. Stainless sheets are available in December on unpolished and February on polished.

New York — Sheet backlogs continue to increase, with orders exceeding shipments. Apart from stainless sheets and certain heavy gages of hot-rolled and galvanized sheets, deliveries generally now extend well into second quarter. Deliveries also are far extended on electrical sheets, with some producers booked solidly into second half. Demand for electrical sheets is especially strong in low silicon grades which go largely into fractional horsepower motors.

In heavy gages of plain hot-rolled and also in heavy gages of galvanized, some tonnage is available for December shipment. In stainless sheets, shipments can be had in late November and early December on unpolished material; but on polished grades little is available before February, with some mills practically booked up for entire first quarter. Eventually this situation will adjust itself to considerable degree, as many small miscellaneous demands for polished sheets for decorative purposes which have accumulated during the war, become worked off.

Meanwhile, establishment of new basing points on stainless continues to result in considerable confusion because of lack of general information as to the manufacturing limitations of the products available at the new basing points. It is not only a question of the products being made, but more importantly the sizes in which the products are being turned out. Some trade leaders believe it may be some time before there is a fairly clear understanding on these matters.

Boston—Pressure for narrow cold strip and sheet deliveries indicates satisfactory progress in reconversion in most consumer goods light industries. Still subject to 60-day inventory limitation, fabricators generally are more interested in building supplies to that point, in addition to nearby requirements and production schedules are designed to cover these ranges in most instances. Alloy strip and silicon electric sheets are in this category and stainless steel buying is active. Narrow strip mill schedules are filled for the remainder of the year and January is filling.

Chicago — While consumers maintain pressure for sheet deliveries and mills are oversold and running behind schedule on all grades, there are evidences that the former are willing to accept smaller quantities than specified and whenever they can be supplied. This apparently is a reflection of the influences which are holding up plans reconversion to civilian goods. Disposition is for customers to store steel if they are able to get it, just as insurance. Protests against mill rationing and delayed deliveries are comparatively mild. New business for practically all grades of sheets can do little better than December or January delivery.

Cincinnati — Sheet mills are getting no relief, because of some reconversion difficulties elsewhere, and delivery promises are still further extended. Supplies of cold-rolled, long ternes and galvanized appear particularly tight in this area the next quarter. Mills try to allocate available tonnage where most urgently needed against a general pressure for deliveries. The Newport Rolling Mill Co. is operating at feasible capacity on a bank of steel and unaffected by a shutdown in steelmaking by Andrews Steel Co.

St. Louis — Sheet mills reflect the great demand for sheets, receiving inquiries from all parts of the country. Many orders are declined. Greatest pressure is on cold-rolled sheets, which are booked a year ahead. Hot-rolled schedules are filled to May, electrical sheets to September and heavy galvanized to first quarter. Labor shortage holds production to about 70 per cent of capacity, greatest lack being in semiskilled workers. Inability to finish sheets and plate is causing accumulation at mills.

Pittsburgh — No significant easing has been felt in pressure for sheet and strip deliveries. A chief concern of producers is equitable distribution of available steel production to meet essential needs of customers, with an eye to maintaining prewar customer relationships. In polished stainless, electrical, enameling and galvanized items sellers now promise second quarter delivery. Many consumers ask protection on mill schedules we-

into next year, but some mills refuse to commit themselves that far.

Cleveland — Labor disturbances are threatening steel mill operations but up to late last week had not directly affected steel producing operations, but they forced a closing of certain soaking pits, blooming and billet mills. Greatest danger point lies in the coal mine shutdowns which are curtailing coke and pig iron production and which will reduce all steelmaking operations unless mines are reopened soon.

Steel sheet tonnage involved in new inquiry is less than a month ago but the number of orders is still large, extending deliveries on most flat-rolled items to midyear or beyond. Some mills are not making delivery promises on new bookings.

Some companies are breaking in new mill crews and report a slight improvement in manpower. Mills are moving cautiously in this direction since they must make provision for rehiring veterans who wish to return to their prewar employment.

Philadelphia — Most sheet producers are sold well into second quarter on hot-rolled pickled, cold-rolled and galvanized sheets. On galvanized sheets in lighter gages some sellers no longer attempt to make definite promises and the same is true of certain specialties, such as electrical and enameling sheets. A spurt is noted in promises on stainless sheets, with polished grades quoted generally in February and March. Plain hot-rolled sheets can be had in January and February.

Steel Bars . . .

Bar Prices, Page 202

Bars continue to show tightness and deliveries are being pushed further into the future. Carbon bar schedules are much heavier than for alloys, deliveries of the latter being available in seven to eight weeks, while carbon bar deliveries in some cases extend into April and May.

Chicago — Fact that reconversion is being retarded in most manufacturing plants either through strikes or other labor irregularities and inability to obtain delivery of new machinery and materials is resulting in somewhat lessened demand for bars, both carbon and alloy. Nevertheless, mill schedules remain congested except for certain alloys. Carbon bars are sold through November. While consumers continue to press for deliveries, they are willing, in most cases, to accept quantities smaller than specified.

Pittsburgh — Delivery schedules on most merchant carbon bar sizes fall into November. Open-hearth and electric furnace alloy are available late this month in a few instances. Orders for carbon and alloy bars continue to show improvement from the railroad, automotive and agricultural implement industries. Cold-drawers report order backlogs expanding in most instances, with deliveries extended into late November and December. Forge shops are operating well below wartime levels, but a moderate increase in demand is indicated. Volume of MM and AAA tonnage is expected to be relatively small through final quarter and consequently should not interfere with output for miscellaneous civilian goods account. The Navy Material Redistribution and Disposal office in Pittsburgh recently advertised for bids on 112 tons of cold-drawn steel rounds and 155 tons of hot-rolled rounds.

Boston — Bar fabricators, having accumulated stock for nearby reconversion needs, are buying slightly heavier for inventory with scattered revisions in specifications to return to grades formerly used. Carbon, notably cold-finished, commands more interest and in these grades delivery pressure is greatest; most mill schedules on all cold-drawn shapes have moved into first quarter. For initial postwar requirements, consumers draw frequently on warehouses, pending delivery of inventory tonnage from mills. Relatively little volume comes from surplus stocks; one sale involves 186 tons to Marlin-Rockwell Corp., Plainville, Conn., anti-friction bearing manufacturer. Cape Ann Anchor & Forge Co., Gloucester, Mass., took close to 100 tons of billet steel. Morgan Construction Co., Worcester, Mass., will build the 10-inch bar mill for Bethlehem Steel Co., part of the $20 million expansion and modernization program at Lackawanna and Woodlawn, N. Y.

Requests for priority assistance for materials and products needed to break bottlenecks in civilian manufacture have been negligible in New England; only 20 had applied up to the last compilation, about half in metalworking industries. Total value of production materials, capital equipment and operating supplies

was less than $35,000.

New York — Backlogs on hot carbon bars are mounting rapidly, due not only to continued strong demand but to production difficulties at various plants resulting from either inadequate labor, or from strikes, or both. Certain leading producers now have nothing to offer in any of the more common commercial sizes before late April and May and in general little can be had before February.

Most cold drawers have little to offer before February, but some tonnage still can even be picked up late this year. Due primarily to expanded wartime capacity, shipments on alloy bars can still be had within a period of seven or eight weeks; however, the situation is stiffening somewhat. Demand is diversified, with small rounds and flats under heaviest pressure.

St. Louis — Merchant bar demand continues heavy and orders are being considered carefully, with many rejections. Much of the pressure is from bed manufacturers and farm equipment builders. Smaller sizes are in greatest demand. Deliveries are quoted for March and April.

Birmingham — Bar demand is surprisingly tight with a variety of smaller industries clamoring for bars, especially in small sizes. The market as a whole is irregular.

Cleveland — Widespread labor disturbances have not resulted in taking tonnage from bar schedules, although postponement of shipments on a comparatively small tonnage has been requested. Mills have been offering, in addition to current output, tonnages which were not delivered, due to war contract cancellations and only a small tonnage remains. War Department orders which are eligible for but do not carry the "MM" rating, as well as other previously rated orders, will be rolled as scheduled. Pressure is still extremely strong on 8-inch mills, some being filled into the final quarter of next year. Other mills can offer earlier delivery. Decline in demand for larger-sized bars which were required in heavy volume to meet war demands, has eased the situation in that quarter, some space being open on 10-inch and larger mills for first quarter. Alloy bars and billets are available for December delivery.

Philadelphia — Scarcity in hot carbon bars is more pronounced, especially in smaller specifications, which now fall late in first quarter, with some producers quoting well beyond that. In larger sizes a little can be had in January, with February and beyond being more generally quoted. Alloy bars can still be had in November. Bethlehem Steel Co. has named Bethlehem, Pa., as a basing point on stainless bars.

Steel Plates . . .

Plate Prices, Page 203

Plate production is in better volume than had been expected for fourth quarter, although not as high as in third, in part due to diversion of steel to other products. Most producers are booked solidly into December, though some tonnage can be taken for November by other makers. Backlogs are increasing, though slowly. Small tanks call for considerable tonnage of light plates.

New York — Plate producers anticipate a monthly shipment over the remainder of this year of around 450,000 tons, or 1,350,000 tons for the entire quarter. While this would be down substantially from the approximately 1,600,000 tons in third quarter, it nevertheless would exceed many expectations for that period, as voiced earlier in the year. As a matter of fact, shipments would probably run heavier were it not for pressure for raw steel for other more urgent purposes at certain producing plants.

Demand is fairly diversified, with special pressure being exerted for lighter gages for fuel oil tanks. Export demand also is quite pressing. Construction work, particularly for bridges, is being increasingly reflected in present specifications.

While some tonnage can still be picked up in November, most producers are booked solidly into December. At the present rate, it appears as though they would be out of the market for the entire year within another fortnight or s

Boston — Plate orders are mounting slowly, most of the increase being for lighter sizes for underground and household tanks. On the whole, however, volume has not reached normal proportions and is far below wartime levels due to slackening in shipbuilding. Railroads are also buying conservatively and the district carbuilding shop is not expected to require plates in volume for resumption of passenger car construction before the first of the year.

Birmingham — Plate production, while

not under as great pressure as in the days of Gulf shipbuilding for war, shows little overall change in demand. Tank production accounts for an increasingly large part of demand, with shipbuilding requirements moderately heavy.

Seattle — Increased interest is noted in demand for tanks and boilers, work which has been postponed during the war. Shops generally are engaged in small jobs requiring minor tonnages, but the aggregate is considerable. Puget Sound Sheet Metal Works, Seattle, has an unstated tonnage for storage tanks for Columbia Breweries, Olympia, Wash.

Philadelphia — With demand for light plates for underground fuel oil and gasoline tanks especially notable, export requirements also exert a bolstering influence. While tonnage is available for November shipment, some sellers have little to offer before December.

Approximately 22,500 tons of steel, mainly plates, will be required for nine cargo-passenger ships placed by United Fruit Co. with Sparrows Point, Md., yards of Bethlehem Steel Co. Completion is scheduled for early January, 1947.

Tubular Goods . . .

Tubular Goods Prices, Page 203

New York — Most sellers of merchant pipe now have little to offer before February. Much of the tonnage is going into distributors' stocks in an effort to fill up gaps created principally by the unusually heavy demand for building construction and maintenance. Oil country buying has subsided, with still a lot of prospective work in sight for gas companies and other utilities.

Seattle — Cast pipe is in strong demand, with municipal projects developing rapidly. Potential demand is large and an active market is foreseen. The Dalles, Oreg., has awarded a mile of steel pipe to Oregon Pipe & Culvert Co., Portland, Oreg., and 2½ miles of 4 and 6-inch cast iron pipe to H. G. Purcell, Seattle. Plans also call for 3½ miles of 10-inch steel or transite conduit pipe and other improvements for which bids will be asked soon.

Tin Plate . . .

Tin Plate Prices, Page 203

Pittsburgh — Fourth quarter tin plate production schedules are virtually all committed, with indicated output expected to total about 875,000 tons of all tin mill products. This estimate is based on probable liberalization in use of tin before the end of the year. On the basis of the estimated fourth quarter tin mill output, aggregate production for the year should total about 3.5 million tons. Production outlook for 1946 is bright with current predictions indicating an increase of around 500,000 tons. Pig tin supply is expected to remain the controlling factor in 1946 production schedules.

Wire . . .

Wire Prices, Page 203

Boston — Orders for high-carbon wire are heavy, frequently in excess of shipments, and with deliveries extended into first quarter producers are spreading nearby tonnage over as many consumers as possible. Orders often are split as to delivery, part being shipped for reconversion, with the remainder later. Pressure for tonnage is unabated, notably from the automotive industry and for manufacturers' wire. Low-carbon demand is heavier than during the war period but most mills are in better position to handle low-carbon than high.

Chicago — Wiremakers report consumers are buying far in advance, giving rise to belief they wish to make secure their position on schedules. Civilian demand maintains pressure, but some slackening is occurring in automotive specifications, possibly due to the unsettled labor situation. While demand for coated nails is diminishing, that for small sizes exceeds supply. Increase is noted in specifications for light-weight welded fabric, reflecting the resumption of highway construction and repair.

Cleveland—Demand for manufacturers' wire products is far in excess of what mills can supply. Spring wire is especially tight. Distribution is being regulated by producers in an effort to satisfy actual needs as equitably as possible. Replacement orders for electrical wire, rope and construction materials exceed in volume those required under new construction programs. Replacement business pyramided during the war period and constitutes a large volume, which is developing rapidly. Chief problem of the wire producers in efforts to increase production is manpower.

Structural Shapes . . .

Structural Shape Prices, Page 203

Chicago — Past ten days has seen award of at least ten structural projects, some of which have been held up for weeks after bids were in. Less than 4300 tons were involved in these lettings, the largest only 900 tons, but it is an indication that fabricators are returning to normal business following end of war contracts. Shortage of steel and workers, including draftsmen, are principal holdbacks to operations. Although new projects are appearing a little more slowly, shops select those they wish to bid. Mill deliveries of standard shapes range from late November to early 1946.

Cleveland — Some structural mills have been forced to reject business, with books generally closed through first quarter. Business has originated in small construction and plant addition projects, several large jobs still being planned. A definite improvement in labor, especially in detailing departments, must develop, before fabricators will be able to handle these larger jobs within a reasonable period.

Philadelphia — Structural demand has eased, ascribed mainly to uncertainties arising from the disturbed labor situation in its bearing on future wage rates and ability of suppliers to make definite delivery promises. However, still more work is being offered than available draftsmen can figure and shape deliveries are gradually being extended, with at least three producers out for the remainder of this year.

Seattle — War cancellations were heavy in the fabricating industry, but private projects are developing and no extended unemployment is expected. Reconversion to normal operations is orderly. Isaacson Iron Works, Seattle, is fabricating about 1000 tons for extensions to two pulp mills in Washington state and also is active in producing truck and other equipment.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 203

Chicago — Reinforcing steel suppliers report their offices swamped with inquiries, many of which are for less than 100 tons. Limited in steel and handicapped by shortage of draftsmen, the general disposition is to dodge requests for estimates. Until these two brakes are removed, business is likely to remain low. A local supplier last week took over 1000 tons for a new lithographing plant here, involving one of the largest single awards since V-J day.

Seattle — Mills note a decided rise in demand for reinforcing bars as private buying develops. Reinforcing bars now represent about 75 per cent of bar production, a normal proportion, reversed during the war. Cancellations have affected backlogs and remaining tonnages are being cleared. Highway programs in the three northwestern states will involve much reinforcing steel, many projects being delayed during the war.

Pittsburgh — Volume of inquiry is steady, in some instances showing improvement. However, delayed mill deliveries and uncertain labor rates are said to be delaying some projects. Bids are to be taken this week on a pier at Portsmouth, Va., for berthing of inactive ships of the reserve fleet. Substantial tonnage of concrete bars, sheet piling and shapes are involved. Production of new billet bars this month is expected to show increase over September but production during November is scheduled still higher. Indicative of the tight situation, a leading seller here last week was forced to refuse a share in an export order for France involving 32,000 tons, for delivery in fourth quarter.

Pig Iron . . .

Pig Iron Prices, Page 205

Pig iron is in strong demand and threat of interruption by coal strikes and other factors is viewed with apprehension. Producers and consumers alike have limited accumulation and face the winter with much less than normal. A number of blast furnaces continue idle for repairs, further limiting output.

Pittsburgh — Sharp curtailment in blast furnace activity is indicated should threat of complete shutdown of coal mining operations in this district materialize. A substantial reduction in beehive coke operations already has occurred and it is probable that by-product coke output soon will be adversely affected. Up to late last week 43 out of 54 blast furnaces in this district were operating, with the likelihood that other units will be banked should coal strikes continue.

Boston — Pig iron demand holds strong, order backlogs of gray iron foundries heavy. Subcontracting continues on a large scale and labor limitations tend

hold melt to recent volume. Basic requirements are maintained and steelworks inventories are generally under the 30-day limit. In a few cases consumers have asked for larger supply to guard against possible shortages later, but this is not general. Part of the gap in supply that normally would be met by the district furnace over the next few months may be taken up in foundry and malleable grades by the Troy, N. Y., furnace.

St. Louis — Pig iron supply is tight, with producers sold through October and few cutbacks are expected on requirements for first quarter. Blast furnace labor is adequate but shortages at mills reduce iron requirements. Inventories generally are well under the 30-day limit. Heavy export demand is being received, but little is accepted.

Buffalo — Pig iron shipments are holding at about recent peaks in spite of holdups in deliveries to Detroit motor foundries affected by strikes. Foundries are hard pressed to fill increased civilian orders. Labor shortage still limits foundry operations. Pig iron production fell 6½ points to 76 per cent when Bethlehem Steel Co. shut down its A stack for relining.

Seattle — End of the war greatly reduced foundry operations on the coast, the industry generally operating on a day-to-day basis. It is expected that by spring considerable business will develop. Meanwhile labor is short. Cast scrap supply is plentiful and the normal ratio of scrap and pig iron is preserved.

Birmingham — Pig iron output locally is back on the basis of 19 blast furnaces. Merchant iron interests report strong demand, approximately equal to production.

New York — Threat of an increasing tie-up in soft coal mines has stimulated demand for pig iron for early shipment. Eastern seaboard producers have not yet been affected by suspension at various mines, but assert that if the tie-up continues long they will be forced to curtail production.

Meanwhile pig iron melt in this district is well sustained, with backlogs of gray iron and malleable foundries further increasing as there has been little improvement in labor supply and demand continues heavy.

Cincinnati — Most melters in this district have entered orders for fourth quarter pig iron, holding closely to tonnage for third quarter. Even though demand for castings is insistent, foundries evidently despair of expanding melt in face of insufficient manpower. One furnace interest was late in opening books for the quarter, possibly while estimating pipemaking requirements.

Chicago — With pig iron supply in this district already tight, curtailment of blast furnaces and coke ovens because of the eastern coal strike threatens continuity of foundry operations. Iron inventories already are well under the 30-day maximum in numerous instances and interruption of shipments would be felt promptly. WPB is not allocating iron during October, but is keeping close watch on books, apparently to determine where control can be suspended. Of 41 blast furnaces in the district, 35 are running. This number will be reduced if the coal strike continues. Two stacks which have been down recently, one of Interlake Iron Corp. and the other of Wisconsin Steel Co., had been scheduled for return several days ago but were held idle until the coal difficulty ends.

Philadelphia — The larger of two stacks at Swedeland, Pa., has been banked as a result of soft coal strikes and a real shortage in pig iron is likely if settlement is not reached soon. A marked shortage of foundry coke already is evident, with shipments by one large supplier reduced 50 per cent and at a time when foundry labor supply was beginning to show some improvement, for the first time in many months and prospects for better foundry output were encouraging. Gray iron and malleable foundries generally have heavy backlogs and only added labor was needed to get the work out.

Scrap . . .

Scrap Prices, Page 206

Scrap is strong and even weak grades have risen recently to ceiling. Supply in general is light and melters seek tonnage to assure winter inventory. Threats of interruptions to steel production have not caused them to limit purchases. In most cases springboard is paid in addition to ceiling price.

Pittsburgh — Despite uncertainty of steel mill operations due to threatened coal shortage and possibility of strikes the scrap market continues strong. Full ceilings plus up to $1 springboard are being paid on all grades except machine shop turnings. However, leading consumer here is absorbing only 50 cents

additional freight on heavy melting steel.

Strikes in the automotive industry are further restricting output of industrial scrap, an additional factor tending to strengthen scrap prices. Shortage in cast scrap could be eased materially if consumers would be willing to absorb freight of $3 to $4 a ton from remote points. Prospect of using a higher proportion of pig iron in foundry operations is limited, due to close balance between pig iron production and demand.

Boston — On moderate buying top quality heavy melting steel readily commands ceiling prices and in one instance a dealer bid over ceiling for No. 1 steel. The seller, a Navy yard, however, moved the tonnage at ceiling. Buying centers rather heavily in strictly No. 1 steel scrap and one of the first reactions of any lifting in price controls is expected to be re-establishment of differentials between No. 1 and No. 2 heavy melting. For alloy-free machine shop and short shoveling turnings ceilings are paid. Supply of good turnings is limited and part of the textile mill equipment shop production is briquetted and used by producers.

Cincinnati — The iron and steel scrap market is marked by absence of tonnage buying, and definite withdrawal for the time being of two outlets. Prices are at ceiling, but there is a tendency toward conservation in view of industrial uncertainties. Pressure on prices of specialties has been reported, resulting in moderate price concessions. Melters' stocks are adequate, but dealers, still short of manpower, approach winter with light inventory.

St. Louis — Heavy rains have cut scrap receipts 25 per cent and industrial scrap is less as war work ends. Mill reserves are comfortable but some buying is being done as a hedge against coal shortage which would reduce pig iron supply. Good grades are in demand at ceilings but poor grades go begging. End of allocations is expected to allow brokers to select customers and favor old ones. Yard stocks are depleted. Machine shop and short shoveling turnings are below ceiling and are being shipped to other areas.

Buffalo — Stronger tendencies prevail in open-hearth scrap grades as two leading steelmakers bought approximately 10,000 tons each at ceiling. Further strength results from the fact that yard receipts are far below normal for the season. Apprehension is felt over possible winter shortage and a leading dealer predicts serious shortage. Industrial scrap is short because many plants have not completed transition to civilian production. Turnings have become scarce. Two more cargoes of 5000 tons each have arrived from the head of the lakes and 4000 tons by barge from the East.

Birmingham — Considerable movement of scrap, both steel and cast iron, has appeared. Most cast grades are scarce, while steelmaking grades are in good supply. Ceiling prices, without springboard, apply.

Seattle — Steel scrap prices have dropped from the war level of $14 to $10 per gross ton. Offerings are larger than mills can use but buying is done steadily to keep inventories filled.

Cleveland — Tightness of the scrap market is indicated by substantial purchases by a melter at Cleveland and another at Detroit of electric furnace scrap for use in the open hearth. As this material cost $2.50 per ton more than No. 1 heavy melting steel pressing need in open-hearth scrap is illustrated. Strike interruption at works of Republic Steel Corp. in Cleveland has had no effect on scrap deliveries as most of its incoming shipments had been ordered to plants at Youngstown where need is greatest. Consumers are trying to buy heavily but the market is almost devoid and few sales are being consummated.

Chicago — Prime grades of scrap retain their ceiling level, a good-sized purchase by a leading steelmaker a few days ago having demonstrated this. Included in this transaction was No. 1 and No. 2 heavy melting and No. 1 and No. 2 bundles. In other transactions bundled machine shop turnings took ceiling price, settling some uncertainty recently, and strengthening the position of machine shop turnings at maximum. Price of mixed borings and turnings is confused; little demand exists here as most shipments are outside the area. Now that allocations of railroad scrap have been discontinued, brokers anticipate more activity. Already there appears to be a tendency for buyers to offer less than ceiling with results not yet clear. Some railroad items have been below ceiling for some time. With steel mills sure to operate at a high level this fall and winter and scrap not too plentiful, a strong overall tone appears likely.

New York — Disturbed labor condi-

tions have resulted in few suspensions in scrap shipments, according to leading brokers. Meanwhile tonnage is moving freely to Sparrows Point, Md., Lackawanna, N. Y., and to points in eastern Pennsylvania. Some tonnage is also moving against old contracts into the Pittsburgh area. Included in the few suspensions, for some reason, are restrictions at Phoenixville and Conshohocken, Pa.

Philadelphia — The scrap situation is mixed. Current reduction in pig iron output because of coal strikes is a strengthening factor, while threats of a decline in steel production as a result of fuel shortage is an easing factor. At the moment the former offsets the latter, as steel production in this district has not yet been affected importantly. However, considerable unprepared scrap continues to come out and while labor is lacking to handle it in yards it exerts a depressing influence. Philadelphia Navy yard closed bids Oct. 5 on 17,000 tons, of which 10,000 tons were unprepared steel scrap. The remainder included 4000 tons of unprepared heavy melting steel and 3000 tons of alloy scrap.

Iron Ore . . .

Iron Ore Prices, Page 204

Iron ore moved on the Great Lakes to Oct. 1 totaled 61,671,771 gross tons, a decrease of 4,231,412 tons from the 65,903,184 tons moved to the same date in 1944, according to the Lake Superior Iron Ore Association, Cleveland. September shipments totaled 10,543,099 tons, compared with 11,329,029 tons in September, 1944, a loss of 785,930 tons.

Shipments by ports in September, 1945 and 1944, in gross tons, follow:

	Sept., 1945	Sept., 1944
Escanaba	548,007	801,470
Marquette	579,425	527,043
Ashland	583,687	707,716
Superior	3,493,586	3,664,630
Duluth	2,818,839	2,861,683
Two Harbors	2,447,962	2,715,841
Total U. S. Ports	10,471,506	11,278,383
Michipicoten	43,744	50,646
Port Arthur	27,849	.....
Total Canada	71,593	50,646
Grand Total	10,543,099	11,329,029

Decrease from September, 1944, 785,930 tons.

Cumulative shipments for the season in both years, in gross tons, follow:

	To Oct. 1, 1945	To Oct. 1, 1944
Escanaba	3,723,090	4,464,977
Marquette	3,025,722	3,124,028
Ashland	3,520,004	4,506,747
Superior	19,988,403	21,562,488
Duluth	16,426,092	16,589,340
Two Harbors	14,568,007	15,302,907
Total U. S. Ports	61,251,318	65,550,487
Michipicoten	344,316	352,697
Port Arthur	76,137	.....
Total Canada	420,453	352,697
Grand Total	61,671,771	65,903,184

Decrease from 1944, 4,231,413 tons.

Warehouse . . .

Warehouse Prices, Page 204

New York — While number of warehouse orders is increasing each week they are smaller and current distribution in tons averages about 65 to 70 per cent of those before the war's end. However, lack of stocks accounts for part of this slack, notably in sheets, strip, small shapes and cold-finished bars. For this reason warehouses frequently are unable to fill all orders for products in which reconversion requirements are greatest. Alloy buying is irregular, with numerous shifts in wanted specifications. Mill replacements of flat-rolled material in general are not improved, nails included, and are more extended on most types of sheets and popular sizes of cold-drawn bars.

St. Louis — Warehouses have increasing difficulty replacing depleted inventories, especially in sheets. All sizes and grades are at the lowest level in months and suppliers are booked for three to six months. Farm and light industry buyers increase their demand. Orders and inquiries are at an alltime high.

Los Angeles — Warehouse inventories are growing slowly in most materials except sheets, on which shipments are weeks delayed. Stainless and other alloys are selling better than at any time since the end of the war. Plates and shapes also are moving fairly rapidly. Galvanized sheets are the scarcest item.

Canada . . .

Toronto, Ont. — With Canadian steel mills booked almost solidly on produc-

tion to the end of this year, much of the interest that has developed in the steel markets recently is associated with first quarter buying. Some producers who withdrew from the market a month or six weeks ago to discourage 1946 buying have reopened books for first quarter and report heavy buying. However, steelmakers have not changed their policy and continue to give price quotations only at time of shipment. Under these conditions consumers obtain no protection from a possible price advance, but have the advantage of delivery. Large commitments have been reported from the automotive industry, electrical equipment makers and rolling stock builders.

Heavy construction projects, including industrial plants, bridges, and various types of public works now proposed will involve expenditure of approximately $500 million and steel buying for these undertakings is proceeding. It is estimated that upwards of 25,000 tons of structural shapes and reinforcing bars are pending for early closing, but this business spreads across the whole Dominion.

Steel in Europe . . .

London — (*By Radio*) — Steel production is increasing slowly in Great Britain but the labor shortage is a strong retarding factor. Steel billets and bars are in short supply, interfering with reconversion to civilian work. Substantial bookings of plates have been made by locomotive boiler makers, as railroads turn to rehabilitating their equipment.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1000 tons, barking plants for two Washington state pulp mills, to Isaacson Iron Works, Seattle.

900 tons, race track, Atlantic City, N. J., to American Bridge Co., Pittsburgh: in addition to 950 tons of reinforcing recently placed.

900 tons, warehouse buildings in Summit, Ill., Minneapolis, Detroit and Houston, for Lloyd C. Fry Roofing Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.

650 tons, repairs to First avenue bridge, Louisville, for Illinois Central railroad, to Virginia Bridge Co., Roanoke, Va.; bids Sept. 17.

550 tons, chemical works at Waterford, N. Y., to Ingalls Iron Works, Birmingham, through United Engineers, Philadelphia.

500 tons, parts building, Denver, for Ford Motor Co., to Stupp Bros. Bridge & Iron Co., St. Louis; bids Aug. 3.

400 tons, service and parts depot building, Houston, Tex., for Ford Motor Co., to Mosher Steel Co., Houston, Tex.; bids Aug. 28.

400 tons, truck and coach repair shop, Milwaukee, for Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh; Siesel Construction Co., Milwaukee, contractor; bids Aug. 13.

375 tons, parts building, Des Moines, Iowa, for Ford Motor Co., to American Bridge Co., Pittsburgh; bids Aug. 28.

375 tons, parts building, Seattle, for Ford Motor Co., to Virginia Bridge Co., Roanoke, Va.; bids Aug. 28.

360 tons, building, American Coating Mills Inc., Chicago, to American Bridge Co., Pittsburgh; bids Sept. 28.

350 tons, factory building, Elkhart, Ind., for American Coating Mills Inc., to American Bridge Co., Pittsburgh; bids June 19.

320 tons, hangars, Chicago, for Pennsylvania Central Airlines, to American Bridge Co., Pittsburgh.

270 tons, building No. 52, LaPorte, Ind., for Allis-Chalmers Mfg. Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.

235 tons, building for Henry Ortleib Brewery Co., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, crane runway, Parish Pressed Steel Co., Reading, Pa., to Belmont Iron Works, Philadelphia.

200 tons, expansion, Semi-Steel Test Foundry Division, Howard Foundry Co., Chicago, to Mississippi Valley Structural Steel Co., Decatur, Ill.

190 tons, building for Deepfreeze Division, Motor Products Corp., North Chicago, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.; bids Aug. 21.

Unstated tonnage, boiler plant, Worcester Gas Light Co., Framingham, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.; Theodore Laranger & Sons, New Bedford, Mass., contractor.

Unstated tonnage, boiler plant addition, Draper Bros., Canton, Mass., to Groisser & Shlager Iron Works, Boston; C. C. Temple Co., Boston, general contractor.

STRUCTURAL STEEL PENDING

10,500 tons, vertical lift bridge, Terminal Island, Calif.; also 25,000 square feet open steel grid flooring, 10,000 linear feet steel railing, 95,000 linear feet steel piles, 110 tons counterweight sheaves and connections, 45 tons balance chains, 30 tons machinery, 17,000 feet steel sheet piles, plans by California State Highway Commission; bids to Bureau of Yards and Docks, Navy Department, Terminal Island.

5446 tons, including 5000 tons timber trestle caps and 446 tons beam spans, various locations, for Atchison, Topeka & Santa Fe railroad; bids Oct. 8.

2300 tons, manufacturing plant addition between plants Nos. 6 and 9, Pontiac, Mich., for Pontiac Motor Car Division, General Motors Corp.; bids Sept. 28.

745 tons, also 50 tons special steel castings, penstocks, U. S. Engineer, Ft. Peck, Mont.; bids in.

628 tons bridge No. 1, Waneta, B. C., for Great Northern railroad.

300 tons, highway beam spans, Llano, Tex., for state highway commission.

132 tons, building, Edward Valve & Mfg. Co., East Chicago, Ind.; bids Aug. 20.

Unstated, Sears, Roebuck store building, Buffalo; Turner Construction Co., New York, general contractor.

Unstated, high level bridge, Eden Valley, N. Y.; McLain Construction Co., Buffalo, low bidder.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1038 tons, new plant, Newman-Rudolph Litho Co., to Ceco Steel Products Corp., Cicero, Ill.; bids Sept. 13.

1000 tons, electronics plant, General Electric Co., Syracuse, N. Y., to Truscon Steel Co., Youngstown, O., through Walsh Construction Co., contractor.

500 tons, sewer, Dugway brook, Cleveland, to Republic Steel Corp., Cleveland, through Builders Structural Steel Co.

114 tons, addition to warehouse, Chicago, for Service Wholesale Drug Co., to Bethlehem Steel Co., Bethlehem, Pa.; S. N. Nielsen Co., Chicago, contractor.

100 tons, plant, Phelps Dodge Corp., Fort Wayne, Ind., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, or more, nurses' home, Swedish hospital, Seattle, to Northwest Steel Rolling Mills, Seattle.

REINFORCING BARS PENDING

2200 tons, vertical lift bridge and foundations, Terminal Island, Calif., bids in to Bureau of Yards and Docks, Navy Department, Terminal Island.

2000 tons, Fisher Body stamping plant, Hamilton, O.

1000 tons, plant, Temstedt Mfg. Co., Fisher Body, Columbus, O.

250 tons, Panama; bids in sch. 7999.

200 tons, Co-operative office building, St. Paul; bids Sept. 25.

150 tons, axle plant No. 5, Pontiac Motor Car Co., Pontiac, Mich.

134 tons, expansion, John Deere Tractor Works, East Moline, Ill., for Deere & Co.

130 tons, state highway, near Mukilteo, Wash.; bids in at Olympia, Oct. 2.

100 tons, building, Chicago, for South Shore National Bank.

100 tons, freight house, Chicago, for Chicago, Milwaukee, St. Paul & Pacific railroad.

100 tons or more, two state concrete bridges; general contract to Henry Hagman, Cashmere, Wash.

PLATES . . .

PLATES PLACED

100 tons, hatch covers for Sun Shipbuilding & Dry Dock Co., Chester, Pa., to Frank M. Weaver, Philadelphia.

Unstated, storage tanks for Columbia Breweries, Olympia, Wash., to Puget Sound Sheet Metal Works, Seattle.

RAILS, CARS . . .

RAILROAD CARS PLACED

Pennsylvania, 90 passenger cars of high-tensile light weight steel, to its shops in Altoona, Pa.; includes 70 coaches, 5 double unit dining cars, and 5 lounge-buffet observation cars.

RAILS PLACED

New York Central, 100,000 tons of rails and angle bars, to Carnegie-Illinois Steel Corp., Bethlehem Steel Co., Inland Steel Co. and Algoma Steel Co.; about 25,000 tons of accessories are being distributed.

PIPE . . .

CAST IRON PIPE PLACED

120 tons including 60 tons 8-inch for Hillcrest St., and 60 tons, 20 and 24-inch for Barton St. projects, Seattle, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

100 tons for Dallas, Oreg., to H. G. Purcell, Seattle.

Unstated, 4 and 6-inch for The Dalles, Oreg., to H. G. Purcell, Seattle.

CAST IRON PIPE PENDING

300 tons, 20-inch, cement-lined, Panama; bids Oct. 5.

100 tons or more, West 68th and 30th Ave. N.W., improvement, Seattle; bids in.

U. S. May Expand Training Of Foreign Nationals

(*Continued from Page 89*)

ton Edison Co.; Boston & Maine Railroad; Borg-Warner Corp.; Braniff Airways; Brown Equipment & Mfg. Co.; Bucyrus-Erie Co.; Buda Co.; Bullard Co.; Bunker Hill & Sullivan Mining & Concentrating Co.; Burd Piston Ring Co.; Burlington Mills Corp.; Busch-Sulzer Bros. Diesel Engine Co.

California Department of Public Works; California State Highway Department; Call Carl Inc.; Campbell, Wyant & Cannon Foundry Co.; Carboloy Co.; Carborundum Co.; Carnegie-Illinois Steel Corp.; Carolina Power & Light Co.; Carrier Corp.; Carter Oil Co.; Caterpillar Tractor Co.; Central Illinois Electric &

Gas Co.; Central Insulator Works; Central Radio Mfg. Works; Century Electric Co.; Chesapeake & Potomac Telephone Co.; Chesapeake & Ohio Railway; Chicago, Burlington & Quincy Railroad; Chicago, Milwaukee, St. Paul & Pacific Railroad; Chicago & North Western Railway; Chicago Pneumatic Tool Co.; Chicago, Rock Island & Pacific Railway; Chicago & Southern Air Lines Inc.; Chrysler Corp.; Cincinnati Gas & Electric Co.; Cincinnati Milling Machine Co.; Cincinnati Planer Co.; Colonial Airlines Inc.; Columbia Motor Service Co.; Columbia Terminals Co. Inc.; Combustion Engineering Co. Inc.; Commonwealth Edison Co.; Compagnie d'Eclairage Electrique, Haiti; Consolidated Edison Co. of New York Inc.; Consolidated Vultee Aircraft Corp.; Consumers Co-operative Association; Continental Machines Inc.; Cooper-Bessemer Corp.; Copperweld Steel Co.; Corn Products Refining Co.; Corning Glass Works; Corporacion Boliviana de Fomento; Culver Aircraft Corp.

Darco Corp.; Delaware, Lackawanna & Western Railroad; Delta Air Corp.; Denver Equipment Co.; Denver & Rio Grande Western Railroad; Detroit Edison Co.; Do-All Co.; Douglas Aircraft Co. Inc.; Draper Corp.; E. I. Du Pont de Nemours & Co. Inc.

Eastern Air Lines Inc.; Eastman Kodak Co.; Ebasco International Corp.; Ebasco Services Inc.; Eisler Engineering Co.; Electricidad de Caracas, Venezuela; Erie Railroad; Ex-Cell-O Corp.

Fairbanks, Morse & Co. Inc.; Fairchild Aircraft; Federal-Mogul Corp.; Federal Telephone & Radio Corp.; Harry Ferguson Inc.; Firestone Tire & Rubber Export Co.; Fitchburg Paper Co.; Florida Power & Light Co.; Foster Wheeler Corp.

Gannett-Fleming-Corddry & Carpenter; General Dyestuff Corp.; General Electronics Industries; General Motors Corp.; General Refractories Co.; Giddings & Lewis Machine Tool Co.; Goodyear Tire & Rubber Co.; Great Northern Railway; A. P. Green Fire Brick Co.; Gulf Oil Corp.

Harbison Walker Refractories Co.; Haslett Warehouse Co.; Heald Machine Co.; Hilo Varnish Corp.; A. C. Horn Co.; Humble Oil & Refining Co..

Illinois Central System; Indiana & Michigan Electric Co.; Ingersoll Milling Machine Co.; Institute Nacional de Obras Sanitarias, Venezuela; Department of the Interior; International Automatic Electric Corp.; International Business Machines Corp.; International General Electric Co. Inc.; International Harvester Co.; International Standard Electric Corp.; International Telephone & Telegraph Corp.

Jackson & Perkins Co.; Jessop Steel Co.; Jones & Lamson Machine Co.

Kaiser Co. Inc.; Kearney & Trecker Corp.; R. D. Keene Inc.; Kellett Aircraft Corp.; Kinner Motors Inc.; Morris Knowles Inc.; Koppers Co.

Lacoste Printing Co.; Ladish Drop Forge Co.; Lake City Malleable Co.; Lane-Wells Co.; Lear Inc.; Lehigh Valley Railroad; Lehn & Fink Products Corp.; R. G. LeTourneau Inc.; Link-Belt Co.; Lion Chemical Corp.; Lockheed Aircraft Corp.; Louisville & Nashville Railroad; Lummus Co.

McClintic-Marshall Corp.; Arthur McKee Co.; Mack Mfg. Corp.; Mackay Radio & Telegraph Co.; Magill-Weinheimer Co.; Magnavox Co.; Maguire Industries Inc.; Maine Public Service Co.; Manasse-Block Tanning Co. Ltd.; Marquette Cement Mfg. Co.; Mars Inc.; Glenn L. Martin Co.; Maxon Construction Co. Inc.; May McEwen Kaiser Co. Inc.; Mead Corp.; Merck & Co. Inc.; Mergenthaler Linotype Co.; Wm. S. Merrell Co.; Meyers Aircraft Co.; Mid-Continent Airlines Inc.; Middle Atlantic States Motor Carrier Conference Inc.; Middle Atlantic Transportation Co. Inc; Minneapolis, St. Paul & Sault St. Marie Railroad; Minnesota Valley Canning Co.; Missouri Pacific Lines; Missouri State Highway Department; Modjeski & Masters; Modern Industrial Engineering Corp.; Monarch Machine Tool Co.; Monsanto Chemical Co.; Morse Chain Co. (Borg-Warner Corp.)

Nashville, Chattanooga & St. Louis Railway; National Airlines Inc.; National Malleable & Steel Castings Co.; National Plastics Products Co.; National Sugar Refining Co.; National Supply Co.; Nebraska Power Co.; Nekoosa-Edwards Paper Co.; New England Shipbuilding Corp.; New Mexico State Highway Department; New York Central System; City of New York Department of Public Works; Niles-Bement-Pond Co.; Nordberg Mfg. Co.; Norfolk & Western Railway; North American Aviation Inc. of Kansas; North Carolina State Highway and Public Works Commission; Northeast Airlines; Northern Pacific Railway; Northern Regional Research Laboratory; Northwest Airlines Inc.

Ohio Department of Highways; Oregon State Highway Commission; Otis, McAllister & Co.; Owens-Illinois Glass Co.; Ozark Ordnance Works.

Pacific Gas & Electric Co.; Pan American Airways System; Pennsylvania-Central Airlines Corp.; Pennsylvania Power & Light Co.; Pennsylvania State Highway Department; Pennsylvania Railroad; Phillips Petroleum Co.; H. H. Pike & Co. Inc.; Piper Aircraft Corp.; Pittsburgh Coal Co.; Pittsburgh Steel Foundry Co.; Pittsburgh Testing Laboratory; Post Office Department; Pratt & Whitney Aircraft; Public Roads Administration; Public Service Coordinated Transport; Public Service Electric & Gas Co.; Publicker Commercial Alcohol Co.

Ranger Aircraft Engines; RCA Victor Division of Radio Corp. of America; Reading Co.; Ready Foods Canning Corp.; Reynolds Metals Co.; Rio Negro (Uruguay, S. A.) Hydroelectric Development; Rogers Motor Lines Inc; George D. Roper Corp.

Sabin St. Germain & Associates; Saco-Lowell Shops; St. Joseph Lead Co.; St. Louis-San Francisco Railway; Sangamo Electric Co.; Seaboard Air Line Railway; City of Seattle Department of Lighting; Seismograph Service Corp.; Servel Inc.; Shell Chemical Division of Shell Union Oil Corp.; Shell Oil Corp.; Silver Fleet Motor Express Inc.; Robert E. Simpson & Sons Inc.; Sinclair Oil Corp.; Smith, Hinchman & Grylls Inc.; Socony-Vacuum Oil Co.; South Carolina State Highway Department; Southern California Edison Co. Ltd.; Southern Lacquer Co.; Southern Pacific Lines; Southern Railway System; Southwestern Bell Telephone Co.; Sperry Gyroscope Co., Inc.; George L. Squier Mfg. Co.; Standard Lime & Stone Co.; Standard Oil Co. (Indiana); Standard Oil Co. (New Jersey); Standard-Vacuum Oil Corp.; Studebaker Corp.; Submarine Signal Co.; Sun Oil Co.; Sun Shipbuilding & Dry Dock Co.; Surface Combustion Co.; Sylvania Electric Products Inc.

Tabor Mfg. Co.; Taylorcraft Aviation Corp.; Tennessee Valley Authority; Texas Bitulithic Co.; Texas Co.; Texas & New Orleans Railroad; Texas & Pacific Railway; Texas State Highway Department; Timber Structure Inc.; Timken Roller Bearing Co.; Transcontinental & Western Air Inc.; Tropical Radio Telegraph Co.

Union Diesel Engine Co.; Union Oil Co. of California; Union Pacific Coal Co.; Union Pacific Railroad; Union Switch & Signal Co.; United Aircraft Corp.; United Air Lines; U. S. Cold Storage Co.; U. S. Industrial Chemicals Inc.; United States Engineering & Foundry Co.; United States Rubber Export Co. Ltd.; United States Steel Corp.; Universal Oil Products Co.

Verza Tanning Co.; Victor Insulators Inc.; Virginia Electric & Power Co.; Virginia State Highway Department; Vollrath Co.

Wabash Railroad; Warner Aircraft Corp.; Warren Brothers Co.; Washington State Highway Department; Washington Water Power Co.; Waterbury Cos. Inc.; Waukesha Motor Co.; West Penn Power Co.; West Virginia State Road Commission; Western Airlines Inc.; Western Electric Co.; Western Union Telegraph Co.; Westinghouse Electric International Co.; Weston Electrical Instrument Corp.; White Motor Co.; Whitin Machine Works; Whiting Corp.; Winthrop Products Inc.; Wisconsin Electric Power Co.; Worthington Pump & Machinery Corp.; Wyoming State Highway Department.

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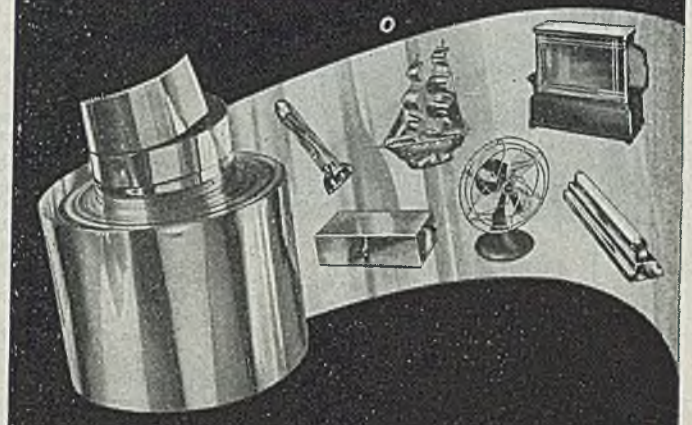

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CONSTRUCTION AND ENTERPRISE

OHIO

ARCHBOLD, O.—King-Wise Mfg. Co. has let contract to E. J. Benes, Terminal Tower, Cleveland, for a one-story agricultural implement manufacturing plant 150 x 200 feet, to cost about $150,000. Britsch & Munger, Nicholas Bldg., Toledo, O., are architects.

CLEVELAND—Gabriel Co., John Briggs, president, 1407 East 40th St., shock absorber manufacturer, will build plant structure on Babbitt Rd., Euclid, O., on 20-acre site, to cost about $750,000.

CLEVELAND—Mor-Flo Heater Inc., A. R. Abt, president, 2176 East 76th St., will build 40,000 additional square feet of floor space in units of 10,000 square feet.

CLEVELAND—Gogan Machine Corp., Joseph Gogan, president, 1440 East 55th St., will build a one-story plant addition 63 x 100 feet, to cost about $20,000.

CLEVELAND—Birmingham Oil Co. has been incorporated with $500 capital and 250 shares of $100 par value, by Bert D. Bradley, 2021 N.B.C. Bldg., to produce petroleum, natural gas and by-products.

ELYRIA, O.—American Brakeshoe Co., 332 South Michigan Ave., Chicago, has let contract to Hunkin-Conkey Construction Co., 1740 East Twelfth St., Cleveland, for an electrical alloys building, to cost about $1 million. (Noted Aug. 20)

LORAIN, O.—National Tube Co., Frick Bldg., Pittsburgh, has let contract to Wilputte Coke Oven Corp., 40 Rector St., New York, for 177 by-product coke ovens, to cost about $30 million.

MASURY, O.—General American Transportation Corp., Masury, has let contract to Heller-Murray Co., 222 West Rayen Ave., Youngstown, for a 100 x 300-foot machine shop, to cost about $250,000.

MASSACHUSETTS

MARLBORO, MASS.—National Battery Co., First National Bank Bldg., St. Paul, has plans under way by J. A. Bigelow, 47 Highland St., for a one-story 120 x 260-foot manufacturing building, to cost over $100,000, with equipment.

WALPOLE, MASS.—Ranger Corp., 2000 Main St., has let contract to Farina Bros., 61 Bridge St., Newton, Mass., for a 40 x 57-foot machine shop, 40 x 60-foot boiler plant and two additions for transformers and pumps, to cost about $40,000. F. B. Mitchell, P. O. Box 147, Foxboro, Mass., is architect.

CONNECTICUT

BRIDGEPORT, CONN.—Remington Rand Inc., 785 Main St., has let contract to E. L. Bray Co., 362 River St., for a one-story 60 x 160-foot plant addition to cost about $55,000. (Noted June 25.)

HAMDEN, CONN.—Safety Car Heating & Lighting Co., Dixwell Ave., has let contract to Dwight Building Co., 152 Temple St., New Haven, Conn., for a 105 x 145-foot plant, to cost about $75,000.

HARTFORD, CONN.—Connecticut Wheel & Rim Co., Mechanic St., New Haven, Conn., has plans by H. S. Cannici, 113 First Ave., West Haven, for a one-story 45 x 80 and 50 x 135-foot manufacturing plant.

RHODE ISLAND

CRANSTON, R. I.—United Wire & Supply Corp., 1497 Elmwood Ave., has let contract to Gilbane Bldg. Co. Inc., 90 Caverly St., Providence, R. I., for a two-story plant, to cost about $75,000.

NEW JERSEY

BOUND BROOK, N. J.—Johns Manville Corp., 22 East 40th St., New York, has let contract to Turner Construction Co., 420 Lexington Ave., New York, for first building of a research center to include six structures, to cost $2 million, total cost of project $12 million.

PAULSBORO, N. J.—Socony Vacuum Oil Co. Inc., Paulsboro, will let contract soon for altering and adding to boiler plant.

PENNSYLVANIA

BUTLER, PA.—Pullman Standard Car Mfg. Co., R. O. Cliffenderfer, works engineer, Butler, plans expansion, including boiler and engine room, coal elevator and conveyor, shop and office building, guard house, turbine engine equipment. Contract has been let to Sumner Sollitt Co., 307 North Michigan Ave., Chicago. Estimated cost is about $1 million. Laramore & Douglas Inc., 327 South LaSalle St., Chicago, is consulting engineer.

EDGWORTH, PA.—Homestead Valve Mfg. Co., F. S. Schuchman, general manager, Coraopolis, Pa., is having plans prepared for a two-story 30 x 200-foot manufacturing plant, to cost about $150,000. Prack & Prack, 517 Martin Bldg., Pittsburgh, are engineers and architects.

MEADVILLE, PA.—Talon Inc. will erect two additions to Plant No. 7 and one to Plant No. 5, here.

MEADVILLE, PA.—American Viscose Corp., Wilmington, Del., has expansion program to increase rayon production 100 million pounds per year by enlargement of its acetate rayon plant here and viscose rayon plant at Nitro, W. Va., as well as erection of a new plant at Bradford, Va.

WEST PITTSBURGH, PA.—Pennsylvania Power Co., Louis B. Round, vice president and general manager, New Castle, Pa., plans to double plant capacity, including 35,000 kw turbo-generator, boilers, transmission facilities and other equipment at cost of $3,200,000.

MICHIGAN

ELKTON, MICH.—Active Tool & Mfg. Co. is building a one-story steel products factory 30 x 150 feet.

LANSING, MICH.—Motor Wheel Corp., 735 East Saginaw St., has let contract to Reniger Construction Co., 127 North Cedar St., for a new plant and remodeling power plant, to cost about $430,000.

ST. JOHNS, MICH.—Sealed Power Corp., Muskegon, Mich., manufacturer of pistons and piston rings, plans new plant here to cost about $250,000.

ILLINOIS

ARGO, ILL.—Corn Products Refining Co., 336 North Michigan Ave., Chicago, has let contract to Ragnar Benson Inc., 4744 West Rice St., Chicago, for a four-story 80 x 228-foot pilot building.

CHICAGO—Steel Sales Corp., 3348 South Pulaski Rd., has let contract to Campbell-Lowrie-Lautermilch, 400 West Madison St., for a one-story 100 x 400-foot warehouse to cost about $150,000. A. P. Klaysing, 31 Maple Ave., is architect.

INDIANA

FORT WAYNE, IND.—Phelps Dodge Copper Products Corp., 40 Wall St., New York, has let contract to Wigton Abbott Co., 122 South Ave., Plainfield, N. J., for a rod, wire and cable plant, estimated to cost about $4,500,000.

MARYLAND

HYATTSVILLE, MD.—Washington Suburban

Sanitary Commission, Hamilton St., has asked bids Oct. 12 for a 300,000-gallon welded steel elevated water tank. H. R. Hall is chief engineer.

ARKANSAS

ROGERS, ARK.—Rollins Hosiery Mills Inc., Des Moines, Iowa, plans a hosiery mill here to cost about $120,000, with equipment costing about $270,000.

OKLAHOMA

TULSA, OKLA.—Braden Steel Co., manufacturer of portable steel buildings, winches, etc., has let contract for a two-story addition.

WISCONSIN

BIRON, WIS.—Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., plans a one-story 78 x 104-foot boiler house and turbine room and one-story 84 x 440-foot paper manufacturing building. W. F. Thiele is chief engineer.

MILWAUKEE—S. K. Williams Co., 2370 North 32nd St., has let contract to Selzer-Ornst Co., 6222 West State St., Wauwatosa, Wis., for a one-story 58 x 144-foot industrial plating building. Eschweiler & Eschweiler, 720 East Mason St., are architects. (Noted Sept. 20.)

MILWAUKEE—Western Hardware & Specialty Co., 228 South First St., will let contract soon for a two-story 146 x 147-foot factory and office building. C. F. Smith, 717 North 65th St., is architect.

MILWAUKEE—Square D Co., 4021 North Richards St., has let contract to Permanent Construction Co., 4100 North Third St., for a one-story and part basement plant addition 300 x 400 feet, estimated to cost about $500,000.

RACINE, WIS.—Modine Mfg. Co., 1202 Seventeenth St., has let contract to Nelson & Co., Inc., 1550 Yont St., for a one-story 184 x 280-foot plant addition. Graham, Anderson, Probst & White, 80 East Jackson Blvd., Chicago, are architects. (Noted Aug. 13.)

MINNESOTA

HOPKINS, MINN.—Minneapolis-Moline Power Implement Co., manufacturer of tractors and farm implements, will let contract soon for a two-story assembly plant addition 260 x 300 feet.

MINNEAPOLIS—Super Six Mfg. Co., 2007 Central Ave., has plans by G. W. Shifflet, 83 South Ninth St., for a one-story plant 80 x 150 feet, at Camden and Washington Aves. North, to cost over $40,000.

MINNEAPOLIS—Twin City Tool Co., 2520 Northeast Marshall St., has let contract for a one-story plant addition 50 x 65 feet.

MINNEAPOLIS—Twin City Steel Mfg. Co., 2648 34th Ave. South, manufacturer of pipe nipples, pipe threaders, etc., has let contract for a one-story plant addition 50 x 60 feet.

MINNEAPOLIS—Crown Iron Works Co., 1229 Tyler St. NE, has started an expansion program costing about $150,000, including forge shop. Company manufactures ornamental steel and iron fabrications and is adding production of coal feed screws for stokers and farm machinery parts.

MINNEAPOLIS—Tire Machines Inc., 312 Erie St. SE, has been incorporated to manufacture machinery for splitting or salvaging tires, by Blake F. Titcomb and associates.

MINNEAPOLIS—Micro-Mark Inc., St. Paul, manufacturer of name plates, etc., has been bought by Stolle Corp., electroplaters, Cincinnati, which will move the business to 253 Third Ave. S., Minneapolis.

PINE RIVER, MINN.—Durkee Mfg. Co. plans a one-story plant 46 x 100 feet for manufacture of store fixtures.

ROCHESTER, MINN.—City plans sewage treatment plant costing about $1,250,000. Toltz, King & Day, Pioneer Bldg., St. Paul, are engineers.

ST. PAUL—Eastern Machine Works, 599 East Seventh St., has let contracts for a one-story machine shop addition 20 x 86 feet.

IDAHO

BOISE, IDAHO—Idaho Power Co. has let contract to Morrison-Knudsen Co. for a hydroelectric plant on Snake river, of 16,500 kw, with 120 mile transmission line to Emmett, Idaho. Project totals $3 million.

NEBRASKA

FAIRBURY, NEBR.—Fairbury Windmill Co. plans one-story plant 70 x 100 feet and an addition to present plant.

IOWA

DES MOINES, IOWA—Ford Motor Co., Dearborn, Mich., plans $700,000 plant on a 20-acre site on East Walnut St.

NEWTON, IOWA—Maytag Co., manufacturer of washing and ironing machines, has bought an interest in Globe American Corp., Kokomo, Ind., and Macomb, Ill., manufacturer of heaters, ranges and poultry raising equipment.

CALIFORNIA

HAWTHORNE, CALIF. — Northrop Aircraft Inc., 1001 East Broadway, has plans for a steel frame shop building 60 x 100 feet, to cost an estimated $50,000, and a frame office building 46 x 180 feet, to cost $35,000.

PASADENA, CALIF.—Holly Heating & Mfg. Co., 1000 Fair Oaks Ave., has let contract to E. S. McKittrick Co. Inc., 7839 Santa Fe Ave., Huntington Park, Calif., for a factory building at 861 South Arroyo Parkway, 140 x 157 feet, to cost about $52,000.

OREGON

PORTLAND, OREG.—Beall Pipe & Tank Co., Portland, plans early construction of a plant 200 x 500 feet on North Columbia Blvd., to cost about $500,000. Plans are by Alexander Stoyanov, engineer. Ceiling of 40 feet is provided, for crane runways. Company plans production of refrigerators, trailers, truck equipment and a new type of aluminum sprinkler pipe, one to six inches.

SALEM, OREG.—California-Oregon Power Co., Medford, Oreg., has state permit for a hydroelectric plant on Umpqua river, first unit of a proposed $4 million project.

SALEM, OREG.—Interstate Tractor & Equipment Co. will build plant on six-acre tract on Silverton Rd., to cost about $100,000 and to be in operation early next year.

WASHINGTON

CAMAS, WASH.—City plans construction of garbage incinerator and disposal plant, to cost about $125,000.

LONGVIEW, WASH.—Port of Longview plans $100,000 warehouse, with purchase of navy and war surplus cargo handling equipment including locomotive cranes and lift trucks. Building will be 150 x 450 feet. Plans by E. F. Carter, Vancouver, B. C., engineer.

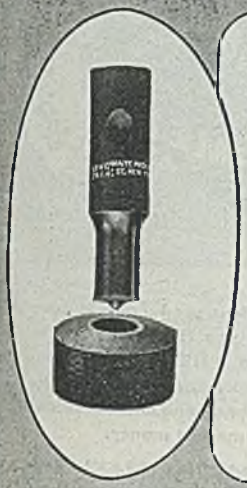
MONROE, WASH.—City has bought site for proposed disposal plant.

SEATTLE—Wirkkala's Machinery Mfg. Co. has been incorporated with $100,000 capital, by O. A. Wirkkala and associates, 300 Nineteenth Ave.

SEATTLE—Ace Tank & Welding Co., 119 Elliott Ave. West, has let contract to R. J. Post for a 24 x 48-foot plant addition.

SEATTLE—Seattle Industrial & Plating Works, 112 Spokane St., plans shop and office 60 x 100 feet.

PUNCHES and DIES



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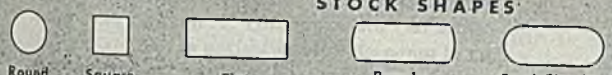

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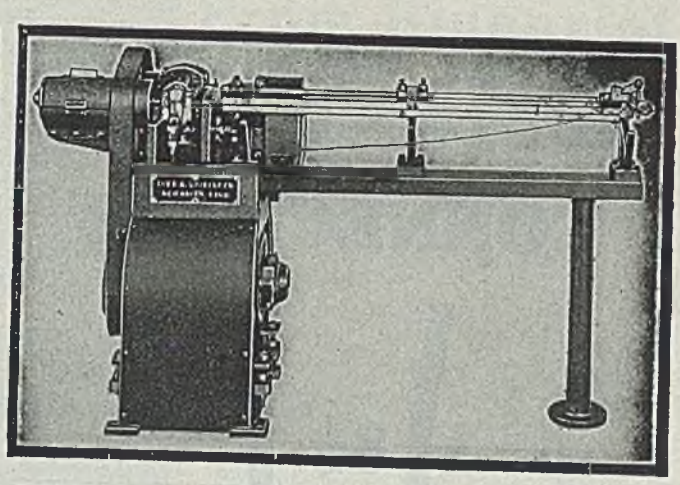

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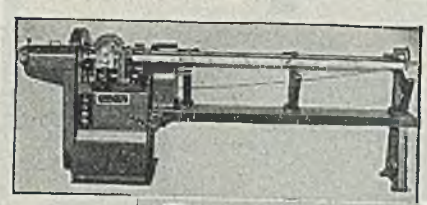

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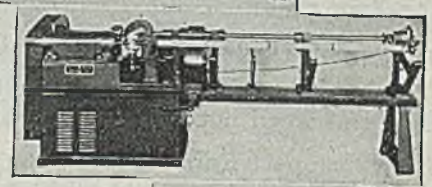
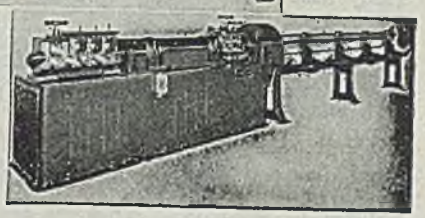
1/16"—3/16"
Dia.



Type 2A
⅛"—¼"
Dia.



Type 3A
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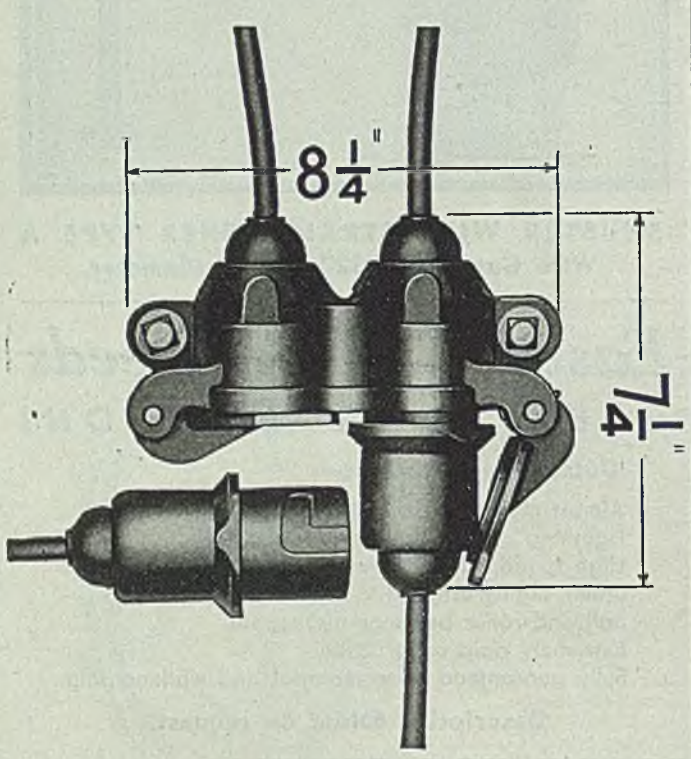

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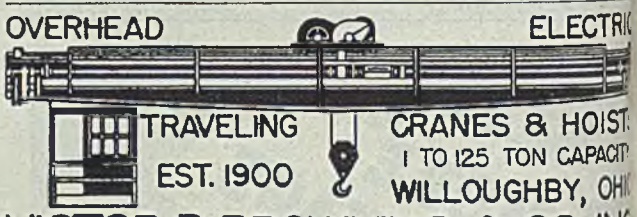

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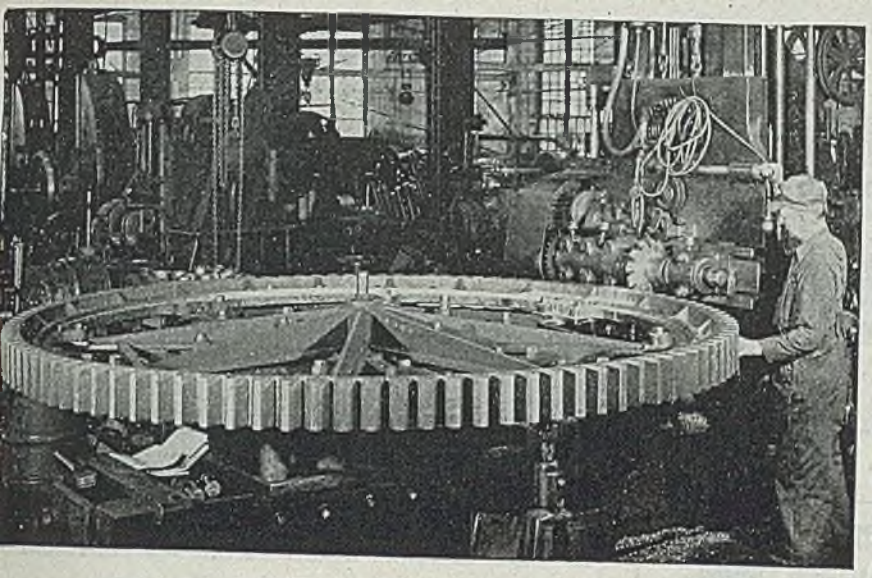

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WANTED, SALES REPRESENTATION. PROCessor of metal parts offers established representative territory in Ohio and adjoining states. Commission basis. Address Box 235, STEEL, Penton Bldg., Cleveland 13, O.

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CLASSIFIED

STATEMENT OF OWNERSHIP

Statement of the ownership, management, circulation, etc., required by the Act of Congress of Aug. 24, 1912 and March 3, 1933, of STEEL, published Weekly at Cleveland, O., for Oct. 1, 1945, State of Ohio, county of Cuyahoga, ss. Before me, a notary public in and for the state and county aforesaid, personally appeared Geo. O. Hays, who, having been duly sworn according to law, deposes and says that he is the Business Manager of STEEL, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal laws and regulations, to wit: 1.—That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, The Penton Publishing Co., 1213 West Third St., Cleveland 13, Ohio. Editor, E. C. Kreutzberg, 1123 National Press Bldg., Washington, D. C. Managing Editor, None. Business Manager, Geo. O. Hays, 1213 West Third St., Cleveland 13, Ohio. 2.—That the owner is The Penton Publishing Company, Cleveland, Ohio. Names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock: Edwin C. Barringer, Washington, D. C.; Samuel E. Bool, Cleveland, Ohio; Richard M. Bourne, Cleveland, Ohio; County National Bank of Santa Barbara, Santa Barbara, Calif.; J. R. Dawley, Cleveland, Ohio; Ernest C. Dempsey, Richard Inglis & Central National Bank of Cleveland as Trustees under agreement with John A. Penton dated Feb. 16, 1924, Cleveland, Ohio; The Fanner Manufacturing Co., Cleveland, Ohio; George O. Hays, Cleveland, Ohio; Russell C. Jaenke, Cleveland, Ohio; S. H. Jasper, Pittsburgh, Pa.; A. L. Klingeman, Cleveland, Ohio; E. C. Kreutzberg, Washington, D. C.; Parness & Co., Cleveland, Ohio; J. D. Pease, Mount Dora, Florida; L. E. Penton, Los Angeles, Calif.; E. L. Shaner, Cleveland, Ohio; Charles J. Stark, Cleveland, Ohio; Penelope M. Stark, Cleveland, Ohio; E. L. Werner, Cleveland, Ohio; Grace Whelan, Santa Barbara, Calif. 3.—That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None. 4.—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. Geo. O. Hays. Sworn to and subscribed before me this 25th day of September, 1945. (Seal) R. W. Coleman. (My commission expires Dec. 26, 1947.)

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 5.00, each additional word .10; all capitals, minimum 50 words 6.50, each additional word .13; all capitals leaded, minimum 50 words 7.50, each additional word .15. "Positions Wanted," set solid, minimum 25 words 1.25, each additional word .05; all capitals, minimum 25 words 1.75, each additional word .07; all capitals, leaded, minimum 25 words 2.50, each additional word .10. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge.

Displayed classified rates on request.

Address your copy and instructions to STEEL, Penton Bldg., Cleveland 13, Ohio.

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WANTED

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Exceptional opportunity to represent nationally and internationally advertised high-quality product used by large and small Government and private industrial enterprises for production and repair. Already successfully introduced in many overseas markets. Foreign demonstrator and sales engineer wanted to select and train foreign representatives. Technical or welding, selling and traveling experience indispensable. Fluent Spanish necessary; French desirable. Send resume of background, giving citizenship. Address Box 185, STEEL, Penton Bldg., Cleveland 13, O.

SALES ENGINEERS WANTED

Established company requires one or more additional sales engineers in their rapidly expanding oven department. Applicant must have had thorough experience designing and selling ovens. Give complete educational and experience history, state salary expected and send recent photograph.

Address Box 228,
STEEL, Penton Bldg., Cleveland 13, O.

SUPERINTENDENT

Good position well established heavy industry, making large and heavy work. Location southeast. Must be experienced in Grey Iron Foundry, Machine Shop, and Plate Shop practices.

Post war opportunity

Write, giving outline of personal data and experience for past ten years. Address Box 220, STEEL, Penton Bldg., Cleveland 13, O.

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Help Wanted

opportunity for

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If you are an experienced designer who would be interested in the problems of developing and improving construction machinery—

or a skilled draftsman on detailing, layout and assembly drawings—

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Mechanical Engineers, Designers and Draftsmen experienced in material handling, crushing, power plants, hoisting, and problems peculiar to mining and smelting.

Structural Engineers, Designers and Draftsmen, experienced in both Structural Steel and Reinforced Concrete for Industrial Type Structures.

Write only, giving broad detailed information regarding age, marital status, education and experience. References required.

Work located in Salt Lake City, Utah. Personal interviews can be arranged in Boston, New York, Chicago, San Francisco and Salt Lake City.

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With successful sales record by one of the leading manufacturers in the metal cutting tool industry. State age, education, experience, special qualifications and compensation desired. Address Box 213, STEEL, Penton Bldg., Cleveland 13, O.

IRON & STEEL EXPORT EXECUTIVE W controls sufficient business to warrant conduc own department on liberal profitsharing arrangement, wanted by established export-imp concern. All correspondence confidential. Address Box 186, STEEL, Penton Bldg., Cleve 13, O.

WANTED: CONSTRUCTION SUPERINTEN dent-General Foreman-Carpenter Foreman. Ge references and salary requirement. Address Orv Wessner, P. O. Box 2057, Milwaukee, Wis.

WANTED—EXPERIENCED ESTIMATOR- General Construction Work. Give references a salary requirement. Address Orval Wessner, O. Box 2057, Milwaukee, Wis.

CLASSIFIED

Opportunities

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IF YOU HAVE AN OPPORTUNITY TO OFFER

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Large well-known chemical and cleaning products manufacturer doing national business, has permanent position open for experienced sales executive.

Must have a thorough knowledge of metal cleaning and finishing operations and have had at least 5 years experience in managing men. This is a position of great responsibility and carries compensation accordingly. State qualifications fully. Will be treated confidentially.

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Penton Bldg., Cleveland 13, O.

DRAFTSMEN — DESIGNERS, LAYOUTS, Checkers, and Detailers experienced on heavy machinery, both mechanical and structural experience. Apply or write to The Engineering Department, Morgan Engineering Company, Alliance, Ohio.

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Large steel company in Pittsburgh area has several opportunities for draftsmen with high school or college education and experience in the following areas: design of steel mill and steel foundry products; railroad track accessories; layout and design of steel mills, blast furnaces, open hearth furnaces, and power plants; design of fabricated concrete bars; layout of electric power and control equipment; general mechanical design and layout. Please submit details, statement of experience and education, inexpensive photograph, and required minimum earnings. Address Box 142, STEEL, Penton Bldg., Cleveland 13, O.

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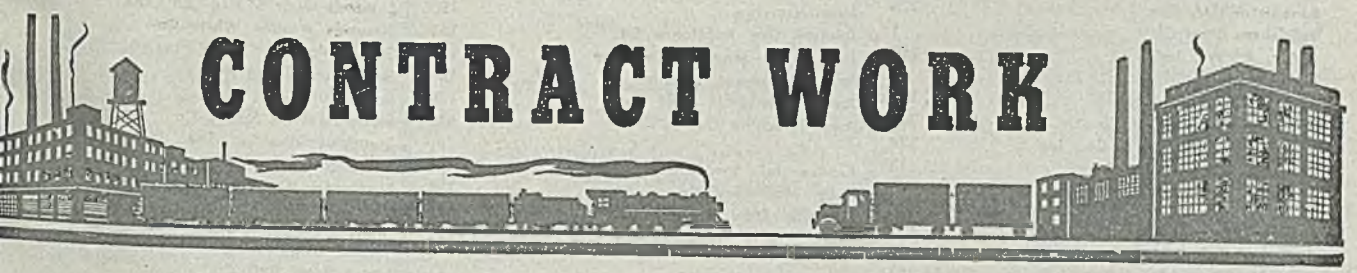

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