



More steel requested for farm machinery to avert threatened food shortage P. 14

C O N T E N T S

Volume 112—No. 4

STEEL

January 25, 1943

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IN THE AIRCRAFT AS IN OTHER INDUSTRIES

EX-CELL-O

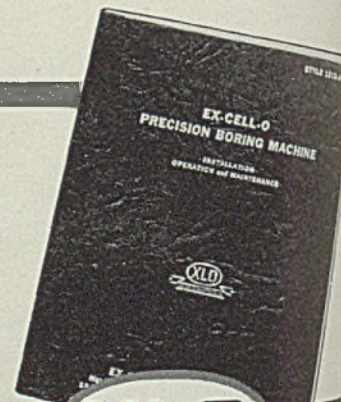
Machine Tools Bring Speed and Accuracy to War Production!

TAKE aircraft engines, for instance. Since fateful December 7, 1941, U. S. aircraft engine production has increased, by horsepower, approximately 240%—actually, in dollar value, there is now more aircraft engine horsepower being delivered every 14 days by American industry than during the whole of World War I. In the turning out of these aircraft engines, Ex-Cell-O is a definite factor. Not only has Ex-Cell-O one of the country's largest precision aircraft parts divisions, but Ex-Cell-O precision machine tools are being used extensively throughout the aircraft industry to produce the many thousands of precision parts needed for aircraft engines. These parts must have a high degree of precision and finish . . . rigid specifications must invariably be observed . . . the parts must be produced as fast as possible. This is the reason why Ex-Cell-O precision machine tools are preferred by managements and workers for the production of these vital parts.

EX-CELL-O CORPORATION • DETROIT

Illustration shows fixture developed by Ex-Cell-O for use in facing both sides of flange and in turning hub diameter on each side, the fixture being operated by a hydraulic cylinder connected to the machine circuit. It carries four tungsten carbide tools that are synchronized mechanically and have individual micro-adjustment in two directions. The two tools nearer the operator turn the hubs and the two at the rear of the fixture face the flange at the same time. All four tools reach the end of their cut simultaneously. Thus, at the intersection of hub O.D. and flange face, each tool is relieved of a plunge cut by the tool on the opposite side. This feature eliminated considerable tool breakage. Former method for machining this aircraft part required three set-ups and production was just one-third of that attained in the one set-up shown above. MACHINE: Ex-Cell-O 112-C Precision Boring.

To get best use of your Ex-Cell-O precision boring equipment, you should have the Ex-Cell-O Instruction Book. If you do not have it, write for free copy. State style of Ex-Cell-O machine you are using.



XLO

EX-CELL-O MEANS PRECISION

Precision THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CONTINENTAL CUTTING TOOLS • DRILL JIG BUSHINGS • DIESEL FUEL INJECTION EQUIPMENT PURE-PAK CONTAINER MACHINES • R. R. PINS AND BUSHINGS • PRECISION PARTS

HIGHLIGHTING

this issue of **STEEL**

POSTWAR PLANNING Now that President Roosevelt has called upon Congress to plan for a sound postwar economy more will be heard about such planning from now on. A great deal of progress already has been made in the blueprinting of postwar plans—both in the government and in private industry. The objective sought by the planners is full employment and high productivity not only by means of large-scale public improvements but through encouraging private industry to function effectively. The subject is one that requires study on the part of everyone in industry. In this issue (p. 24) appears the first of a series of special reports on this subject to industry. . . . Need for postwar planning was emphasized at a meeting conducted last week by the American Management Association (p. 27).

SMALL PLANTS More than a billion dollars in war contracts have been placed with small plants during the past two months (p. 29) and this trend is being accelerated. For example, small manufacturers in Northern Ohio are to have the benefit of a clinic on Jan. 27 in which their problems will be analyzed (p. 41). S. 356, introduced last week by Senator James M. Mead, would "aid small independent business of the country by the collection and dissemination of knowledge of business management and its application of specific problems and opportunities, that the American system of free enterprise may be strengthened, and that individual small business may be continued at a profit both to the businessman and the community." The Mead bill would set up a field organization under the Department of Commerce somewhat similar to the county agent of the Department of Agriculture, designating men of experience to give counsel and aid to small manufacturers (p. 23).

MISCELLANEOUS Iron and steel producers now may use AA-1 rating to obtain repair and maintenance materials (p. 23). . . . Plans have been formulated to replenish copper warehouse stocks (p. 39); metallic bismuth has been placed under complete control. . . . Garden and certain hand tools are subject to a simplification order (p. 29); a United States mission is studying the North African economy; clearing house has been established to locate idle resistance welding equipment and put it to work. Ways to increase production of essential mining machinery are under study (p. 28). . . . A guide for

engineers and designers, for use in specifying compositions for brass and bronze castings is contained in a down-grading chart issued by the War Production Board Conservation Division's specifications branch (p. 38).

FOOD The Truman committee last week issued a report following its investigation of the food situation. Among other things, it objected violently to the proposal of the Office of Civilian Supply calling for a drastic reduction in the manufacture of farm machinery. At a time when farm labor is scarce and when serious food shortages are threatened, the Truman committee holds that production of farm machinery, as recommended by the Department of Agriculture, should be sufficiently high to support efficient operation of the country's farms (p. 14).

TECHNICAL The huge amount of steel and alloys involved in production of synthetic rubber is immediately apparent when examining the illustrations accompanying Professor Macconochie's description of synthetic rubber production at a typical plant (p. 46), Section 10 in STEEL's series on conservation and substitution.

West Shea describes an integrated handling system that has important possibilities for increasing the efficiency of materials handling operations in many plants. Equipment (p. 52) is unusually flexible in application.

J. A. Merryman tells how underwater resistance welding is being employed to save critical tin by eliminating soldering operations (p. 56). At the same time, a better joint is produced since full flexibility of standard cable is retained in making electrical connections.

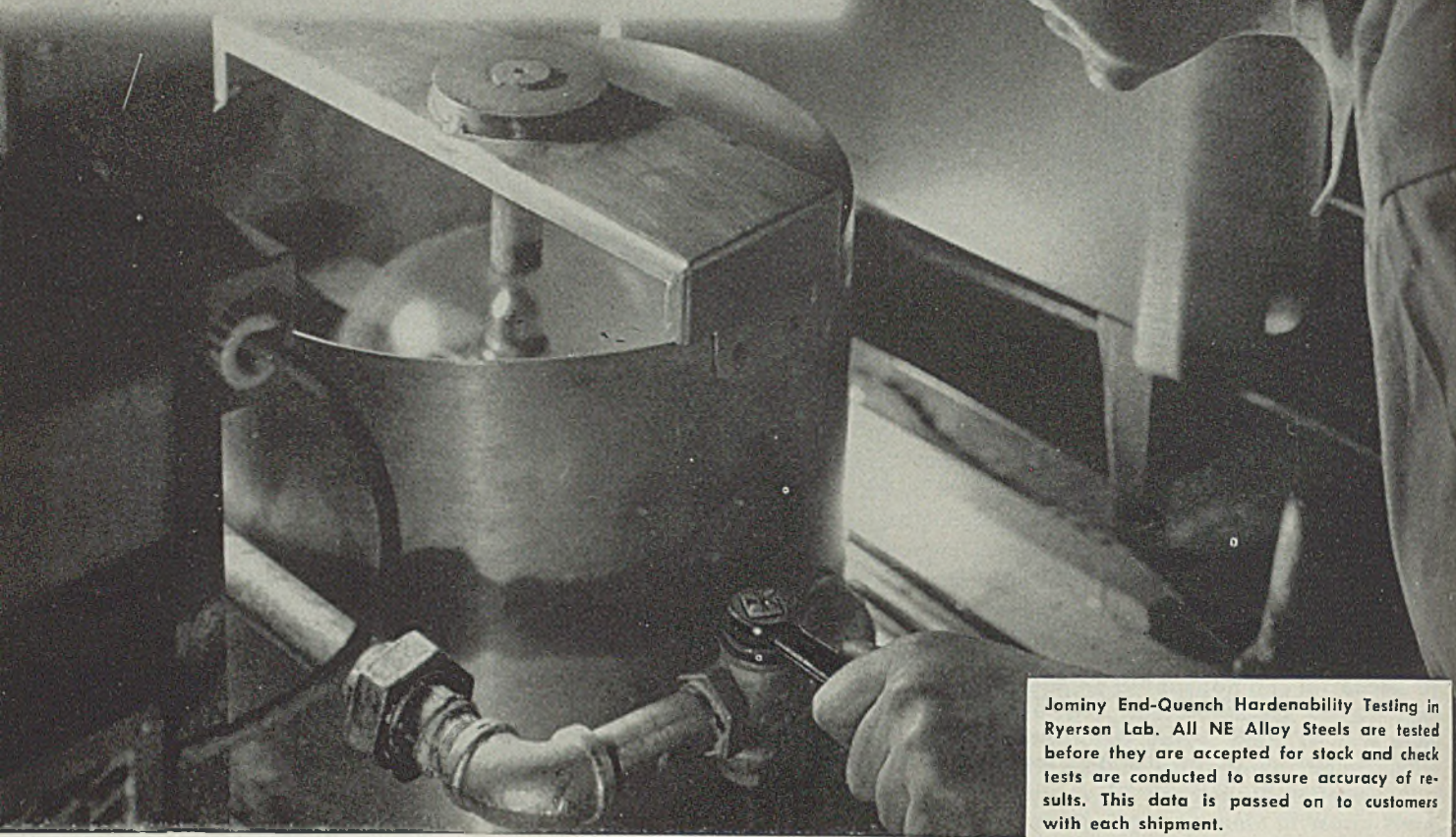
Standards for surface condition and appearance of machined metal surfaces are described by Walter Mikelson (p. 62) who details practice at General Electric as developed by considerable investigation of the many factors involved.

Increasing industrial importance of South America makes the story of a Brazilian pipemaking plant timely. Gaston A. Maigne presents information of ores available, equipment and procedure. Plant facilities include four blast furnaces, centrifugal casting shop, gray iron foundry, power house, machine shop, and the like. Average capacity of furnaces is 128 tons of pig iron daily.

Latest list of the NE (National Emergency) alloy steels is presented (p. 84) along with a discussion of the end-quench hardenability test by its originator, W. E. Jominy.

SWITCH TO NE STEELS

...with Assurance



Jominy End-Quench Hardenability Testing in Ryerson Lab. All NE Alloy Steels are tested before they are accepted for stock and check tests are conducted to assure accuracy of results. This data is passed on to customers with each shipment.

NE Alloys in Ryerson Stocks

Write for New Booklet

New Technical data — including heat treatment response—is available on NE (National Emergency) Steels. Ryerson tests all NE Steels in stock. This test information is furnished with each shipment of that particular NE Steel. Thus, users can choose which of the lean-alloy steels will best replace the steels of high alloy content previously used.

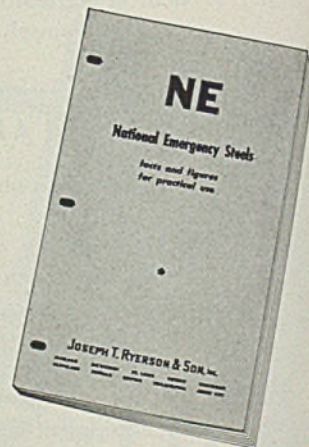
Jominy End-Quench Hardenability Tests, standard for NE Steels, are a quick, reliable method of determining heat treatment response. How this test is made, the results obtained, and how to interpret hardenability in terms of tensile strength, yield point, elongation, and reduction of area, are clearly told in a recent Ryerson publication on NE Steels. Copies are available—call or write your nearby Ryerson plant.

Representative stocks of NE Steels are available at Ryerson for prompt shipment. Turn-over is rapid; withdrawals are heavy, but new stocks are constantly being received. Ryerson engineers and metallurgists will gladly answer any question you may have and help you get started with NE Steels.

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A HANDBOOK ON NE STEELS
New, complete, authoritative! Compiled by Ryerson. If you are adapting NE Steels to your production and haven't a copy, ask for one today!



RYERSON STEEL-SERVICE

A Matter for Congress

In a recent issue of Barron's Weekly, James Truslow Adams defined capital as "that which is left over as a surplus after immediate effort has supplied immediate needs and which may prove to be useful subsequently."

War, of course, always has been destructive of capital. Applying the Adams definition, one may safely conclude that the present global conflict will dissipate more of the "capital" or "surplus" of man's efforts than has any major catastrophe in modern history.

If the foregoing is true, then it would seem that a prudent course for our government to take would be to pursue policies which conserve rather than destroy capital. Unfortunately the administration frequently gives evidence that it is interested more in destroying or impairing capital than in conserving it.

A case in point is the limitation of salaries, if not total incomes, to \$25,000 per year. Inasmuch as nobody contends that this is a revenue measure, it can be justified only as (1) a temporary wartime expedient calculated to improve national morale or as (2) a social reform, constituting an important first step in a program of changing our economic order.

If the White House espouses salary limitation for the first-named reason, it is doing so in response to the demands of certain labor union leaders who proposed it prior to the time the administration gave it its blessing. If the White House is promoting salary limitation for the second reason, then it is following in the footsteps of the American Communist Party which included a 100 per cent taxation of all incomes above \$25,000 as a plank in its 1928 platform.

In either event, the administration is playing with dynamite. Limiting incomes leads to asking the individual to work according to his ability and to receive according to his needs. This is the ideal which Russia adopted, tried and discarded after it had failed.

Limiting salaries is an attack upon the capitalistic system. It is a matter for Congress, not for an off-hand directive from the White House.

E. L. Shaner

Editor-in-Chief

Higher Production Quotas Asked for Farm Tools

Demand for more produce, labor scarcity, and 23 per cent new equipment quota pose serious problem. Senate committee recommends "adequate" program

DRASTIC reduction in the farm labor supply and sharply increased demands for farm produce have posed a serious problem to the Department of Agriculture and the Office of Civilian Supply. That problem is, simply: Shall restrictions on the production of farm machinery and equipment be relaxed

The Office of Civilian Supply was sharply criticized last week by the Senate's Truman committee investigating whether or not sufficient steel and other materials have been allocated to agricultural output. The committee reported the country faces a grave food shortage this year and next because of the limitation on the production of farm machinery and placed the responsibility squarely on the Office of Civilian Supply.

To attain 1943 food production goals, the Department of Agriculture recently estimated that farmers would need new machinery to the extent of 50 per cent of 1940 production, and said that 38 per cent would be an absolute minimum.

The Office of Civilian Supply regarded these figures as extravagant and recommended to the War Production Board that quotas be set much lower and that the production of repair parts be increased.

Output Limited

On this recommendation, WPB in Limitation Order L-170 restricted the manufacture of new machinery to 20 per cent, on a tonnage basis, for the year ending Oct. 31, 1943. Production of repair parts was set at 130 per cent for the same period. Translated later by the Office of Civilian Supply to dollar sales volume on 1940-41 average, this represented 23 per cent for new machinery and 137 per cent for repair parts.

The 137 per cent quota for repair parts then was raised to 167 per cent, an action necessitated by the fact that some increases for repair parts were allowed in 1942 and the 137 per cent quota was not sufficient to give the required increase in volume.

Farm leaders have insisted these quotas are inadequate to the task at hand—

producing more food with less help. They admit they got along fairly well under restricted quotas in 1942, but point out that a considerable quantity of farm machinery was available from dealers' inventories and that the labor situation was not nearly as critical as it will be in 1943.

Increasing acuteness of the food production problem already has necessitated several relief measures:

1. Farm machinery builders will be permitted to build their full 1943 quotas within the next several months, thus

clearing the way for a possible increase in quotas later this year.

2. Selective Service eased draft regulations for farm labor and made deferments for farm workers more liberal.

3. L-170 was amended to lift restrictions on the production of certain farm equipment items.

The Truman committee's report charged that although farmers are being asked to exceed 1942's crop by 4 per cent, "the farm machinery program for 1943 has been made the red-headed stepchild of the war production effort—despite the fact that food as a weapon is equal in importance to guns, tanks and planes."

To alleviate the machinery shortage the committee proposed:

That Food Administrator Claud R. Wickard's determination of nonfood materials needed for the food production program be given "maximum consideration in allotting materials."

That farm machinery now scheduled for manufacture during the year ending Oct. 31, 1943, be completed instead by June 30. This in effect would



Production of two-bottom tractor plows, widely used on most medium-size farms, has been curtailed from 68,000 produced in 1942 to 16,000 this year

amount to a 33 1/3 per cent production increase.

That for the year beginning July 1, "a new and more adequate program for farm machinery production" be put into effect.

The committee held that the Office of Civilian Supply "erroneously regarded farm machinery as semiessential," and declared that farm machines are the machine tools of agriculture.

The report said: "We should take warning from the unfortunate experience of 1940 and 1941 when a shortage existed in machine tools for production of combat weapons."

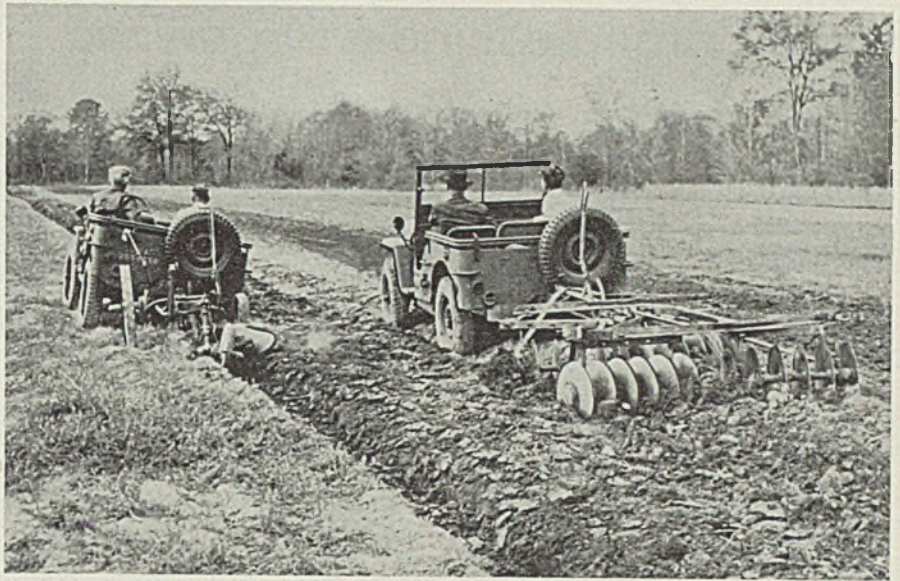
The committee criticized the Office of Civilian Supply's recommendations for restricted output and contended that the iron and steel supply situation, particularly for bessemer and certain low-grade steels which can be used in farm equipment, is not as critical as pictured. The committee said the WPB agency also failed to take into consideration frozen stocks of steel in inventories of manufacturers of nonessential goods and declared that at least part of this steel could be used for making farm machinery.

The Truman group charged that WPB in establishing the quotas had followed the recommendations of the Office of Civilian Supply and ignored those of the Department of Agriculture and the Equipment Branch of WPB, both of which, it said, were better qualified to ascertain needs.

As with escort ships, rubber and aviation gasoline, the problem on farm machinery has been a lack of steel. But unlike ships, rubber and fuel, WPB apparently has been assailed by doubts as to whether the farm machinery requested by the farm leaders and Department of Agriculture is really needed. They believe the farm people may be merely playing safe in their estimates.

Farm equipment manufacturers, WPB officials suggest, are backing increased quotas because they want to keep their dealer organizations intact. The machinery manufacturers, however, have taken no stand, at least publicly, in the matter. They are accepting WPB's limitation order and utilizing steel in accordance with it. Most of the major concerns have enough war materiel contracts to keep their plants fairly busy. The smaller plants are making most of the equipment now being produced under the WPB's policy of concentration.

While most farm leaders expect considerable liberalization in the farm machinery quotas, they point out that remedial action can hardly become effective this year. Machinery for the planting or harvesting of most 1943



After the war is over, the little jeeps, now doing yeoman service for the armed services, are expected to become standard farm equipment. Their versatility in the performance of many farm tasks already has been indicated

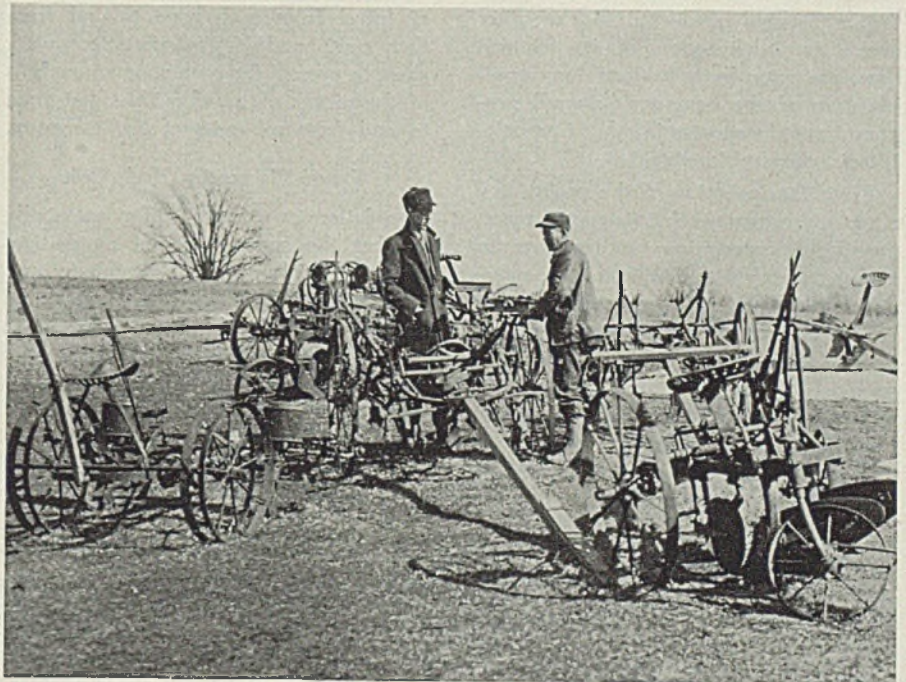
crops normally would be in process of production now.

If quotas are increased, it appears probable that the steel can be allocated. Late in December, WPB assigned the top priority rating of AA-1 to delivery of critical materials for both new machinery and repair parts.

While the limitations on output of types of farm machinery vary and are expressed in percentage figures that mean

little to anyone not intimately connected with the industry, some idea of the curtailment under the present program may be obtained from the following figures:

Tractors will be reduced to 37,000 from 170,000 in 1942; one and two-row corn pickers to 5000 from 15,000; small combines to 17,000 from 36,000; grain drills to 6700 from 26,000; manure spreaders to 7130 from 46,000; two-bottom tractor plows to 16,000 from 68,000.



Many a farmer is regretting that he did not take better care of his equipment when it could be obtained with only a down payment. Machinery left in the open during all kinds of weather deteriorates rapidly. The question now before the Department of Agriculture and the OCS is how much steel to allot for repairing old equipment, and how much for building new

How Carnegie-Illinois Organized To Conserve Manpower Resources

FOR years the only problems of transportation that have been of interest to steelmakers have been those encountered in the receiving of raw materials, and the shipment of finished products. Today, with the nation at war, another phase of the transportation problems has caused them considerable concern. This pertains to the movement of workers to and from their places of work.

The rubber shortages early in 1942 made industry generally aware that large numbers of its employes live more than a normal walking distance from plants. Further, it was obvious that adequate transportation facilities were not available to replace the automobile. These realizations convinced everyone that the automobile, which had been considered by some as an American luxury, was now in reality an industrial necessity and a public trust.

Surveys in Three Districts

In clarifying these general assumptions, the Carnegie-Illinois Steel Corp. developed transportation surveys—one in the Pittsburgh area, one in the Mahoning valley district at Youngstown, and one in the Chicago district. The Pittsburgh (or Allegheny county) area survey was identical in organization and technique to the surveys conducted in the other areas. Any delineation of its features therefore may be considered as representative of the company's overall program or of the surveys in other Carnegie-Illinois geographic districts.

From the inception of the project the company recognized that its part in meeting the transportation problem was to gather and tabulate data and to co-operate with other industrial, commercial, civic and governmental groups in effecting a community answer. While the problem of collecting, calculating and analyzing information from the 125,000 employes presented certain mechanical

difficulties, the technique employed can be utilized by any company, whether employing large or small numbers of workers.

Representatives of the company concerned with this problem recognized at the outset that certain conditions would have to be met for the survey to achieve its purpose. It should be objective, allowing as little chance as possible for individual opinion. It should be valid, minimizing individual error. It should be economical in terms of the large number of employes involved. Moreover, it should furnish sufficient information to indicate answers to travel needs in relation to new problems as they might arise in a constantly changing travel pattern. These needs might be community-wide, or they might exist only within the company.

After considering these factors, four forms were adopted as constituting the basis for constructing and analyzing the transportation picture within the company; namely, a questionnaire suitable for machine tabulation and sorting to be filled in by the individual employe; a map of Allegheny county, which includes the city of Pittsburgh, divided into zones; a summary sheet to establish for each unit in Allegheny county a picture by method of travel of the degree and kinds of travel from each zone to and from that unit; and a transportation work sheet to present for each zone an analysis of the means of travel within that zone to and from all units of the company.

Travel Picture for Each Unit

The latter two forms differ essentially in that the summary sheet emphasizes the travel picture for each company unit relative to all of the zones, while the transportation work sheet emphasizes the existing patterns of travel for one zone relative to all of the company's county units. (STEEL regrets that due to time limitations all of these forms can-

not be reproduced, but the reader will readily perceive their composition from text).

Since the co-operation of employes for accurate, complete information was important, the following statement was furnished each employe with his questionnaire:

"We are engaged in an all-out war effort, and the many problems related to Victory take precedence over all other considerations. Our personal affairs become secondary. The problem of public and private transportation must be judiciously weighed against the vital necessity of moving men and war materials from one location to another. It is expedient, therefore, that we be prepared to meet whatever conditions might be imposed upon us by tire shortages, gas rationing, and even restrictions on the movement of vehicles as they affect the transportation of war equipment.

"Only by taking immediate steps will each employe be able to cope adequately with this issue; and so that we may be ready to meet whatever conditions may be imposed upon us by such transportation restrictions, this questionnaire has been developed to assist you in solving our mutual problem. You are requested, therefore, to answer each of the following questions accurately and completely."

Zone Map Is Essential

The zone map is an essential part of the survey, because it enabled the translation of the location of a worker's home to a geographic unit, the boundaries of which were determined by area relations to public carrier, highway and street transportation patterns. The Allegheny county area, including the city of Pittsburgh, was divided into 99 zones—townships, boroughs, and similar restricted areas. Each of the zones was designated for convenient reference by a number. When the questionnaires were distributed, maps showing these numbered zones were posted on plant bulletin boards to facilitate the employe's determining his area of residence, and a list of the zones together with their designation numbers was printed on the back of the questionnaire card. The same card, except for the zone lists printed on the back, was used in the Youngstown and Chicago surveys.

Each employe filled in his own ques-

SUMMARY OF EMPLOYE TRANSPORTATION SURVEY—ALLEGHENY COUNTY PLANTS

(Industrial Relations Department, Carnegie-Illinois Steel Corp.)

	Clairton	Duquesne	E. Thomson	Homestead	Schoen	Howard	Carrie	Irvin	Isabella	Wood	City office	Total	% Of Grand total
A—Employes walking to work	2,310	3,381	2,714	2,711	251	94	413	22	218	147	71	12,332	31.85
B—Employes using private automobiles	3,231	1,784	979	2,433	223	59	216	2,153	101	155	220	11,554	29.84
C—Employes riding street cars	12	767	1,177	4,103	77	108	223	1	88	44	1,097	7,697	19.88
D—Employes riding trains	4	1	107	17	...	1	2	1	...	1	208	342	.88
E—Employes riding buses	1,047	633	288	1,121	12	26	11	972	3	116	588	4,817	12.45
F—Combination of above	261	261	312	746	31	9	48	208	9	34	58	1,977	5.10
TOTAL	6,865	6,827	5,577	11,131	594	297	913	3,357	419	497	2,242	38,719	100.00

WORKERS' TRANSPORTATION

tionnaire. This had a two-fold advantage: In the first place the worker, in giving serious thought to his own problem, became more conscious of the general transportation problem. In the second place, this method necessitated only one writing of each card. It was not necessary to recopy the information for tabulation.

The questionnaire required, as a means of identification, that each individual give his name, badge or check number, home address, plant and department. The other essential information requested may be classified under four general questions:

1. Where does each employe live in relation to his work? Each employe indicated the designation number of his zone of residence in the proper space at the left side of the form. He determined this number by consulting either the back of the questionnaire card or the zone map

on the plant bulletin boards. With his zone number of residence known, as well as the name of his plant, the terminal points of an employe's daily line of travel were established in a form that could be readily tabulated. Thus, the trip of an employe living in Duquesne and working in Homestead became, in tabular form a trip from zone 32 to zone 35.

2. At what time of day does the employe travel to and from work? The questionnaire required that the employe indicate, by checking opposite the proper item, whether he works a steady shift, a rotating shift, or an irregular shift. The employe also inserted the a.m. or p.m. hour at which he started work on the day of the questionnaire and the time (excluding overtime) at which he expected to finish. These items of shift and time permitted setting up flow lines of travel for any part of the

24-hour cycle, whose stability could be determined by taking into consideration which type of shift—steady, rotating, or irregular—each plant group of employes ordinarily works.

3. How does he travel? Each employe "x"ed in columns headed "To Work" and "From Work" his usual means of travel; viz., walking all the way, train, bus, street car, automobile, or other—the last, by naming the means. From this information obtained in the poll, it was found that approximately one-third of the employes walk all the way to work, approximately one-third use public carrier service, and the remaining one-third drive or ride in private cars. Obviously, the third group, the automobile users present the critical and immediate problem. The walking group is no problem, while the bus, train, and street car riders are significant only to the extent that additional workers move into a community to take up residence for new war jobs, to the extent that public carrier service might be decreased in the future or to the extent that motorists change to public carrier riding habits.

4. What adjustments can be made to assure the continuation of adequate worker transportation? The answer to this question is provided by the information supplied by the worker in the rest of the questionnaire:

"Factors of Convenience"

a—Spaces were printed on the form in which the worker checked whether he lives "less than 1 mile," "1 to 2 miles," or "over two miles" from each of three carrier boarding points: railroad station, street car line, and bus line. This part of the form made known the factors of convenience in terms of the various carrier's availability to the worker.

b—The worker who drives his own auto regularly or in turn with other auto owners, by stating how many others regularly ride to work with him and how many additional workers his car could carry, enabled the company to determine the "space-efficiency" of cars as they are now being used and the "space availability" in cars if the necessary provision can be made for "sharing the ride."

c—The trend of decreased automobile use was determined by the worker checking in the proper block whether his tires would last "less than six months," "six months to one year," "1 to 1½ years," "1½ to 2 years," or "over two years" assuming that his present driving practices would be continued.

d—The future demand for space in public carriers was determined by the car user's indicating the transportation

(Please turn to Page 110)

EMPLOYE TRANSPORTATION WORK SHEET

Carnegie-Illinois Steel Corp., Pittsburgh District

GENERAL OFFICE ZONE 34		HOWARD AXLE WORKS ZONE 35	
A 31	D 0	A 0	D 0
B 0	E 0	B 0	E 0
C 3	F 0	C 2	F 0

CLAIRTON WORKS ZONE 36		SCHOEN WHEEL WORKS ZONE 37	
A 0	D 0	A 0	D 0
B 1	E 2	B 1	E 0
C 0	F 0	C 0	F 0

DUQUESNE WORKS ZONE 32		IRVIN WORKS ZONE 38	
A 0	D 0	A 0	D 0
B 9	E 0	B 0	E 1
C 11	F 0	C 0	F 1

EDGAR THOMSON WKS ZONE 39		ISABELLA FURNACES ZONE 39	
A 0	D 0	A 0	D 0
B 3	E 0	B 0	E 0
C 3	F 0	C 0	F 0

HOMESTEAD WORKS ZONE 33		WOOD WORKS ZONE 33	
A 1	D 0	A 0	D 0
B 7	E 3	B 0	E 0
C 67	F 1	C 0	F 0

CARRIE FURNACES ZONE 38		TOTAL	
A 0	D 0	A 32	D 0
B 0	E 0	B 21	E 6
C 2	F 0	C 88	F 2

LEGEND	
NUMBER OF EMPLOYEES WALKING TO WORK	A
NUMBER OF EMPLOYEES RIDING PRIVATE CARS	B
NUMBER OF EMPLOYEES RIDING STREET CARS	C
NUMBER OF EMPLOYEES RIDING TRAINS	D
NUMBER OF EMPLOYEES RIDING BUSES	E
NUMBER OF EMPLOYEES RIDING COMBINATION ABOVE	F

SUMMARY	
NUMBER OF EMPLOYEES USING PUBLIC TRANSPORTATION (C-D-E-F)	96
NUMBER OF EMPLOYEES USING PRIVATE TRANSPORTATION (B)	21
POSSIBLE INCREASE ON PUBLIC TRANSPORTATION (B-ANY OTHER)	21
PER CENT OF INCREASE	21.8

Zone chart compiled in survey of transportation facilities

Canadian Steel Strike Cuts Output To Less Than Half of Capacity

TORONTO, ONT.

STRIKE of 10,000 steelworkers at plants of Algoma Steel Corp. Ltd., Sault Ste. Marie, Ont., and Dominion Steel & Coal Corp. Ltd., Sydney, N. S., last week reduced the rate of steel ingot production in Canada to about 40 per cent and pig iron to 46 per cent. Algoma workers walked out Jan. 12 and were followed by the Dominion's Jan. 14. A minimum hourly wage of 55 cents, with bonus based on changes in cost of living is demanded; also, recognition of the union as bargaining agent. Government agencies are seeking to mediate.

Late last week it appeared that employes of the Steel Co. of Canada Ltd., Hamilton, Ont., would make the same demands. If they go out about 90 per cent of steel capacity will be tied up.

Some steel consumers have sufficient material for three to four weeks while others have only enough for a week to ten days; a few depend on immediate supply.

The strike-bound companies are the principal steel producers in Canada, Algoma being the largest manufacturer of structural steel and rails. The Dominion works specialize in rails, plates and other heavy items, and also produce through subsidiary plants special war materials. Closing of the Algoma mills may be reflected in production of rolled material by Steel Co. of Canada Ltd., Hamilton, Ont., which has been taking ingots and pig iron from Algoma to supplement its own steel.

Three blast furnaces at Sydney and four at Sault Ste. Marie were idle. Steel Co. of Canada Ltd., has its three stacks blowing with output about 2000 tons per day, all required for its own use. Canadian Furnace Co., Port Colborne, Ont., has two stacks blowing on foundry and malleable merchant iron, at about 600 tons daily.

In December, with all 12 blast furnaces blowing, production was at an average daily rate of about 5600 tons. Since last June Algoma and Canadian Furnace have been the only sources of merchant iron and have been producing at about 30,000 tons monthly.

Lackawanna Strike Settled

A threat of a major strike at the Bethlehem Steel Co.'s Lackawanna Buffalo plant was halted last Wednesday as company and union officials reached an agreement on the wage dispute which in-

involved electrical maintenance workers.

The union declared 3000 men had participated in the strike, including employes in other departments. Edward F. Entwisle, general manager, estimated the number of men in the walkout as 800. A settlement was reached at a conference of company and union officials and War Production Board representatives.

The strike developed when three electrical workers objected to a wage rate schedule fixed for a job on an ore bridge. The settlement satisfied them. Mr. Entwisle did not disclose other terms. Collective bargaining agreement signed Aug. 10 will remain in effect.

Foundry workers at Plant No. 2 of the Wright Aeronautical Corp., Paterson, N. J., returned to their jobs Jan. 18, after an 8-day strike, following certification by the National Labor Relations Board of the CIO as collective bargaining agent for all workers in Wright plants. The strikers, an independent group, had demanded the exclusion of the CIO from any conference on its protest over the reported reduction in the incentive bonus scale.

Strikers at the Otis Works of Jones & Laughlin Steel Corp. at Cleveland returned to work pending study of a wage dispute by the United States Conciliation Service.

Four other strikes in the Cleveland area were tentatively settled by federal conciliators. These included: E. F. Hauserman Co., making steel airplane landing mats and deckhouses; Triplex Screw Co.; Grabler Mfg. Co.; and Fulton Foundry & Machine Co.

Western Pennsylvania Miners, Operators Agree on 6-Day Week

Way was cleared for the operation of commercial coal mines in Western Pennsylvania on a six day a week basis with the signing of an agreement between the Western Pennsylvania Coal Operators Association and the United Mine Workers of America, it was announced at the office of the association on Jan. 14.

The agreement covers all member mines of the association and will affect over 28,000 miners producing about 800,000 tons of bituminous coal a week in Allegheny, Westmoreland, Armstrong, Butler, Mercer, Lawrence, Beaver, Washington, Fayette and Greene counties.

The agreement, which is a supplement to the Appalachian agreement, pro-

vides that all individual mine workers working in excess of 35 hours in any one week, beginning on Monday of each week, shall be paid time and one-half for the extra work. Up to the present, mine work has been limited to a five-day week of 35 hours.

The operators' request for price increases to compensate for the increased operating costs due to premium pay for the sixth day is now pending before the Office of Price Administration.

Supreme Court Holds NLRB Must Hear Violence Charges

United States Supreme Court last week held the National Labor Relations Board must consider charges of violence and misconduct on the part of a union in ordering the board to reopen the case the Michigan Electric Co. and the International Brotherhood of Electrical Workers.

The court was divided five to three, with Justices Black, Douglas and Murphy dissenting.

Majority opinion, written by Justice Jackson, said:

"The process of presenting cases to it (the board) must be kept free from forces generating bias or intimidation. Dynamiting or display of force by either party has no place in the procedures that lead to reasoned judgments.

"The influence of lawless force directed toward parties or witnesses to proceedings during their pendency is so sinister and undermining of the process of adjudication itself that no court should regard it with indifference or shelter it from exposure and inquiry."

Lawrence A. Appley Appointed Executive Director of WMC

Lawrence A. Appley, vice president, Vick Chemical Co., was appointed executive director of War Manpower Commission, Paul V. McNutt, chairman, announced. The executive director holds complete administrative authority over all phases of staff services, planning, and operations.

Mr. Appley, who served as special assistant to the Secretary of War on civilian personnel, joined the commission Dec. 30 as director of the placement bureau. Arthur S. Flemming, civil service commissioner, served as acting executive director. He will continue as a member of the War Manpower Commission and as chairman of the Management Labor Policy Committee.

Weirton independent union, whose membership consists of employes of the Weirton Steel Co., has been incorporated under laws of West Virginia.

Koppers Lights Blast Furnace; Building More Coke Ovens

KOPPERS United Co., Pittsburgh, blew in its second reconditioned and enlarged blast furnace at Granite City, Ill., Jan. 16. Capacity of the furnace, which had been idle since the summer of 1930, is 600 tons per day, an increase of 100 tons over its prior output. The other reconditioned furnace, idle since 1932, was lighted in the fall of 1941.

Both furnaces, formerly part of the St. Louis Gas & Coke Corp., were rebuilt and are being operated for the Defense Plant Corp. by the Koppers blast furnace division. Some of the iron is being delivered in ladle cars to Granite Steel Co., a short distance away. Ore from the northern ranges is being used, with as much Missouri ore as is available.

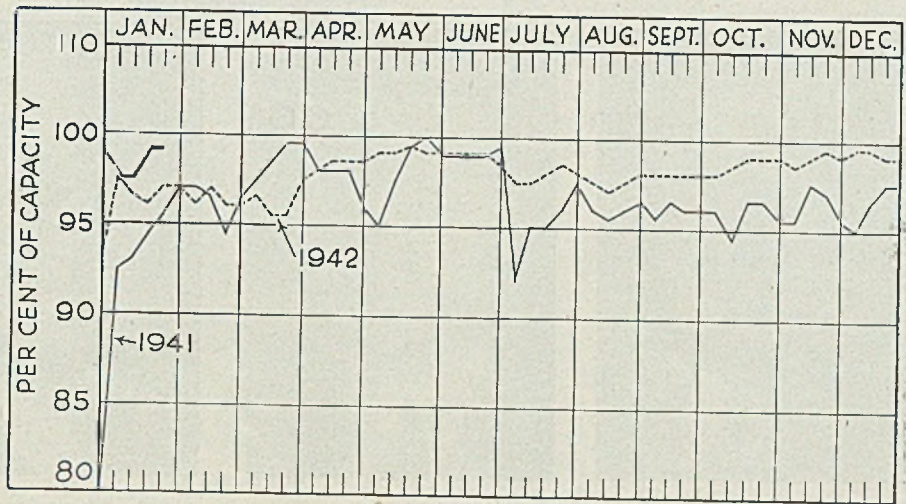
Koppers Co., Pittsburgh, is in charge of design and construction of a modern coke plant, also for Defense Plant Corp. It will consist of 49 ovens and equipment for recovery of all by-products. It is scheduled to go into operation in February.

Completion of a portion of the first metallurgical coke plant on the West coast also was announced Jan. 20 by Koppers Co.

Batteries totaling 90 Koppers-Becker coke ovens of latest design and equipment for recovery of all usual by-products are included. The ovens will furnish more than 900 tons of coke daily for the blast furnace of Kaiser Co.'s steel mill at Fontana, Calif. Coal was charged on the first battery of ovens in December. Wherever possible concrete and wood were used in the construction, with a consequent saving of steel.

By-product equipment provides for recovery of tar, ammonium sulfate, benzol, toluol, xylo, solvent naphtha and phenols, including the extraction of phenol from waste liquors by the Koppers dephenolization process. This chemical equipment was erected outside wherever possible. The arrangement is such that it may be readily expanded with additional units if desired.

Illinois Institute of Technology dedicated its new \$250,000 Metals and Minerals Research building, Jan. 11. The building is the first of seven modern functional units planned for the \$3,100,000 campus development. Foundry division is equipped with two cupolas, a bessemer converter and two electric furnaces.



STEEL INGOTS . . . STEADY

PRODUCTION of open-hearth, electric furnace and bessemer ingots last week remained at 99 per cent. Two districts made gains, one declined and nine were unchanged. A year ago the rate was 97 per cent; two years ago it was 95½ per cent, both computed on the bases of capacity as of these dates.

Chicago — Up ½-point to 102½ per cent, highest since the week of Dec. 26, when the figure was the same. Scrap is adequate and furnace repair is the only factor limiting production.

St. Louis — Unchanged at 93 per cent, for the fifth week.

Buffalo — Gained 2½ points to 93 per cent as Republic Steel Corp. lighted its ninth open hearth, other interests remaining unchanged.

Cincinnati — Receded 2 points to 95 per cent. Two interests are operating at 100 per cent to make up tonnage lost during recent high water.

Cleveland — Held steady at 91 per cent, pending completion of open-hearth repairs.

Youngstown, O. — Scrap supply being sufficient and repairs held at a minimum steelmaking continued at 97 per

cent last week, the same rate that has prevailed since the first of the year.

Central eastern seaboard — With sufficient scrap supply steel production continued at 96 per cent.

New England — Operations maintained 95 per cent, with one open hearth under repair.

Pittsburgh — Steel production last week was steady at 97½ per cent, slight shifts in furnaces balancing.

Wheeling — Holding the gain made the prior week, operations were steady at 80 per cent.

Birmingham, Ala. — Pressure for steel holds production at 95 per cent, which has prevailed for several weeks.

Detroit — Necessity for furnace repairs holds production unchanged at 93 per cent.

Steel Situation Greatly Improved, Says Nelson

The steel situation is greatly improved, WPB Chairman Donald M. Nelson declared last week in announcing that the WPB is considering a request from Oil Co-ordinator Harold Ickes for a second pipeline from Texas to Indiana.

Mr. Nelson expressed high praise for the industry's war effort under the direction of Hiland G. Batcheller, head of the Steel Division.

Navy shipyard at Ambridge, Pa., operated by American Bridge Co., United States Steel Corp. subsidiary, will launch its first landing barge for tanks Jan. 28. It will be launched nine months to the day after construction started on the company's new 64-acre shipyard.

DISTRICT STEEL RATES

	Percentage of Ingot Capacity Engaged in Leading Districts		Same week	
	Week ended Jan. 23	Change	1942	1941
Pittsburgh	97.5	None	95	96
Chicago	102.5	+0.5	102	97
Eastern Pa.	96	None	90	96
Youngstown	97	None	86	94
Wheeling	80	None	88	100
Cleveland	91	None	94.5	84
Buffalo	93	+2.5	79.5	93
Birmingham	95	None	90	100
New England	95	None	85	100
Cincinnati	95	-2	88	90
St. Louis	93	None	76	87.5
Detroit	93	None	92	95
Average	99	None	*97	*95.5

*Computed on basis of steelmaking capacity as of those dates.

MEN of INDUSTRY



K. C. GARDNER



RALPH E. KRAMER



LOUIS KAHN



RONALD R. MONROE

K. C. Gardner, vice president, United Engineering & Foundry Co., Pittsburgh, has been appointed to the additional office of general manager. Associated with the company since its organization in 1901, he has been a director since 1911 and vice president since 1928.

Ralph E. Kramer, formerly president H. Channon Co., Chicago, distributor of industrial supplies, tools, machinery and equipment, has been appointed general manager, Suprex Gage Co., Ferndale, Mich. Mr. Kramer is also vice president, National Association of Supply and Machinery Distributors. At one time he was associated with Sullivan Machinery Co. in a sales engineering capacity at Mexico City and later as manager for the Far East, with headquarters in Tokyo, Japan. He then was recalled to the Claremont, N. H., plant of the company where he spent two years on engineering and development research.

Taylor H. Beech, formerly Pittsburgh representative for Darwin & Milner Inc. and Wheeling Bronze Casting Co., is now technical analyst with the Steel Recovery Board, Pittsburgh.

Albert M. St. Germain has been appointed chief industrial engineer, Excel Foundry & Machine Co. Inc., Fall River, Mass.

M. L. Briggs has resigned as vice president, Briggs Mfg. Co., Detroit, to become associated with the real estate department of Briggs Commercial & Development Co.

Samuel J. Kornhauser, attorney, has become executive vice president, National Tool Co., Cleveland. A. J. Brandt, president, has been called to various aircraft plants for engineering and production advice. Mr. Kornhauser has

been associated with National Tool in various capacities since 1916, at which time he reorganized it.

Louis Kahn, for many years secretary-treasurer and executive head of Albert Kahn Associated Architects & Engineers Inc., Detroit, has been elected president. He has been with the organization since 1909. Three new vice presidents are: Sheldon Marston, George H. Miehl and Robert E. Linton. George K. Scrymgeour is secretary and Saul Saulson, treasurer.

Maj. E. W. Senior, director of the Iron and Steel Division of the British Raw Materials Mission, Washington, is a native of Sheffield, Yorkshire, England. He was chairman and managing director of Pond's Forge, Sheffield, and chairman of the Sheffield Forge and Rolling Mills. He joined the Iron and Steel Control in England in 1940, as general director of special and alloy steels, and came to this country for the first time in September, 1942, to assume his present position.

W. A. Neracher, founder of Beaver Pipe Tools Inc., Warren, O., 43 years ago, and president during the entire period, has been elected to the newly created position of chairman of the board. W. A. Phillis, formerly vice president, has been elected president and general manager; M. W. Bechtel, executive vice president and treasurer; C. W. Shafer, vice president, manufacturing; E. R. Barkley, vice president, sales; and R. C. Mellinger, vice president, accounting.

David Hall, 68, Westinghouse engineer since 1908 and active in the electrical industry the past 46 years, has retired. Mr. Hall has headed engineering activities for Westinghouse Electric & Mfg. Co. in the Los Angeles area since 1926. He served as engineer-

ing supervisor until mid-1941, when he was named assistant to Pacific Coast district engineering and service manager and assigned to special work.

Ronald R. Monroe, vice president, J. C. Brill Co., has been elected president, with headquarters in Philadelphia. He succeeds Leslie E. Hess, who has become chairman of the board, replacing Charles J. Hardy, who will continue as chairman of the executive committee. John E. Rovensky has been elected a director, succeeding William J. Harris, resigned.

Curtis H. Barker Jr., materials handling expert of General Electric Co.'s Bridgeport, Conn., works, has been granted a leave of absence to join the Navy Department as technical consultant in its Supply Corps. With headquarters in Washington, Mr. Barker will organize and co-ordinate a centralized material handling activity embracing five bureaus of the Navy. He will also assist in modernizing materials handling methods to expedite movement of all materials.

Peter N. Jansen, former director of manufacturing, Curtiss-Wright Corp., has been promoted to general manager of the Airplane Division, in charge of the division's five manufacturing plants, directing the work from Buffalo. John P. Davey, formerly works manager at the St. Louis and Columbus, O., plants, becomes general manager in Columbus. Mr. Davey succeeds J. A. Williams, who will return to Buffalo to handle contracts with the government and subcontractors.

Raymond F. Evans has been appointed vice president and general manager, Diamond Alkali Co., Painesville, O., plant. Formerly president of Diamond Magnesium Co., Mr. Evans will be suc-

ceeded in that post by A. H. Ingley, heretofore secretary-treasurer and Ohio works superintendent. C. H. Shie has been made vice president in charge of operations.

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J. H. Allen, formerly managing director, Olavarria Trading Corp., New York, has become affiliated with L. W. Minford & Co. Inc., New York, general exporter, as general manager of the company's steel division.

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W. G. Paton, of Cleveland, and W. R. Engstrom, of Seattle, have been appointed vice presidents, Austin Co., Cleveland. Associated with the company since 1919, Mr. Paton became assistant to the general manager in 1938. In addition to being elected a vice president, Mr. Paton has also been made



W. G. PATON

assistant secretary and assistant treasurer. Mr. Engstrom joined the organization in 1925 as a field engineer in the Seattle territory, subsequently becoming assistant to Seattle district manager in 1929 and district manager in 1933. In mid-1940 he was given additional responsibilities of general project manager of the company's navy construction work in the Pacific Northwest.

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Richard E. Palmer, the past year associated with the Aircraft Division of the War Production Board, has been appointed assistant to O. L. Woodson, vice president and assistant general manager, Bell Aircraft Corp., Buffalo. He will be assigned to problems concerning manufacturing processes. He was sales manager for Aviation Mfg. Corp. from 1939 until 1941, and before that was identified with Curtiss-Wright Corp., Stinson Aircraft Corp., and Vernille Aircraft Corp.

William B. McBride, since January, 1940, employed in various capacities by



W. R. ENGSTROM

Bell Aircraft, has been named production manager, succeeding M. E. Roc, who will devote his attention to problems in the tool engineering division of the company.

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Jonas R. Moore, a graduate of the University of Nevada, has been appointed to the research staff of Battelle Memorial Institute, Columbus, O., and has been assigned to the division of chemical research. He was formerly associated with the General Chemical Co., El Segundo, Calif., and General Chemical Defense Corp., Point Pleasant, W. Va.

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Albert C. Delmont has been named research director of the newly organized research and laboratory departments, Douglas T. Sterling Co., Stamford, Conn., management consultants. Mr. Delmont was formerly engaged in consulting work on naval ordnance production.

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T. O. Eaton has been appointed assistant manager of sales, power transformer section, General Electric Co., Pittsfield, Mass. He became associated with the drafting department at the Schenectady works in 1925 and in 1930 was transferred to Pittsburgh as switchgear specialist. He was a member of the industrial sales department at Pittsburgh from 1933 to 1938 when he was transferred to Philadelphia as switchgear specialist.

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Harry M. Coleman, the past four years publicity director, MacFarland, Aveyard & Co., Chicago, has been named vice president in charge of public relations.

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B. F. Cordts, engineer, Cars & Shops, Independent Subway System, New York, was elected president, Eastern Car Fore-

man's Association, at a meeting in New York, Jan. 9. Other officers elected: First vice president, K. H. Carpenter, superintendent of the car department, D. L. & W. R. R., Scranton, Pa.; second vice president, F. H. Becherer, superintendent of the car department, Baltimore & Ohio Railroad, Baltimore; treasurer, T. G. Case, general car foreman, Grand Central Terminal, New York; secretary, Wilson P. Dizard, American Car & Foundry Co., New York.

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B. C. Thompson, Detroit district representative for Electric Furnace Co., Salem, O., has moved his sales offices from 8291 Wisner avenue to 5911 Courville road.

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Rommie B. Smith, since last July assistant coal traffic manager, Illinois Central railroad, Chicago, has been appointed coal traffic manager.

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F. O. Case, Midwest director for International Smelting & Refining Co., has been appointed general manager of Basic Magnesium Inc., Las Vegas, Nev.

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David Hinshaw has been appointed vice president, Institute of Public Relations Inc., New York. Engaged in public relations work more than 30 years, Mr. Hinshaw served the Standard Oil Co. of New Jersey the past four years in a public relations capacity in Latin-American problems.

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Percy E. Rhicard, works tool engineer at the East Springfield, Mass., plant of Westinghouse Electric & Mfg. Co., recently received the Westinghouse Order of Merit for his work in designing tools for production of ordnance equipment for the United States Army.

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Frederick J. Dunkerley, a graduate of Thiel College and the Carnegie Institute of Technology, has been appointed to the research staff of Battelle Memorial Institute, Columbus, O., where he has been assigned to war research in metallurgy.

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John W. Evers Jr., since 1924 secretary, Commonwealth Edison Co., Chicago, has been elected vice president to succeed John F. Gilchrist, who has retired after 55 years' service with the company.

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Thomas S. McEwan, former regional manager, OPM and WPB, Chicago, has announced his return to association with McClure, Hadden & Ortman Inc., Chicago, consulting management engineers.

PRIORITIES-ALLOCATIONS-PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, Dec. 14, 1942

L ORDERS

- L-30-a (Amendment):** Household Utensils, effective Jan. 15. Freezes manufacturers' inventories of pails, buckets and wash tubs. Exceptions to the ban on wholesale transactions include: preferred orders; sales to Rubber Reserve, U. S. Commercial Corp. and Defense Supplies Corp.; and orders of war industries which certify that the products purchased will be used for certain specified purposes. Sales also may be made with specific authorization of WPB granted on PD-556. Order also allows further exceptions to the prohibited use of iron and steel in manufacture of specific articles to include: one- to five-gallon cans designed for storage of oil, gasoline or kerosene, but only for fulfillment of preferred orders or orders from railroads or other common carriers for use in their operations; or if they are of the safety type.
- L-170 (Amendment):** Farm Machinery, effective Jan. 19. Modifies restrictions on manufacture and distribution of farm machinery and parts. Eliminates 3 months' restriction on distributor's inventory of repair parts as well as necessity of filing a "Certificate for Emergency Order" to obtain repair parts. Allows production of repair parts at a rate of 167 per cent of 1940 total.
- L-222 (Amendment):** Floor Maintenance Machines, effective Jan. 18. Postpones curtailment dates on production and assembly of parts for floor finishing and maintenance

machines and industrial vacuum cleaners.

L-236 (Amendment): Hardware, effective Jan. 13. Advances effective date of Schedule No. 1 covering manufacture of builders' finishing hardware from Jan. 15 to March 1, 1943.

M ORDERS

- M-63 (Amendment):** Imports of Strategic Materials, effective Jan. 18. Extends control to about 15 groups of commodities and tightens control over three other products. Zinc dross, scrap and skimmings have been added to List II, containing commodities which once imported, may be sold or processed without restriction under M-63, but are subject to the provisions of other applicable WPB orders.
- M-276:** Bismuth, effective Feb. 1. Provides complete allocation and use control. Prohibits delivery without authorization of WPB, except to: Metals Reserve Co., to other producers, to a distributor (if he does not have an excessive inventory), and to a person whose total receipts during that month total less than 50 pounds. Limits use from consumer's inventory to 50 pounds without WPB authorization.
- M-200 (Amendment):** Milk Shipping Containers, effective Jan. 15. Permits manufacturer during the year ending June 30, 1943, to use 65 per cent of weight of iron and steel used in the production of old type milk cans in preceding like period. Manufacturer may add to that total the difference between the amount of iron and steel he has used in

old type cans since July 1, the amount he would have used if all cans he manufactured had been the new simplified type.

P ORDERS

- P-68 (Amendment):** Steel Plant Maintenance, effective Jan. 19. Grants iron and steel producers AA-1 preference rating for acquisition of repair and maintenance materials. Producers smaller than PRP units may use AA-1 rating.
- P-136 (Amendment):** Scrap Metal Processors, effective Jan. 13, 1943. Extends assignments of A-1-a to AA-2X ratings to Canadian yards. Provides that certifications of experience which must be obtained by each yard from WPB are to be issued by the Scrap Processors Branch of the Conservation Division instead of by the Automobile Graveyard Section of the Conservation Division as formerly.

PRICE REGULATIONS

- No. 4 (Amendment):** Iron and Steel Scrap, effective Jan. 22. Reduces maximum prices on machine turnings and mixed borings and turnings \$1 a ton. Raises prices on shoveling turnings \$1 a ton. Eliminates charges for crushing machine shop turnings and shoveling turnings. Institutes several upward adjustments in differentials between unprepared grades. Raises prices for short-cut electric furnace grades. Increases differential between clean auto cast and unstripped motor blocks from 50 cents per gross ton to \$2.50. Makes certain changes in definitions and specifications.
- No. 69 (Amendment):** Primary Lead, effective Jan. 20. Allows smelters a uniform premium of 25 cents per hundredweight over the pig price for ingots, linked ingots and billets for primary lead, high-grade secondary lead,

OBITUARIES . . .

Henry C. Pierle, 62, secretary and general sales manager, R. K. LeBlond Machine Tool Co., Cincinnati, and internationally known machine tool salesman, died Jan. 14, in that city. Born and educated in Cincinnati, he began as a machine shop hand, being employed in turn by Lodge & Shipley Machine Tool Co., Cincinnati Bickford Tool Co. and the R. K. LeBlond company. He had been associated with the latter 32 years, since 1918 as sales manager. He was past secretary, National Machine Tool Builders' Association.

Otto D. DeHart, 59, southwestern district manager for Pittsburgh-Des Moines Steel Co., the past 30 years, died in Dallas, Tex., Jan. 17.

Harris T. Dunbar, vice president, David Bell Co., maker of automatic screw machines, Buffalo, died in that city, Jan. 15. He was one of the founders of Buffalo Foundry & Machine Co.

Sigmund Herzog, 77, director, Superior Die Casting Co., Cleveland, died in that city, recently.

L. S. Thomson, for 14 years in the general sales department, Alan Wood

Steel Co., Conshohocken, Pa., died in Norristown, Pa., Jan. 16. Before joining Alan Wood he was associated with the Midvale Steel & Ordnance Co., Nicetown, Pa., and before that with the LaBelle Iron Works, Steubenville, O., before its absorption by Wheeling Steel Corp.

Benjamin Rathbun, president, Chemung Foundry Corp., Elmira, N. Y., died Jan. 9.

Charles D. Spalding, 66, who retired in 1940 as assistant superintendent of No. 3 rolling mill, Wisconsin Steel Co., division of International Harvester Co., Chicago, died in that city, Jan. 15. He had served the company 31 years.

Edward J. Schreeter died Jan. 1 at his home in Cleveland Heights, O. He was president, Huber Mfg. Co., Marion, O., and had been president of the Teachout Co., Cleveland.

Andrew J. Fleiter, president, Akron Standard Mold Co. and Electromelt Steel Casting Co., died Dec. 29, in Akron, O. He was also vice president and general manager, Barberton Foundry Co.

Don C. O'Brien, 37, salesman in the Indianapolis office of American Rolling

Mill Co., died in an automobile accident Jan. 14. Associated with American Rolling Mill over 14 years, he worked in the company's sales offices in Detroit, Philadelphia and Chicago before being transferred to Indianapolis.

Ernest B. Prentice, 63, vice president and secretary, Massillon Refractories Co., Massillon, O., died at his home in Aquadale, near Massillon, Jan. 5. With the late William G. Hipp and others, in 1919 Mr. Prentice assisted in the founding of Massillon Refractories Co. and served as vice president and secretary until his death.

Thomas M. Jewell, 74, who retired in 1932 as rolling mill superintendent, Wisconsin Steel Co., division of International Harvester Co., Chicago, died in Orlando, Fla., Jan. 13.

Thomas T. Sullivan, 65, who retired in 1939 as a vice president, secretary-treasurer and a director, Stewart-Warner Corp., Chicago, died Jan. 10, in that city. He had been associated with the company over 25 years.

Col. Harold W. Hudson, 67, chief construction engineer for the Triborough and the Hell Gate bridges, New York, and other important projects, died recently in that city.

Expert Consulting Service Planned; Army Man Now Heads Division

SENATOR James M. Mead, New York, has introduced Senate bill 356 to "aid small independent business of the country by the collection and dissemination of knowledge of business management and its application to specific problems and opportunities, that the American system of free enterprise may be strengthened, and that individual small business may be continued at a profit both to the business man and the community".

The bill directs the Secretary of Commerce to establish a field consulting service, using men experienced in problems of small business and capable of counseling owners in ways to surmount obstacles. It also directs the secretary to develop and conduct research dealing with the basic and current problems of small enterprises. The bill would authorize an appropriation of \$10,000,000 to finance the activities.

The plan visualized in the Mead bill is something like that of the Department of Agriculture's county agents system to assist farmers. The Mead bill first was introduced last year but was not acted on.

Appointment of Col. Robert Johnson as director of the Smaller War Plants Corp., supplanting Lou E. Holland, chairman of the agency since its inception, was announced last week by the White House. The new chairman, who was appointed on recommendation of WPB Chief Donald M. Nelson, is expected to begin his duties this week.

According to WPB officials, he has been considered for the post since last summer. Described as "a very able man . . . highly qualified beyond anyone else who could have been chosen", Col. Johnson is said to sympathize with the problems of small business as opposed to the trend toward collectivism in this country. Before he entered the Army, he was president and chairman of Johnson & Johnson, surgical dressings concern.

Mr. Holland's status in WPB will soon be clarified. He has been offered a position as assistant to Col. Johnson and has indicated that he will accept, since he came to Washington to further the cause of small business.

Iron, Steel Producers Granted AA-1 Rating for Repair Parts

Producers of iron and steel have been granted the use of preference rating AA-1 for the acquisition of repair and maintenance materials, it was announced today by the Director General for Operations.

Previously, such producers were permitted to use an AA-2X rating for certain operating material and an A-1-a rating for other material.

Producers who are PRP units have been notified of this action. Smaller producers are permitted to use the AA-1 rating through an amendment to Order P-68.

at a cost of approximately \$4,000,000.

With National Distillers Products Corp., for the construction and equipment of a plant in Missouri at a cost of approximately \$2,000,000.

With General Electric Co., Schenectady, N. Y., to provide equipment in a plant in Indiana.

With Publicker Commercial Alcohol Co., Philadelphia, for further expansion of a plant in Pennsylvania at a cost of approximately \$2,000,000 resulting in an overall commitment of approximately \$4,500,000.

With the Andrews Steel Defense Corp., Newport, Ky., to provide additional plant facilities in Kentucky at a cost of approximately \$1,000,000. This increase will result in an overall commitment of approximately \$5,000,000.

With Couse Laboratories, Newark, N. J., to provide additional equipment in a plant in New Jersey.

low-grade secondary lead, and antimonial lead. Makes additions to price basing points and a few changes in basing point prices. Permits plumbing houses to determine maximum lead sales prices by adding to the cost of material the percentage of mark-up obtained on Oct. 1, 1941, sales and deliveries.

No. 70 (Amendment): Lead Scrap and Secondary Lead, effective Jan. 20. Makes identical revisions as for primary lead (noted above) and the following: Establishes ceiling of \$3.50 a hundredweight f.o.b. point of shipment, for battery plates sold in single shipments of 8000 pounds; eliminates provision requiring brokers to make a report to OPA on the completion of a brokerage contract; requires only those who sell scrap material and battery lead scrap to a consumer to keep records of the transactions for inspection by the OPA.

No. 159 (Amendment): Concrete Reinforcing Bars, effective Jan. 25. Provides that lump-sum and average-price bids must not be made at prices which are higher than the maximum prices for the different quantities, sizes, and specifications of bars estimated by the bidder to be needed for the job in question. Requires that after the job is completed, contract price must be adjusted so that the total does not exceed sum of the applicable maximum prices for the quantities, sizes and specifications used in carrying out the contract. Makes other minor revisions in the order.

No. 246 (Amendment): Farm Machinery, effective Jan. 13. Permits manufacturers to set temporary maximums for equipment modified since March 31, 1942. Procedure conforms to that established for new and seasonal farm equipment.

No. 302: Magnesium, effective Jan. 20. Establishes maximum prices for scrap and remelt magnesium ingot. Maximum prices for 20,000 pounds or more of remelt magnesium ingot, including transportation costs not exceeding 75 cents per hundredweight, are: 21.50c for Class A, 18.50c for Class B, and 16.00c for Class C ingot. Quantity differentials are: ¼-cent, 10,000 to 20,000 pounds; ½-cent, 1000 to 10,000 pounds; and 1-cent, less than 1000 pounds. Maximum price of magnesium or magnesium alloy content in cents per pound in lots of less than 1500 pounds are: 8.00 for segregated borings and turnings; 11.00 for grade 1 solids and 7.00 for borings and turnings, mixed or contaminated plant scrap with grade 2 taking 2-cent premium; 11.00 for uncontaminated and 9.00 for contaminated obsolete scrap. In lots of 1500 pounds or more add one-cent to above prices.

NEW FACILITIES

A. O. Smith Corp. Awarded \$23,000,000 Contract

War plant expansions and purchases of new equipment were authorized last week by the Defense Plant Corp., which will retain title to the facilities while they are operated by private companies. New contracts and increases in present contracts include:

With A. O. Smith Corp., Milwaukee, to provide plant facilities in Wisconsin at a cost in excess of \$23,000,000.

With County Distillers Products Inc., Cincinnati, to provide equipment in a plant in Kentucky.

With Briggs & Stratton Corp., Milwaukee, to provide equipment for a plant in Wisconsin at a cost in excess of \$900,000.

With General Electric Co., Schenec-

tady, N. Y., to provide additional equipment in a plant in New York at a cost of more than \$1,200,000, resulting in an overall commitment in excess of \$2,500,000.

With Meisel Press Mfg. Co., Boston, Mass., to provide additional plant facilities in Massachusetts at a cost in excess of \$750,000, resulting in an overall commitment in excess of \$1,200,000.

With American Bosch Corp., Springfield, Mass., to provide additional equipment for a plant in Massachusetts at a cost in excess of \$350,000 resulting in an overall commitment in excess of \$3,350,000.

With Indiana Steel Products Co., Chicago, to provide additional plant facilities at a plant in Indiana at a cost in excess of \$250,000, resulting in an overall commitment in excess of \$600,000.

With General Motors Corp., Detroit, for a plant and equipment in Indiana

WINDOWS of WASHINGTON

Postwar planning receives impetus as United Nations take offensive. Many manufacturers already have set up programs for return of peace, including plans for new products and lower costs

IT LONG has been recognized by the administration and by industry in general that planning for the postwar period is an essential activity—and that unless we go into that period with a sound economic program we will invite disorder and even chaos. A lot of such planning has been done by the government. A vast amount of attention has been given to postwar planning by individual industry.

At first it was called post-defense planning. Since Pearl Harbor it has been postwar planning. Now and then newspapers and other publications have carried stories about such planning, notably in connection with speeches by Vice President Henry Wallace, Sumner Welles and others. In the main, however, there has been a more or less general disposition that nothing must be allowed to divert attention from putting our full strength into the winning of the war. Now that the United Nations have ceased giving ground, and are on the offensive, and now that President Roosevelt, in his New Year's message, asked the 78th Congress to plan for the peace, the whole subject is slated to come out in the open. A lot will be heard about postwar planning from this time forward.

Utopia Elusive

Ever since human history has been recorded mankind has sought Utopia. Every once in a while man thought he had found it—only to find to his grievous disappointment that it was not so. Hence it is that a great many hard-headed manufacturers, despite the planning that now is going on, are skeptical about the future. They recall all too well how during the Hoover administration there were to be two chickens in every pot. Then came the Great American Depression. Many manufacturers, now operating their plants day and night on war production, look ahead to the postwar period with fear. Many of their thinking employes, now earning big pay, are haunted by the same fear. The fear is that the war no doubt will bring a boom demand for a period but that subsequently there will come another great depression.

Postwar planning already has developed a pattern, in respect to both government and private planning. The pattern is aimed to bring about full employment and high productivity. It is the

product of a great many minds among whom those who are recognized as sound thinkers predominate.

It would take a rash individual to make any definite promises as to the shape that the postwar economy will take. In the first place, the pattern that finally develops will depend on a great many factors. With respect to our own national economy much will depend on the extent to which the always unpredictable Congress will enact legislation to implement the pattern. Much will depend on who is in the White House after the 1944 election. Too, our national economy in the long-pull period after the war will depend to a considerable extent upon the world economy, and that in turn will depend to a large extent upon the terms of the peace treaty—in which we may not after all have the dominating voice.

As has been stated, many manufacturers already have set up postwar programs. They have evolved new products which they hope to make when materials, machines and labor become available for civilian use after the war. They have developed technological improvements aimed at bringing out their improved products at lower costs. They have prepared plans for selling and distributing after the emergency is past, including such activities as selling throughout Latin America. Many have studied the possible range of products that can be made with their existing facilities so as to be prepared to jump in accordance with the way the wind blows.

Plan New Products

Such postwar planning has been done and continues to be done on a highly-organized basis not only by all large companies but by many small ones. For example, one small manufacturer who always in the past has made one product, and that product only, and who now is making that product for the war effort, has developed not less than eight additional products which he can produce with his existing facilities. A great many other companies have additional strings to their bow so as to be prepared to meet eventualities.

These companies and their employes have no lack of confidence in their ability to stay in business provided that they can find customers for the products they are planning to manufacture in the postwar period. That is the reason for

their fear. They recall what happened after the first world war. First there was a short depression followed by improved business that swelled to boom proportions in 1929—and then came the long depression.

Manufacturers realize that a big demand for peace time goods now is accumulating, also that buyers of war bonds are accumulating a vast amount of purchasing power that will be released when the war is over. They expect a boom after the war. But they fear it may have in it the seeds of a subsequent deep depression, by-product of which will be a vast amount of social discontent.

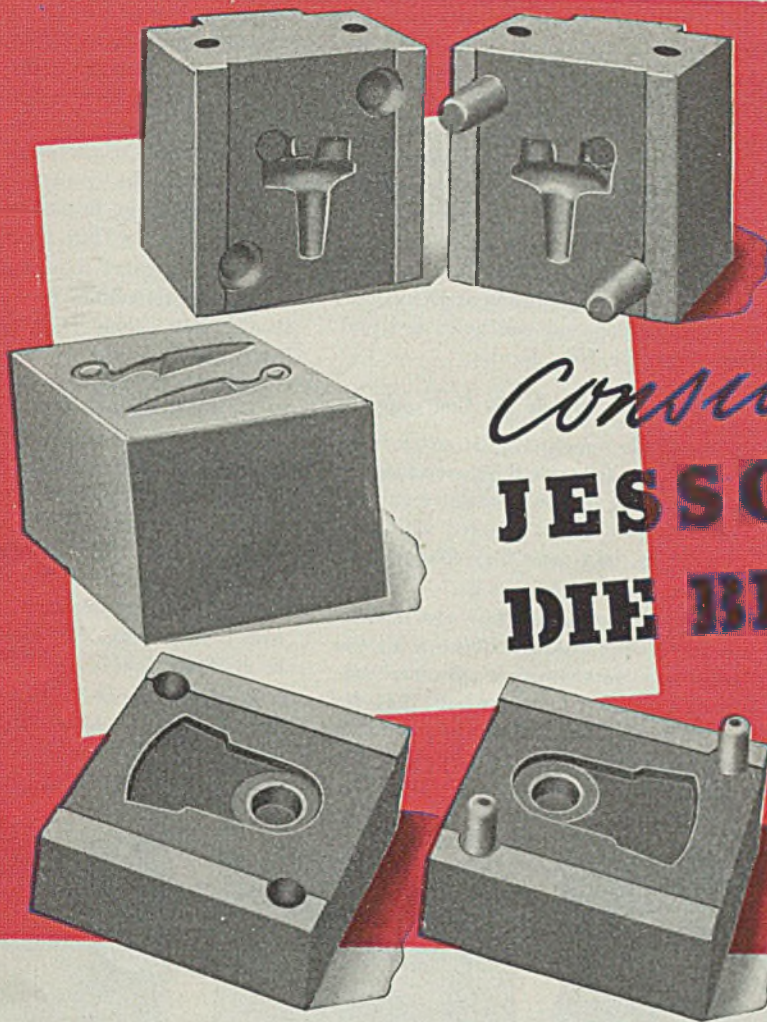
Skeptical of Federal Planning

Manufacturers and their thinking employes have read many stories and articles, and they have heard many radio broadcasts, which have carried assurances that we are not going back to conditions that in the past have been regarded as "normal" but that, rather, we are going into a new world of peace and plenty, not only for the people of the United States, but all the people of the world. This, they have been inclined to feel, is taking in a lot of territory.

Also, they recall some of the strange economic thinking that has prevailed in much of the government during the past decade. They recall the persecution of business, and the increasing extent to which the government has attained power over industry, money and many other factors in our economic structure. They think about the many attempts at "reform", about the false nostrums that have been advanced. The result is that when they hear about government postwar planning they are apt to be skeptical.

On the other hand, a large number of men from business and industry have reversed their opinion about the government. They have gotten acquainted with it and feel friendly and have faith in it. They have come to believe that the government can be counted on to supply the sort of leadership and control that will bring about a sound postwar economy. They have come to believe that the period of persecution and reform is at an end and that from here on we can expect greater liberality and encouragement toward industry.

A lot of water has passed over the dam since the early 1930's. A lot of lessons have been learned. Original prejudices and innate antagonisms have been rudely jarred. Today it would not be possible to have the spectacle of the Temporary National Economic Committee



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Die Blocks for various hot work applications. They are furnished in fully annealed condition to facilitate ease of machining and for subsequent hardening. Each die block is tested to assure thoroughness of annealing, and also carefully inspected for size and workmanship before shipment. They are available in the following types:

TYPE 2B-(LC)

Tungsten Hot Work Die Steels—with low carbon content—for tools subject to heavy battering action where hardness and considerable toughness are required. APPLICATIONS: Brass Forming Dies, Extrusion Dies, Gripper Dies, Heading Dies for Bolts and Rivets, Hydraulic Forging Dies, Plungers, Trimming and Swaging Dies, Upsetting

Dies, also for die casting of aluminum and copper alloys.

TYPE J

Chrome-Molybdenum hot working steels with low carbon content and having extreme toughness and hardness. For dies where lower initial cost is of importance. APPLICATIONS: Drop Forging Dies, Gripper Dies and Open Dies, Mandrels and Rivet Sets, Punches and Plungers.

TYPE JJ

Same as TYPE J with higher carbon content. Recommended for use when wearing qualities are most important and where slight sacrifice

of toughness is permissible. Superior to regular straight chromium Hot Work Steels. APPLICATIONS: Bull Dies, Hot Bending Dies, and also same applications as TYPE J.

TYPE DICA-B

Developed especially for die casting of aluminum and aluminum base alloys. It is highly resistant to abrasion and corrosive action. Can be air hardened without excessive scaling. APPLICATIONS: for die casting of Aluminum and Aluminum Base Alloys, it is also used for Drop Forging Dies, Header and Gripper Dies, Hot Press Dies.

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WINDOWS of WASHINGTON

hearings repeated. The war has taken all the meat out of the theory that "bigness is badness." There now is a general realization in government that without our private industry, large and small, without our business management, without the ingenuity, the "know-how" and determination of our private industrial leaders, we would not be producing for war as we are. It has taken this war to prove that our private industry is the instrument upon which we have to rely to get out production, step up employment and create purchasing power. It has taken this war to upset many crackpot ideas that made headlines over so many years.

While the war has been a factor of great weight in proving what makes the wheels go round, there is another factor that should not be ignored. In England it long has been said that if you wanted to make a conservative out of a radical all you had to do was appoint him to the post of Prime Minister. The same thing holds good here. Most men appointed to important government posts

are honest, competent and patriotic Americans. It may take them a while before they arrive at a thorough understanding as to what policies are best for the country but as they go along they acquire experience. It is an encouraging sign that less and less politics have featured the Roosevelt administration as it has gone along. Today one finds almost as many Republicans as Democrats in Washington—and one hears less and less about the New Deal.

Familiarity Breeds No Contempt

One of the reasons why so many business men do not trust the government is that they are not acquainted with it. When they do get acquainted with government, in most cases they change their attitude.

Time and again has this been demonstrated. Take the experience with the Department of Commerce's Business Advisory Council. Organized in 1934 for the purpose of obtaining closer contact between business and government, the council has a unique record. It accom-

plished a good many things but it now can be seen that its primary merit was that it served as a school in which men from industry learned about government. Its "graduates" constituted a reservoir from which the government selected many of the men in charge of much of our war effort. They include such figures as:

Donald M. Nelson, James W. Young, W. L. Batt, John D. Biggers, Mason Britton, W. Gibson Carey Jr., C. S. Ching, W. L. Clayton, R. R. Deupree, W. Y. Elliott, Charles T. Fisher Jr., Ralph E. Flanders, W. A. Harriman, Charles R. Hook, Roger D. Lapham, Thomas B. McCabe, George H. Mead, Robert L. Mehornay, D. Hayes Murphy, Philip D. Reed, Reuben B. Robertson, George A. Sloan, Robert T. Stevens, Reese H. Taylor, Walter C. Teagle, Sidney J. Weinberg, W. H. Wheeler Jr., E. R. Stettinius Jr.

Another example of what frequently happens when industrialists get together with the government is reflected in the experience of Harold L. Ickes with the



WILLIAM L. BATT



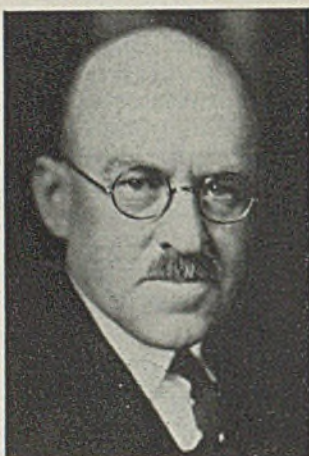
MASON BRITTON



CHARLES R. HOOK



PHILIP D. REED



RALPH E. FLANDERS



E. R. STETTINIUS JR.



GEORGE A. SLOAN



REESE H. TAYLOR

"Graduates" of Department of Commerce Business Advisory Council now help direct war program

oil industry. When his appointment as Petroleum Coordinator was announced the oil industry literally shivered with fear. Then, when gossip rumored that Mr. Ickes was to be shifted in order to take charge of the War Manpower Commission, the oil industry again became agitated. When finally President Roosevelt appointed him Petroleum Administrator for War, the oil industry was delighted. In other words, the industry did a complete about-face in its attitude toward Mr. Ickes. It was just a matter of getting to know him and of Mr. Ickes getting to know them.

"Mr. Ickes is one of the grandest men I ever worked with", is a typical comment by an important man in the petroleum industry.

"He knows how to pick reliable men who know their business and he relies on the information they give him. He is witty and friendly and backs us in our work. He is absolutely honest and fearless and the information he has handed to the public has been sound.

Foresaw Oil Shortage

"For example, in the summer of 1941 he was denounced from one end of the country to the other because he urged voluntary rationing of gasoline. He acted on the basis of accurate information. What he foresaw was a fuel oil shortage in the New England states the following winter and he wanted to ease the situation by cutting down shipments of gasoline to that area. As it happened, the pinch in fuel oil in New England did not come until the spring of 1942 had almost arrived, so that the shortage was not really serious at the time. Everybody now knows that Mr. Ickes was entirely correct when he urged voluntary gasoline rationing the previous summer. Had his recommendations been acted on then we would have a much less serious situation on our hands now."

It may be added here, parenthetically, that Mr. Ickes is not quite so popular with certain smaller petroleum interests who follow the custom of wastefully draining the oil out of an area and then pulling up stakes and doing the same thing in some other place. This is because of his pronounced views on petroleum conservation, which represent also the views of the larger petroleum interests. He believes our oil reserves should be carefully husbanded and not wasted.

There are certain exceptions to this general condition at Washington. Congress is not predictable. Neither is the Department of Justice. This also is true in certain other directions. Government

is an intricate and elaborate affair. The point is that the old attitude of industry, of trying to fight shy of all contact with the government, is a stupid one today. At a time when the president of a company has nothing to say about who he sells or delivers to, what prices he pays for his materials and what prices he charges for his product, when he is told what materials he may use, when he has little to say about his labor policies, and when he has nothing to say about the wages he pays, it is most essential for industry to know where it can find friends in Washington. It is all the more necessary for the reason that government controls seem to be here to stay.

Just what the controls will be when the war comes to an end cannot be exactly prophesied. The study of the postwar planning program as it already has been developed, however, is quite illuminating and from it a manufacturer can get a lot of food for thought. It may be added that an understanding of this planning and its scope gives considerable ground for comfort. A great many able minds, both in industry and in government, are occupied with this planning task. Where so many able people are striving to bring about an objective, it seems that something good ought to result.

Three agencies are most prominent in the overall postwar activity. They are the National Resources Planning Board,

a government body, and the National Planning Association and the Committee for Economic Development which are independent organizations and have no connection with the government. However, all three bodies thoroughly understand what the others are doing.

The National Resources Planning Board keeps in contact with various government departments through formal or informal planning committees or groups. The Department of Commerce, for example, has an interbureau Committee on Postwar Planning consisting of 23 members. The Board of Economic Warfare, while primarily a war agency, must, by the very nature of its activities, have postwar Western Hemisphere economic planning in mind at all times and, as explained in this spot in the issues of Jan. 11 and 18, is building up a vast amount of dollar exchange in Latin America that is itching to be spent. The Department of Commerce, the Federal Reserve System, the Department of the Interior, the Office of Coordinator of Inter-American Affairs, the Federal Security Agency, the Maritime Commission, the National Housing Agency, the Department of State, the Army and the Navy and the Treasury Department all are concerned with postwar planning.

How this postwar planning breaks down in detail, what are its objectives and what progress already has been made will be discussed in this department in the next issue of STEEL.

Postwar Sales Planning Vital, American Management Group Told

POSTWAR sales planning does not mean lessened interest in the primary job of winning the war; in fact, some executives believe that winning the war and winning the peace are parts of the same problem.

This was brought out in discussions at the American Management Association's Wartime Marketing Conference, held in Hotel Drake, Chicago, Jan. 14-15, before an attendance of about 400.

Importance of maintaining a sales organization was stressed by W. R. Moore, general sales manager, abrasive division, Norton Co., Worcester, Mass. Pointing to the opportunity sales engineers and service men have today to further their company's good will relations by helping production departments assist their customers, Mr. Moore said that today's abnormal conditions are not sufficient reason for disbanding and releasing

sales personnel. This is especially true if the product is of a technical nature and sales personnel is made up of well trained engineers, he added, with the suggestion that salesmen's titles be changed to "Service Engineers" or "Field Engineers."

"Statistics today indicate that approximately 50 per cent of the salesmen of all industries are still covering their territories; 10 per cent are in the armed forces with a possibility of 25 per cent being taken before the war ends; 15 per cent have been released and 25 per cent converted to other work," Mr. Moore continued.

"In carrying out a conversion program the first step that should be taken is to analyze the qualification of your sales force. If a company has changed from civilian products to war products some of them can be retained for service or maintenance work . . . They can help

your purchasing department chase supplies and equipment. If subcontractors are needed they can be used in searching out those who have suitable equipment for handling your work. In the home office they can be used as expeditors and they can also be used in aiding production as well as in scheduling and planning work. If this program can be followed, your sales organization, although converted to entirely different work, can be retained for the postwar period when their past experience will again prove invaluable.

"Postwar prosperity will be directly in proportion to speed of reconversion. . . . A well trained, well balanced, efficient sales organization will be most essential in the future. Every effort should be made to maintain it today."

Subjects for Research

A research program to guide management in postwar problems should be instituted now because time is required for its development, it was recommended by Donald R. G. Cowan, manager, commercial research division, Republic Steel Corp., Cleveland. Pointing out that it is impractical to establish a pattern for all companies to follow in gaining an understanding of probable postwar problems and ways of dealing with them, Mr. Cowan suggested that the committee plan be used by larger companies having diversified products and markets. Among subjects to be studied he included the following:

1. The measurement of probable postwar productive capacity.
2. The study of post-war conditions existing after World War I was a partial guide to the future.
3. A statistical analysis of past trends in related industries as a partial basis for postwar market estimates.
4. The analysis of changing markets.
5. The development of new products and the knowledge of the probable markets for them.
6. The reduction of marketing expenses and the increasing of the marketing efficiency through a careful study of the sales organization.

In discussing the likely effects of various circumstances on postwar business, Mr. Cowan indicated that we shall probably have an unprecedented demand for consumers' durable goods; that construction of homes will be stimulated by a number of factors; that the wearing out of machinery and equipment from war production and the technological improvements in such units will force factories to acquire new ones; and that export trade will have broad potentialities, dependent to a major extent upon the national policy adopted toward foreign trade.

Discussing "Peacetime Values from a War Technology," Dr. Gustav Egloff, director of research, Universal Oil Products Co., Chicago, and president, American Institute of Chemists, said that World War II may not be a total loss for humanity.

"A tempo never before attained in the United States has been reached with a collaboration and exchange of knowledge between heretofore highly competitive groups," he pointed out. "New materials now in war production will have great peacetime values. We will also have access to a vast amount of knowledge and experience which has been accumulated as the result of hectic years of war. Man's life will be prolonged, his health, mentality, imagination and productivity increased, and the pain and irritations of life will be reduced to a minimum.

"Private initiative is responsible for America's world leadership in science and industry. The tremendous effort that is being put forth in the United States, the effort that will win the war, is the work of private initiative.

"The impact of researches, carried on by private corporations and speeded up enormously by the war, will bring vast changes in our peacetime economy. Their research departments were the organizations upon which many companies relied to bring them out of the depression. Their results are the backbone of the country's mobilization for total war. . . . A new era in design, building, housing and transportation will be the aftermath of the present war, with many new materials now produced diverted from the war to peace. A tremendous business potential is ahead of all of us, which will strain us to the limit to fulfill the demands of building, furnishings, automobiles, trains, etc."

Implications of the concentration of production are distasteful, but alternative measures would be dangerous, the conference was told by Arthur R. Burns, deputy director for programs, office of civilian supply, WPB. "Without planned concentration, firms in civilian production will hang on, use up their resources and fail, and support of the armed forces will be niggardly," he pointed out.

"Where necessary, some businesses must be closed to enable others to stay in business and work at a profitable level in order to insure civilian supplies.

"When production is concentrated and some plants are closed, less labor is used to produce a given amount of goods. Civilian production must be concentrated in areas where war production makes smaller demands for labor than elsewhere. We can achieve our greatest effectiveness for war and best serve the civilian by cutting the pattern

of civilian production to fit into the program of war production.

"Transportation, fuel and power shortages are growing, and, like labor, they appear as a series of local bottlenecks, rather than as a single national one. Concentration will relieve them. It may be necessary to reduce uneconomical transportation by the zoning of market areas."

Calling the interpretation of price control regulations to over 2,000,000 retailers and 200,000 manufacturers a bigger job than the government bargained for, A. O. Buckingham, vice president, Cluett, Peabody & Co. Inc., New York, said that it was amazing that price control had worked at all, in view of its complicated regulations.

He pointed out the discrepancy of patterning our price control policies after those of England and Canada whose population centers are concentrated and easily manageable by price deputies, since we have over 56,000 civil divisions. Scoring the complicated system of individual ceiling prices for every store, Mr. Buckingham forecast relief in the promised modification of the general maximum price regulation on a dollar-and-cents basis within a prescribed geographical area and allowing for different size establishments and types of operation.

Outlines Seven-Point Program for Peace

A seven-point program for manufacturers' postwar operations was outlined Jan. 19 by Oscar N. Lindahl, Pittsburgh, vice president, finance, Carnegie-Illinois Steel Corp., in an address before the Illinois Manufacturers Costs Association in Chicago:

- "1. Relations with employes must be placed on a sound basis.
- "2. Financial structures must be protected.
- "3. Unbalanced or speculative inventories must be avoided.
- "4. Loose extension of credit should not be permitted.
- "5. Cost procedures should be modernized.
- "6. Business mobility must be developed.
- "7. Excess plant facilities should be definitely ear-marked. Data on all facilities should be separately recorded, and production costs determined for material produced in them."

Mandatory Scheduling of Mining Machinery Foreseen

Production of mining machinery could increase at once some 20 per

cent and within six months to more than 40 per cent, with present plant facilities, if manpower and materials were available, it was estimated recently by the WPB Mining Machinery Manufacturers Industry Advisory Committee at its first meeting in Washington. Some further expansion of production could be accomplished by reconversion of plants from ordnance to machinery.

"We must find ways to make available more equipment to the highly essential coal, metal, and non-metallic mining industry," said Arthur S. Knoizen, director of WPB's Mining Equipment Division, who acted as government presiding officer. "In order that output of essential minerals may not be slowed down by equipment break-downs, it may be necessary to set up WPB control through mandatory scheduling of mine machinery production and delivery, both for domestic use and for lend-lease. Through such scheduling we hope to achieve maximum utilization of materials, facilities, and manpower."

BEW Defers Action on Export Licenses for Latin America

No new export license applications for shipments to South American countries for which large backlogs of licensed commodities have been built up beyond available shipping space will be considered by the Board of Economic Warfare until March 1, except in cases of urgent necessity, the board has announced. The countries are: Argentina, Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela.

A program will make possible a re-appraisal of outstanding licenses, coordinating them more closely with available shipping and in accordance with the most urgent needs of the countries concerned, is contemplated by authorities, who do not expect to cause any interruption or delay in continuing scheduled shipments. Also the validity of outstanding licenses is not affected, and there are more than enough goods, licensed and available for shipment, ready to go forward.

Exceptions to the special program period of selective import licensing are made when materials or shipments are entitled to AA and A ratings, in cases of extreme urgency, and when required to maintain public health and safety of the country of destination.

Smaller War Plants Obtain \$1,000,000,000 in Contracts

More than a billion dollars worth of war contracts have been placed with companies employing from five to 500 persons during the last two months, WPB has announced. Spokesmen for the war

board said that this was made possible by the full support given by Army procurement officers to principles established by the Smaller War Plants Division.

Calder Succeeds Kanzler in Industry Operations Post

Curtis E. Calder, president, American & Foreign Power Co. Inc., New York, last week was appointed director general for operations by WPB Chairman Donald M. Nelson. He succeeds Ernest Kanzler who resigned because of ill health. Mr. Calder joined WPB in November, 1942, as assistant deputy director general for industry division.

Howard Coonley, New York, has been appointed director of a new Conservation Division in WPB. He formerly was chairman of Walworth Co. and is a past president of the National Association of Manufacturers.

The new Conservation Division will consist of the three technical branches included in the former Conservation Division. These are the conservation and substitution, simplification, and specifications. The salvage branches have been combined into a Salvage Division under direction of Paul C. Cabot.

John R. Kimberly, formerly deputy director general for industry divisions, has been named assistant director general for operations. Mr. Kimberly formerly was associated with the Kimberly-Clark Corp., Neenah, Wis.

F. Higginson Cabot has been appointed chief of the Commodities Bureau of WPB, succeeding E. W. Reid. Mr. Cabot is chairman of the board of the General Public Service Corp.

U. S. Mission Studies Needs Of French North Africa

An economic mission has been sent to French North Africa to assist Robert Murphy, chief civil affairs officer on the staff of Lieut. Gen. Dwight D. Eisenhower, commander-in-chief of allied forces.

United States and United Kingdom representatives already are on the scene surveying: (1) French North African requirements for nonmilitary supplies from the United States and other United Nations sources; (2) Production and supply of materials that may be made available from French North Africa for needs of the United States and other United Nations.

Members of the mission are: Paul Culbertson and Donald Hiss, State Department; Morris S. Rosenthal and Har-

old W. Starr, Board of Economic Warfare; Lloyd Cutler and Livingstone Short, Office of Lend-Lease Administration; Josiah DuBois, Treasury Department; Arnold A. Garthoff, Department of Agriculture.

Size of shipments of nonmilitary supplies both to and from French North Africa is limited by the military requirements for operations in this theater.

Form Clearing House To Find Use for Idle Welding Tools

Plans have been completed for a resistance welding equipment clearing house by the resistance welding unit of WPB's General Industrial Equipment Division. The latter will administer the clearing house in co-operation with the Redistribution Division in an effort to put idle machines into service for war production or essential civilian activities.

It is estimated that over 8000 resistance welding units are now idle and have been idle for nearly a year in plants of converted durable goods manufacturers. Meanwhile, orders for welders are piling up because of the shortage of critical materials. The result is a jam that threatens to hold up production schedules on some of the most essential war contracts.

WPB Industry Advisory Committee for resistance welding equipment advised that all idle machines that can be used should be restored to active service. The rest should be scrapped.

The clearing house will help locate this idle equipment; put it back into use; relieve pressure on manufacturers; and is expected to develop into a general information center for all resistance welding equipment users.

Garden, Other Hand Tools, Standardized by War Board

Simplification schedule covering forks, rakes, hoes, hand cultivators and numerous other gardening implements and industrial tools, has been issued by WPB as Schedule V of Limitation Order L-157.

All tools in the six lists that make up the schedule must be fabricated from carbon steel after the effective date of the order, April 8. No alloy steel may be put into process by any manufacturer after that date in the making of any tool listed in Schedule V. An interval will be allowed, however, until May 8, during which producers may complete the processing and fabricating of tools put in process prior to April 8.



9 1/2 MILLION CASUALTIES

Issued in Support of the War Production Fund to Conserve Manpower

... on the HOME Front!

This is the 1941 all-accident score: 102,500 Americans killed, 9,300,000 injured!

It's a crime to waste these millions of man hours when our fighters need everything we can produce. Industry *can* do its part. For example, a safety program in one metal fabricating plant slashed the accident frequency rate 80% in 5 years.

What can your plant do?

Make "good housekeeping" the No. 1 rule. Keep your plant clean; urge workmen not to leave tools on

the floor. Check these suggestions:

Do your shop men wear safety shoes? (Foot injuries predominate in every metal fabricating plant.)

Are good gloves worn to protect their hands? Is clothing close-fitting, with no dangling frills?

Do welders and others nearby wear head-shields or protective glasses? Are there exhaust ducts to carry off dangerous fumes?

Do men on cutting machines protect their eyes with goggles?

Do your presses have sweep or

basket guards? If two or more men work at a press, are the controls set in such a way that all must touch them before the press can work?

Do you install safeguards whenever a new "danger spot" is seen?

Help convert your accident-lost man-hours to war production. The American Rolling Mill Company, 131 Curtis St., Middletown, Ohio.



THE AMERICAN ROLLING MILL COMPANY

MIRRORS of MOTORDOM

Absenteeism problem attacked by War Manpower Commission. Percentage runs as high as 6 per cent in Midwestern munitions factories, seriously crimping material production

DETROIT

PROBLEM of absenteeism in war production plants is occupying considerable attention lately, probably because of the exaggerating effect which the holiday season produced on the list of job vacaters. Army officers have issued stern warnings over failures of large numbers of workmen to appear at jobs "the morning after", but in some cases these warnings have been overdrawn, no doubt purposely.

The example cited of one plant here where employes were soundly berated by an officer who cited an absenteeism percentage figure on a certain day of serious proportions. Later investigation proved that the plant was not scheduled to work at all that day, so there was no absenteeism at all. Union officials were in a lather until facts of the situation were clarified.

However, an immediate attack by the War Manpower Commission on the problem in this area has been promised. Preliminary study of records of 45 plants in Michigan, Ohio and Kentucky reveals that in more than half, employing 210,000, failure of employes to report regularly is seriously crimping output.

M. A. Clark, district WMC director, states that absenteeism in plants having the most complete records of those studied runs from 3 to better than 6 per cent of the total working force, with little difference in the records of men or women, white or colored, or of other groups.

Check List Made Available

An absenteeism check list will be made available to employers and worker groups by the commission, to permit analyzing various situations and to equip plant labor-management production drive committees with background on possible causes. The check list is not a government questionnaire. It is not to be returned to any government agency. Its sole purpose is to aid management and labor in each plant to arrive at solutions by learning exactly where the fault lies.

Eleven main reasons for absenteeism, the survey reveals, are: Illness; job shopping and piracy; lack of information on the relation of an employe's work to the finished product and the importance of the product in winning the war; long hours and excessive overtime; wages and wartime prosperity; inadequate housing

or transportation, or both; lack of carefully planned production; women workers remaining home to perform household duties; lack of good supervision; hiring in excess of immediate needs; accumulation of finished goods, leading workers to assume erroneously that what they are making is not urgently needed in the war effort.

Excessive consumption of *spirits frumenti* was found to be a factor in only one of the 45 plants originally studied. Through the new check list, employers will be asked by the WMC to seek their own answers to such questions as: Do workers have to wait for assignments? Is supervision adequate? Are foremen fully informed of their responsibilities? Are additional workers hired only when the plan is ready to put them into jobs or full-time training? Are explanations given workers for temporary layoffs caused by material shortages or for other reasons beyond the employer's control?

Ask Reasons for Absence

List of questions directed to workmen includes: Do you remain absent frequently to shop for jobs paying a few cents more an hour? (It is difficult to imagine anyone answering this question in the affirmative, even if that is the case.) Is absence to take care of personal affairs actually necessary? Do you realize the vital necessity of being on the job?

In addition to reasons furnished by labor and management, inadequate community services frequently cause absenteeism, the WMC points out. Workmen may take time off to look for houses or rooms—almost a lost cause in Detroit. Good recreational facilities, places to cash checks, and arrangements for workers to obtain medical care in evening hours might eliminate other causes. Worst weather conditions in 15 years and nearly complete congestion of public transportation facilities are other local causes of importance currently.

Yet there is no gainsaying the apt phrase of the WMC: Absence makes the war grow longer.

Guaranteed work week of 40 hours, to be increased to 48 hours within 60 days, and institution of a uniform wage pattern for the automotive industry, are steps urged by Walter Reuther, vice president of the UAW-CIO, as essential to achieving maximum war production in 1943. His program appears to have

the usual slant of labor proposals—government regulations requiring industry to do certain things and asking nothing in return from workmen. Consider a few excerpts from Reuther's actual statement:

"Management and government would be compelled to plan for full employment . . . Labor's desire to co-operate is being short-circuited and replaced by resentment and cynicism . . . Providing a minimum of 40 hours work a week should be made an immediate obligation of management and government, with sights raised continuously so that at the end of two months the minimum should be 48 hours . . . The present chaotic wage situation will continue until a comprehensive industry wage stabilization program is instituted."

It must be admitted that there are vast and serious wastages of men, materials, machines and money in the current production effort. The solution to that difficulty will not be found in establishing any more government regulations or new commissions or tri-partite committees. There are too many of those already. As a matter of fact, it is doubtful if any solution will ever be found to many of the inefficiencies of war production. It is too complicated, too rushed, too subject to change, too dislocative. Resentment and cynicism are bound to develop, but they find as many subjects in the field of management and supervision as in the ranks of labor. What is called for is a super-human effort at understanding the size of the job which industry has been assigned, and an attempt to co-operate as well as is possible. Grousing and grumbling will never help to digest the unbelievable production task now in process of being swallowed.

Advises on Maintenance

Studebaker's owner relations department has just issued a brief folder entitled, "How to Keep Your Car Healthy on a Rationed Diet" which is particularly appropriate under today's driving restrictions and is worthy of reading by anyone interested in automotive information. Engineers advise rescheduling of lubrications on a time rather than mileage basis. Tire pressures should be increased about 15 per cent. Batteries are shouldering a much heavier load under slower speeds and restricted mileage. Quantity and quality of oil in crankcases should be watched carefully today since its function can be seriously impaired by water due to condensation.

Frozen gas lines have given considerable difficulty in this area, resulting from water which has either condensed in gasoline tanks or seeped into service

MIRRORS of MOTORDOM

station tanks. Suggestion has been made that one pint of alcohol be added to the gasoline tank regularly to prevent this.

Dodge Now Manufacturing Sperry Gyrocompasses

Dodge Division of Chrysler Corp. has swung into quantity production of Sperry gyrocompasses, said to be one of the most delicate pieces of precision work in the war effort.

Shortly after Pearl Harbor, Chrysler was asked by the compass division of the Bureau of Ships at Washington if it would produce the intricate gyrocompass. The request was accepted and the job commenced. Monthly production is already in three figures and is being increased constantly.

The device the United Nations developed to combat the Axis magnetic mines

so affected the operation of magnetic compasses, with which sailors had navigated for many years, that they could no longer be relied upon. Almost overnight the gyrocompass, unaffected by the device, became a vital machine of war. Gyrocompasses were immediately demanded for ships of all kinds and sizes plying in mine-infested waters.

Most of the workmen on the gyrocompass job formerly built automobiles and trucks at Dodge. R. G. Knight used to be superintendent of the body building division and is now in charge of the new job.

On the gyrocompass, the mechanism has certain parts where "tolerance" is nothing, machining must be exact to the hundred-thousandth of an inch. Some realization of this precision is gained by watching one of the compasses being "roughly" balanced. The "tops" as they are called, look absolutely stationary on

the balancing line. No movement or vibration can be detected, in fact a five cent piece can be balanced sidewise on them. Yet a glance at the indicator above shows that these "tops" are spinning at some 6000 revolutions per minute.

These "spinning tops" in the gyrocompasses are suspended by simple looking strands of wire, the production of which is a most delicate manufacturing job.

The strand consists of 18 separate wires, each 0.009-inch in diameter, or about the thickness of a hair. The assembled strand is about one foot long, and each of the 18 wires must be exactly the same length, and of exactly the same tension. Examined under a microscope, these 18 wires form a perfect circle with an air space down the center also about the thickness of a hair. After assembly, these strands of wire cannot be touched, as the perspiration or moisture from a single finger print might cause rust affecting the weight or balance of the entire strand. After manufacture, however, these strands are protected so salt air, moisture, or other factors cannot affect them.

There is a "breather" hole in the assembly of the gyrocompass that must be protected with yarn of uniform weave and twist along a two-inch length. The function of this hole is similar to that of an air cleaner on an automobile, but its manufacture is far more precise and exact. Unless this "breathing" point functions properly, the compass may be "off" as much as ten degrees. There are bearings in the gyrocompass on which during production a particle of cigarette ash might ruin the whole 600-pound job.

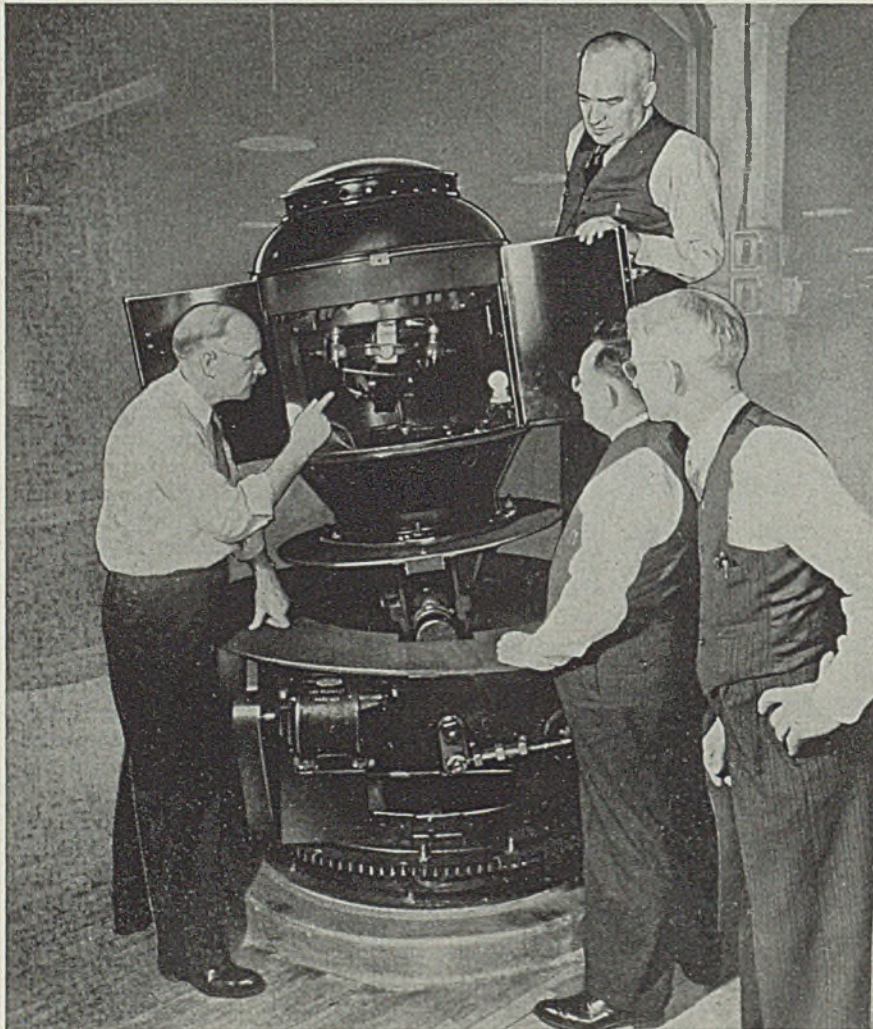
Standard Oil Operating New Super-Fuel Plant

A giant catalytic cracking plant for producing 100-octane gasoline was placed in operation by Standard Oil Co. of New Jersey in Bayway, N. J., Jan. 18.

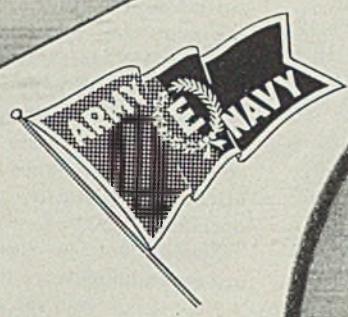
The plant is the first of its kind to be built in the vital Eastern seaboard region. Two others using the same process are located in Louisiana and Texas. This super-gas is considered one of the country's "secret weapons," since it can yield 40 miles per gallon for an average standard car.

American planes in combat at present are using 87-octane gasoline. Bombers will be able to carry 5000 pounds more of bombs than with the old fuel.

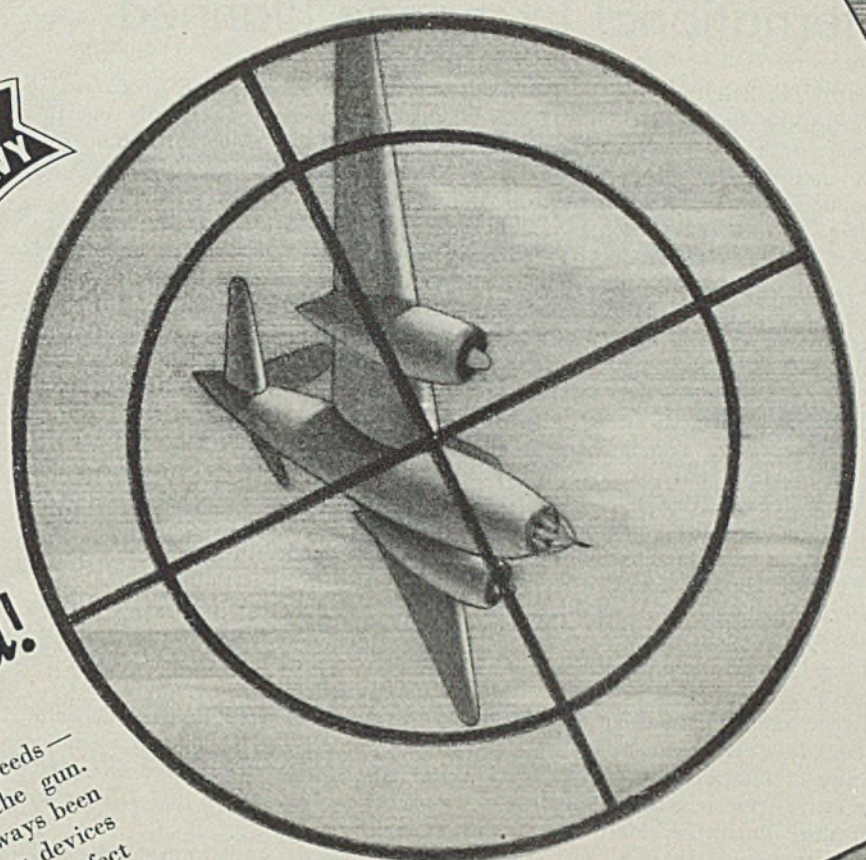
Leon Henderson, formerly head of the Office of Price Administration, bequeathed a staff of 90,000 workers to his successor, Ex-Senator Prentice M. Brown.



Here's the intricate Sperry gyrocompass, "as delicate as a watch", being built in quantity by Dodge. Richard G. Knight (left) superintendent of the gyro-division; Arthur C. Sachse, electrical engineer; Albert Kirsch, master mechanic, and Fred J. Lamborn (top), vice president in charge of manufacturing, are shown inspecting the action of the mercury ballistic on the gyro's rotor. This is the complicated device that works with the earth's gravity to make a compass out of a gyroscope

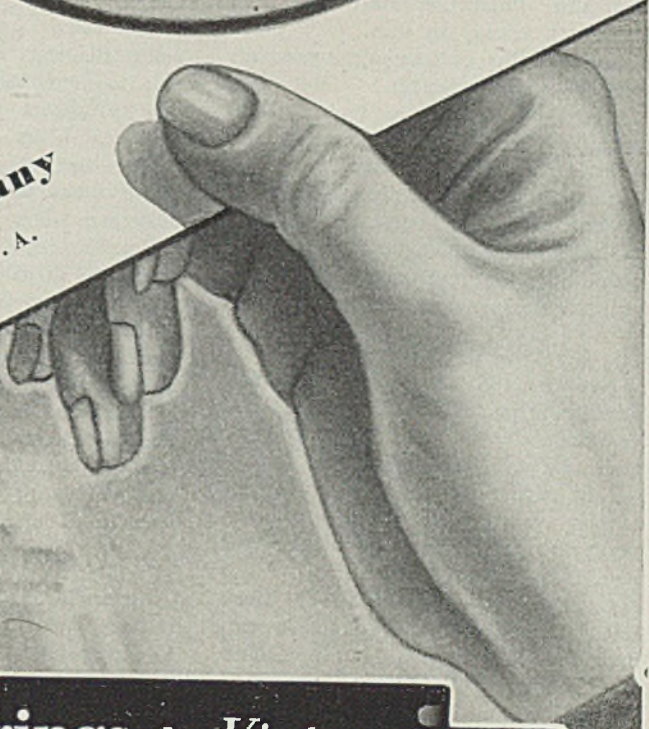


TARGET PRACTICE with a Camera!



Quick bursts — at dizzy speeds — and you aim the plane, not the gun. American fighting men have always been better marksmen — and training devices like this camera gun help them to perfect their marksmanship. Barnes-made springs have long been standard in photographic equipment in civilian life. Now they enlist for the duration in the Victory Program.

Wallace Barnes Company
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT, U. S. A.



Barnes-made Springs for Victory



Save Time and Materials; International Exchange Planned

FOUR hundred thousand suggestions for increasing war production and saving manpower and vital materials have been received by labor-management committees in some 1900 war plants.

Many of these have been placed in effect. While War Production Drive Headquarters finds it impossible to make any accurate estimate of the time saved by all these suggestions, it has figured that 30 of them make possible a saving of 112,459 man-hours annually.

Outstanding suggestions by workers are "plowed back" into industry to allow all American war plants to benefit. An international exchange of ideas now is being started and the best suggestions received are sent to England through the British Supply Council of North America. Later they will be distributed to war plants of all the United Nations.

Twenty-six thousand Awards of Individual Production Merit have been made by plant committees and 55 of the suggestions have won their originators Certificates of Individual Production Merit. Highest of three honors, the Citation of Individual Production Merit has been conferred on only six men.

Some of the outstanding suggestions that have been offered:

New power knife to replace hand operation in changing size of plaster forms for bullet-proof tanks saves 1500 man-hours per year on present output.

Combining two operations in the manufacture of milling cutters into one operation saves 4197 man-hours in one year on present operation.

Filament Output Boosted

New method of feeding wire into machine in manufacture of filaments increases production from 150 to 500 per hour, and saves 2090 man-hours.

New method to cut and form filament tension springs saves 5250 man-hours per year and increases production per hour from 200 to 750.

Change in the manufacture of track roller frame assembly eliminates two operations thereby saving 120 pounds of welding rod and 400 man-hours per year.

Use of reversible air wrench to remove cap screws saves 150 man-hours per year.

Suggestions to use carts in which to pile finished pieces saves 300 man-hours of work per year.

New tool to rough and finish turn spherical ball on king bolts saves 150 man-hours annually.

Change in method of adjustment of limit switches on electrically operated oil cooler doors reduces the time from 7 hours and three men to one man and eight minutes (52 times faster).

New method for stranding wire eliminates breaks and saves 40 minutes per shift, or 2 hours on one operation.

New method of crating and shipping Boeing B-17 bullet-proof fuel tanks saves 45 minutes in crating and 15 minutes in uncrating, or one hour per tank, (Now used on 28 tanks per day and expected to rise to 100 tanks per day.)

Device to eject loose shells on reducing press dial makes it possible for one operator to take care of two machines instead of one. (Eight operators are eliminated in three shifts).

New standardized feed gears on ceramic firing feeders allows one attendant to service three furnaces instead of two and saves 3800 man-hours per year.

Change in plate design eliminating scarce metal and number of operations in specialized power tube saves 3400 man-hours yearly and \$17,115 in tantulum.

Two new special mandrels make coiled filaments for power tube adaptable to automatic winding, one saving 435 man-hours yearly and the other 4700 man-hours.

New test set to check specialized power tubes brings about a saving of 2200 man-hours yearly.

Rearrangement of operators and operations in mounting tubes saves 14,000 man-hours yearly.

Change in assembly operation on mounting power tubes saves 6700 man-hours annually.

Change in method of grinding operation on receiver body of 20 mm gun increases production 142 per cent and reduces setting up time from 2 or 3 hours to ½ hour.

New Pipe Clamp Helps

Streamlined pipe clamp used for attaching lines of small pressure tubing to larger pipe lines saves 25 per cent in material and 50 per cent in man-hours.

Change in design of radiator and transfer of its manufacture to outside jobber reduces cost and releases valuable skilled help.

Change in valve design on tubes of gas saves 275 man-hours and \$8000 in material.

Simple change in bulb punchout, bead inserting and sealing machine

makes double operation possible, and saves 4050 man-hours yearly.

Change in boring tool for rough boring on inside of cylinder increases from 7 to 21 pieces machined per shift, while two machines, six operators per shift are released.

Fixture for alignment of reduction gear bearing races and gear casing saves 212 hours of assembly per engine.

Change in time of spot facing cylinder top plate increases production from 36 per shift machined to 80 per shift machined. (Releases one lathe and 3 operators.)

Special cut in jig allowing more maneuverability saves 566 man-hours.

New gage to overcome problem of maintaining correct finished weight of machined 155-millimeter shells reduces scrap 50 per cent and saves approximately 26,000 man-hours in inspection and repair.

Use of test jig to reduce hook-up time on transformer operations saves over 500 man-hours yearly.

New jig to hold transformer can lids during assembly saves over 500 man-hours per year.

Master plates designed for multi-graph machines on government orders reduces set-up time 50 per cent, eliminates one operation and saves 2500 man-hours yearly.

Simple Ideas Often Sound

Simple suggestion that information to go on kit boxes be stencilled directly on box saves 1000 man-hours yearly.

Change in method of numbering on small power tubes saves 3300 man-hours yearly.

Suggestion on a reaming operation of a Thompson submachine gun increases production 100 per cent.

Suggestion on the installation of engines, fans, propellers, etc., on board ships speeds up crotch block work 75 per cent.

Suggestion on the finishing of a concave surface of a 57-millimeter breech block increases production 500 per cent.

Combination torch guide enables operator to burn a straight line without nerve strain.

New device to remove copper bands from shells increases production 150 per cent.

Change in heating elements and sealing of mounts on power tubes reduces shrinkage 3 per cent, saving \$2050 in cost of vital material yearly.

Special salvage operation on filaments saves 25 per cent of the anodes previously scrapped.

Ordering of steel plate to specification eliminates a shearing operation, and saves 32 tons of steel plate annually.

New method of grinding cut-off cone

automatic tools reduces consumption by 25 per cent.

New set of spacers for Roto-Mill cutters doubles the life of the cutter.

Fixture for making water test on chamber of crankcase nose section increases production, result 30 per cent.

New sleeve arrangement to center the retainer for the tachometer drive shaft oil seal increases production 20 per cent.

Use of alemite grease fittings on retarder gear cases used in railroad pumping operations saves 300 gallons of oil, expedites movements of cars, and eliminates delays due to freezing.

Designing of machine to set gaps for aircraft spark plugs enables even a beginner to operate machine and turn out 800 correctly gapped spark plugs per day instead of former top production of 300.

Redesign of coupler bodies on army searchlight cables increases production 50 per cent and removed bottleneck in machine shop. On present order saves 8930 pounds of brass rod, 21,530 pounds of phosphor bronze and 120,881 pounds of aluminum.

New method of increasing life of electrodes salvaged a two-year supply of scrap inserts.

New tool for bending copper tubing increases production 50 per cent.

Method for sorting and separating random lengths of tubing increases production 55 per cent.

Method of eliminating breakdowns caused by extruding dies pulling out of die plates on presses for extending radiator tubes used for cooling airplane motors saves \$5000 in tools and repair time.

Suggested copperplating steel plates and substituting them for regular copperplate on IBM machines saves vital material and improves product.

New set of tools to manufacture indexing lug for special tubes greatly reduces screw machine time, and saves 75 per cent of the nickel formerly used.

New fixture to grind parts for control valve makes possible grinding of 6 at a time instead of one.

Change in method of milling support shaft center bearing reduces milling operation from 40 minutes to 10 min-

utes. New die, instead of a hack saw, cuts stainless steel piano hinges to different lengths. Hack saw cut only 25 hinges in 8 hours, whereas the die cuts 100 hinges an hour.

Change in method of milling spring buttons cuts operation time in half.

A fixture to assure accuracy of assembling connecting rods reduces a previous rejection experience of 2 per cent to almost nothing. (As engines are almost completed at this stage, rejections are very serious.)

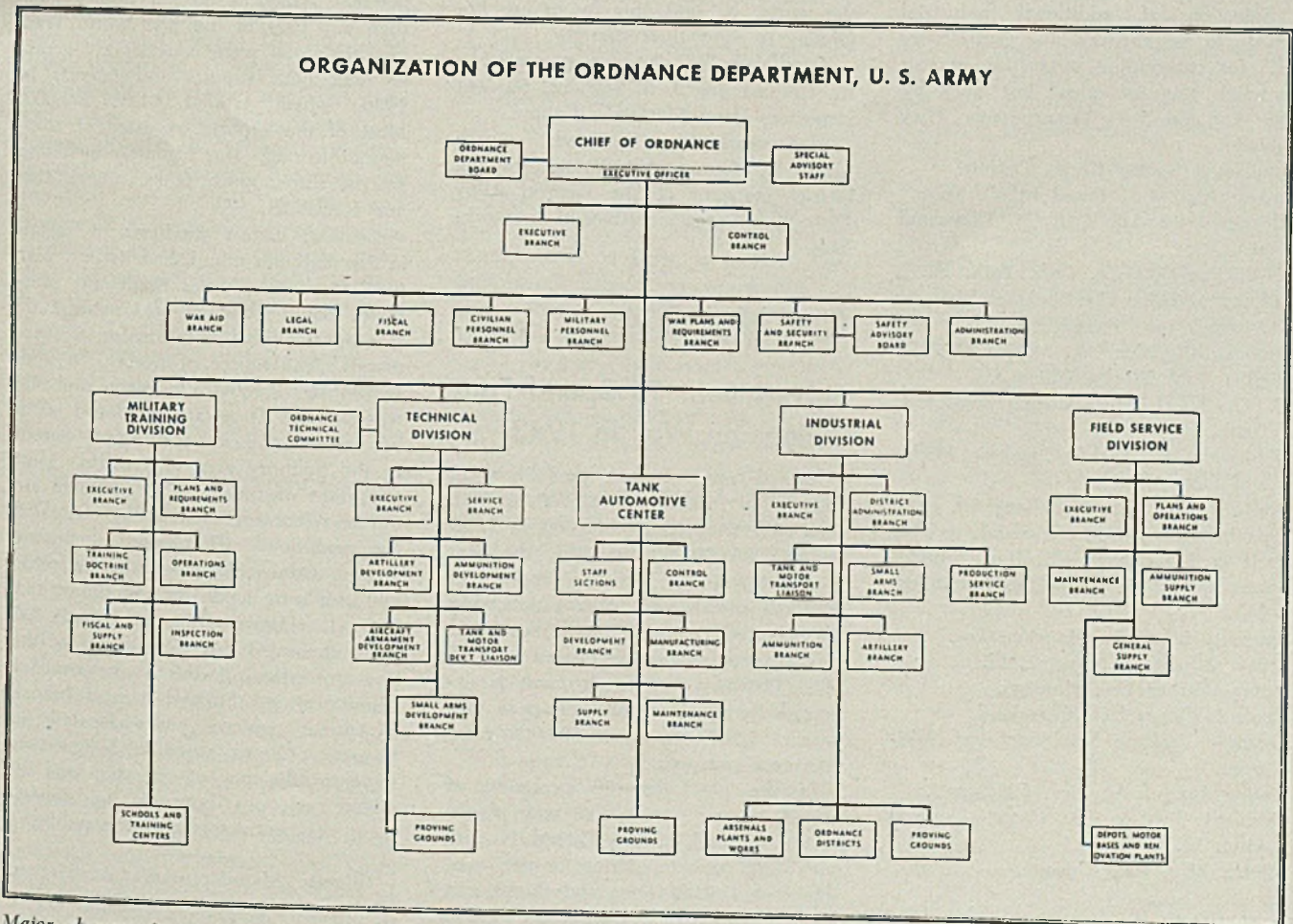
New tool to polish internal face of gears increases production as much as 50 per cent.

Substitution of rivets for screws and other changes in machining and assembling latches speeded up production 25 per cent.

Change in construction of grinding wheel allows better view of material to be cut, thereby eliminating errors and waste of materials.

New holding fixture to simplify burring of cylinder top plates reduces operation time to one-fifth of previous method.

ORGANIZATION OF THE ORDNANCE DEPARTMENT, U. S. ARMY



Major changes in peace-to-war transition of the U. S. Army Ordnance Department have created an organization, as shown on this chart, capable of meeting demands of global war with its abrupt shifts in supply requirements or changes in material or labor conditions at home. Patterned on an "Industrial Mo-

bilization Plan" conceived years ago, the reorganized department, with its decentralized district offices located in strategic industrial centers, is now constituted to take full advantage of research developments and engineering design activities, and to control all agencies of production and material



H. E. LEWIS, president, Jones & Laughlin Steel Corp., addresses employes and guests who attended the Army-Navy "E" ceremony at the company's Aliquippa Works recently

More Firms Win "E" Pennants

Selection of additional industrial plants to be awarded the Army-Navy "E" for outstanding production of war materials was announced last week by the War and Navy Departments. They include:

- Associated Spring Corp., Detroit.
- Broad Brook Co., Broad Brook, Conn.
- Chicago Pneumatic Tool Co., Cleveland plant.
- A. B. Farquhar Co. Ltd., York, Pa.
- Fidelity Machine Co., Philadelphia.
- Fleetwings Inc., Bristol, Pa.
- Hussman-Ligonier Co., St. Louis.
- Illinois Tool Works, Chicago.
- C. O. Jelliff Mfg. Corp., Southport, Conn.
- Kelsey-Hayes Wheel Co., Jackson, Mich., and Detroit.
- Midwest Mfg. Co., Galesburg, Ill.
- Pipe Machinery Co., Cleveland.
- Pratt & Letchworth Co. Inc., Buffalo.
- Simonds Saw & Steel Co., Fitchburg, Mass.
- Specialty Mfg. Co., Houston, Tex.
- Stoner Mfg. Corp., Aurora, Ill.
- Texas Washer Co., Houston.
- Tools & Gages Inc., Cleveland.
- Triangle Package Machinery Co., Chicago.
- Trailer Co. of America, Cincinnati.
- Vermont Tap & Die Corp., Lyndonville, Vt.
- Witteck Mfg. Co., Chicago.

Republic's Central Alloy Plants Win Army-Navy "E"

Canton and Massillon, O., plants of Republic Steel Corp. were presented Army-Navy production awards in cere-

monies in the two cities Jan. 19.

In presenting the awards Brig. Gen. Trelawney Marchant said the nation is faced this coming year with a much brighter outlook than in 1942. All over the world, he said, our forces are beginning to show their strength.

Army-Navy "E" pins were presented to Lt. Commander P. S. Sessions, resident inspector, Navy Materials, Canton.

The awards were accepted for both plants by George W. Putnam, acting district manager of the Central Alloy District, and representatives of the workmen.

CANADA

Government To Spend Four Billions on War in 1943

Annual rate of war production in Canada is forecast at \$3,700,000,000, compared with \$2,600,000,000 in 1942 and \$1,200,000,000 in 1941, the Dominion Bureau of Statistics reports. In addition, metals and other products to be exported to the United States and Empire countries are estimated to total \$850,000,000. War employment is expected to reach an all-time peak this year at 1,100,000, about 100,000 more than now engaged.

In the past year 70 per cent of Canadian war production was placed at the disposal of the United Nations with half the munitions output consigned to British fronts and Russia and 20 per cent to the United States and the Pacific area, including China.

War production is scheduled to reach its maximum soon. Output of mechanical transport in 1942, valued at almost \$400,000, was nearly double that of

1941. Value of aircraft production was \$268,000,000, about 158 per cent over 1941, at the rate of 400 airplanes a month. During the present year production of merchant shipping is expected to reach more than 1,000,000 tons, in addition to 200 to 300 naval craft.

C. D. Howe, minister of munitions and supply, reports that 6500 aircraft have been produced since June, 1940, and the program will be greatly enlarged in 1943, with nine types of planes. Of these planes 5000 remained in Canada for the joint air training plan and the remainder were sent to active war areas. From now on 50 per cent of planes will be sent abroad for service and combat, all being of types that can be flown to any war area, requiring no shipping space.

Aircraft workers have increased from fewer than 1000 in peacetime to more than 75,000, including more than 21,000 women. Workers are expected to number 100,000 when the program reaches its peak.

As a direct result of strides in war materials production export trade in 1942 was at the all-time peak of \$2,385,000,000, which is 50 per cent greater than any year in the first World War. Exports alone were considerably greater than both exports and imports in 1939, which totaled \$1,687,000,000. Most of the exports consisted of shipments to all war fronts, including planes, ships, guns, tanks, ammunition and foodstuffs.

Canada, largest producer of metals in the platinum group, had its best year in 1942, states Charles Englehard, president, Baker Platinum of Canada Ltd., leading smelter and fabricator of these metals. The source of supply, he said, should be adequate to meet probable war needs. They are produced as a by-product of nickel and copper output in the Sudbury area of Ontario. Most important wartime uses of platinum are in the chemical, electro-chemical and electrical fields. The largest single use is as a catalyst in production of nitric and sulphuric acids for munitions.

C. L. Drewry, Toronto, Ont., has been appointed director general of the Toronto office of the Department of Munitions and Supply, a new branch to direct various staffs located in Toronto. Centralization is designed to increase efficiency of operation and facilitate relations between the department, its contractors and the public.

Illinois Manufacturers' Association, Chicago, has issued its 1943 tax calendar to remind members of dates, payments and reports, when due. Covering only general taxes and reports, the calendar lists 29 dates on which a total of 59 different reports or payments fall due.

Scrap Industry Foresees Heavier Burden To Meet Larger War Needs

IMPROVEMENT in supply of steel and iron scrap since the shortage of last year does not relieve the industry from hard work to meet the increased requirements for the enlarged steelmaking program this year, speakers emphasized at the fifteenth annual convention of the Institute of Scrap Iron and Steel Inc., at New York, Jan. 15-16.

Increased pig iron production will help materially, it was pointed out, but the country must not lose the scrap consciousness developed late in 1942 with such good results. In developing an adequate supply the great burden naturally will fall on the scrap industry itself, as may be indicated by the fact pointed out by E. C. Barringer, president and executive secretary of the Institute, that dealers actually shipped 85 per cent of all purchased scrap.

Mr. Barringer was re-elected president and executive secretary and Philip W. Frieder, Philip W. Frieder & Co., Cleveland, was elected vice president. Hiram Winternitz, Charles Dreifus Co., Philadelphia, formerly treasurer, was made secretary, succeeding George L. Strum. Everett B. Michaels, Hyman Michaels Co., Chicago, formerly vice president, was elected treasurer and Thomas F. Kelly re-elected comptroller.

Directors-at-large for two-year terms were: Maurice Schlafer, Schlafer Iron & Metal Co., Detroit; C. C. Cohen, I. J. Cohen & Co., Kansas City, Mo.; Henry J. Kieber, Hickman, Williams & Co., St. Louis; Hyman Moskowitz, Moskowitz Bros., Cincinnati; Abe Cohen, Lynchburg Iron & Metal Co., Lynchburg, Va.

Relations with Government Good

Declaring that relations between the scrap industry and the government are better today than at any time in the war period, Mr. Barringer gave credit to the advisory committee organized in August to work with the Office of Price Administration. Operation of this group, he said, increased reliance of the government on practical scrap men and augurs well for the future, especially in view of the fact that when the government acquires controls it does not easily relinquish them. The scrap industry is in sympathy with the objectives of OPA, he said. Appointment in December of a new advisory committee on scrap to the War Production Board is bringing practical scrap men into closer contact with the salvage division.

"It goes without saying," he said, "that

we pledge our support to the reorganized salvage division and that we have a mutual interest in the conduct of salvage drives."

Membership in the industry is at an all-time high with 852 at present.

Donald B. Kennedy, price executive of the iron and steel branch, OPA, asserted that the price schedule issued by the division had resulted in annual saving to buyers, principally the government, of a billion dollars. Indicating the principles under which OPA expects to carry forward price control, he included a maximum price structure to assist in preventing inflation and at the same time maintain adequate flow of scrap; to base action on facts; to consult closely with the industry primarily through the advisory committee and also through other available means; to correlate administration and price action with other government agencies involved in the movement of scrap; to adapt price regulations to changing conditions where necessary; to simplify price schedule No. 4 to the extent this is feasible.

Cost-Finding a Chore

Determination of costs of preparation of scrap constitutes one of the most difficult phases of the whole problem of basing action on facts, he pointed out. Unprepared scrap is purchased at a flat price. From this several grades of prepared iron and steel scrap result, including on occasion some nonferrous scrap. Thus a situation involving both joint product and by-product costs is present. However, several overall averages are available, he said, and referred to a survey made in the New England area last spring by the iron and steel branch. Figures showed cost of purchased scrap per ton was \$11.04; labor costs \$1.44 and executive salaries and net operating profits, \$1.23. These figures indicate that the price which a dealer pays for unprepared scrap is much more important in the total cost than the cost of labor per ton.

This price, he explained, is determined in a large measure by (1) the price at which unprepared may be sold; (2) the price other dealers can afford to pay for unprepared scrap; and (3) the price consumers are permitted to pay for unprepared scrap. Action just being taken by OPA in increasing to \$3.50 the differential which determines the price consumers may bid for unprepared steel scrap improves this phase of the dealer's

cost position, he pointed out; also, it benefits those who contract for preparation in transit of scrap purchased by the mills and foundries.

W. A. Janssen, chief of the metals and minerals unit, Department of Commerce, said that notwithstanding the large blast furnace capacity which will be available after the war it is possible consideration will be given to conservation of scrap to prevent rapid depletion of high grade iron ore reserves. He visualizes a change in steel production technology to conserve iron ore by use of a larger percentage of scrap than formerly. To meet this increased demand it is quite probable that instead of being exporters of scrap this country may become importer and processor of foreign scrap.

To what extent wartime steel production may continue is a moot question, he said. Some believe post-war demand for the immediate few years may equal or even exceed that of the war.

Proposes Streamlined Drive

Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., chairman of the scrap committee of the American Iron and Steel Institute, praised the recent national newspaper drive for scrap but said the nation's salvage program should be reorganized and streamlined.

Mr. Wolcott declared that in the future salvage collection drives should be run with clock-like and military precision so that it would be possible to stress the collection of certain waste materials, such as fats, for example, while at other times the collection of scrap metals could be emphasized. With a flexible organization, he said, the requisite changes in stress could take place smoothly and quickly and without chaos or confusion.

To bring this about, Mr. Wolcott called for a decentralization of the nation's salvage organization "to give greater authority to state salvage officials and through them to the county and then the community officials."

Continuing, he declared, "I would have the present regional salvage offices serve merely as liaison agencies, while the work actually is carried on by state, county and local officials. This is essential in order that we shall capitalize to the fullest upon the very lively competitive spirit and pride prevalent among the states.

"I predict that if salvage is made a state function and responsibility as far as possible you will see the fur fly in many states that have yet to go all out on scrap collection . . . and everything said with regard to the states goes doubly for the counties and local governments."

He said salvage is a local function.

Down-Grading for Bronze, Brass Castings Charted by War Board

GUIDE for engineers and designers in specifying lower grades of critical material for brass and bronze castings is contained in a down-grading chart issued by the WPB Conservation Division's specification branch.

Primary objective of the chart, according to Carter S. Cole, chief of the metals section of the branch, is better utilization of available material for the war effort.

"When copper, tin and other metals were cut off from their civilian uses some of the normal channels in which these materials regularly flowed were closed," Mr. Bole said. "As a consequence lower grades of secondary materials are relatively much more available than primary metals. Brass mill scrap on the

other hand has been routed back to the brass mills for reprocessing. In normal times, copper clippings and similar high purity scrap were used to sweeten, or upgrade, casting alloys. So the ingot-makers and foundrymen have had to work with materials having higher impurities than those to which they were accustomed."

The chart shows most of the important specifications grouped in columns according to the material required by the ingotmaker or foundryman. "All New Metal" includes No. 1 and No. 2 copper as well as electrolytic. "High Purity Secondary" is exemplified by such items as fired cartridge cases currently used to make regular manganese bronze.

In any specification where lead is

equal to or greater than the tin, the tin content of bronze generally can be introduced into the alloy from secondary sources such as radiator cores. Lead generally is the contamination of secondary material that restricts its use in the tighter specifications.

The designer, in the past, said Mr. Cole, has given little or no thought to conservation but has specified the best material for the purpose intended. Composition "G", or gun metal, has many important uses, and in peacetime when supply of metal was unrestricted for designers who specified this metal. Now, however, the 0.2 or 0.3 lead maximum in specifications for this bronze places it in a class requiring primary copper and tin for its manufacture, and the designer must revise his thinking and specify the least restrictive material that will do the work at hand.

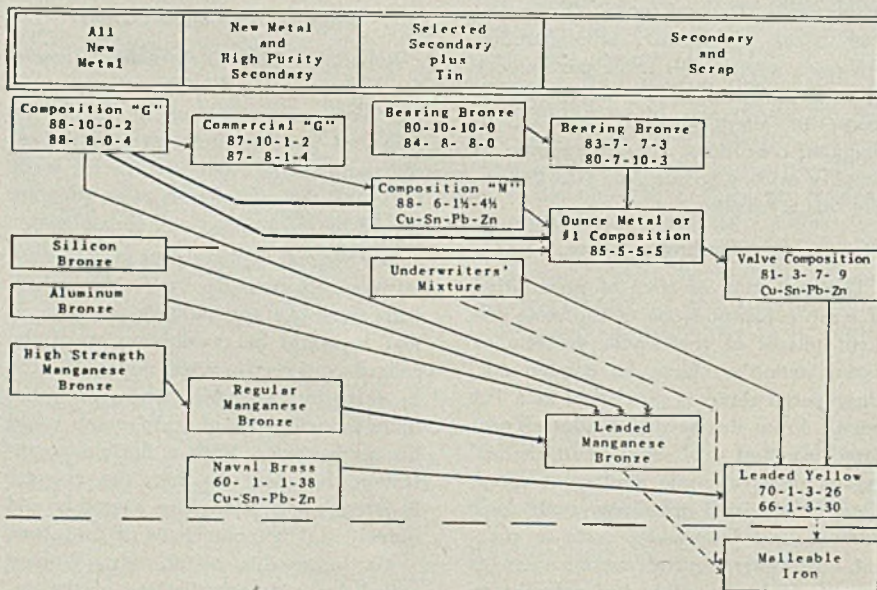
"As indicated on the chart, in many instances Composition 'M', or even 85-5-5-5 will give adequate service performances for many items where Composition 'G' has been specified. The armed services are recognizing this and have made many specification changes of this nature which conserve primary metal. The Navy, for instance, last spring issued a directive permitting the use of Composition 'M' in place of Composition 'G' in pressure castings. The Maritime Commission has changed propeller shaft sleeves from 'G' to 'M', an alloy on which the Navy had standardized for this purpose.

"More recently the Navy has pointed out the possibilities of the use of 85-5-5-5 for Composition 'M', Composition 'G' or silicon bronze for sea water valves and fittings. It might also be noted that where structural strength is the primary consideration loaded manganese is an excellent design choice, in place of Composition 'G', silicon bronze or aluminum bronze.

"There are times, of course, when a partial or full substitution of ferrous metal may be made for some of the non-ferrous alloys—even in some uses directly or indirectly connected with our war effort. Such, for instance, is the current use of malleable iron tail-pieces for fire hose couplings that formerly were made of the underwriters mixture."

Reduced Imports, Production To Curtail '43 Lead Supply

Lead supply in 1943 is expected to be somewhat below that of last year, the decrease being both in imports and domestic mine production, Erwin Vogel-sang, director, WPB Tin-Lead Division, informed the Lead Producers Industry Advisory Committee meeting in



SPECIFICATIONS					
ALLOY	ASTM	ARMY & FEDERAL	NAVY	AMS	SAE
Composition "G"	B 143, 1A & 1B B 60	QQ-B-691a - 5	46M 6g "G"	4845 A	62
Commercial "G"	B 143, 2B E-B 143, 2X	QQ-B-691a - 6	46B 5h "P-c"		
Composition "M"	B 143, 2A B 61	QQ-B-691a - 1	46B 8g "M"		
85-5-5-5	B 145, 4A B 62	QQ-B-691a 2	46B23c "Oz-c"		40
81-3-7-9	B 145, 5A	QQ-B-691a - 11	46B24d		
80-10-10	B 144, 3A			4842	64
84- 8- 8	E-B 144, 3Y	QQ-B-691a - 8	46B22d "11"		
83- 7- 7-3	B 144, 3B	E-QQ-B-691a - 8			660
80- 7-10-3	E-B 144, 3X				
Naval Brass	B 146, 6C	QQ-B-621 - A	46B10f "N-c"		
70- 1- 3-26	B 146, 6A E-B 146, 6X & 6Y	E-QQ-B-621 X & Y			
66- 1- 3-30	B 146, 6B	QQ-B-621 - B	46B11f		41
Silicon Bronze		QQ-C-593	46B28		
Aluminum Bronze	B 148, 9A & 9B	QQ-B-671a	46B18c		68
Underwriters' Mixture		WW-C-621a	34F 3c		
H. S. Manganese	B 147, 8B	QQ-B-726b B & C	46B29 "MA-c"	4862	
Regular Manganese	B 147, 8A	QQ-B-726b - A	49B 3e "Mn-c"	4860	43
Leaded Manganese	B 147, 7A	E-QQ-B-726b - A			

Down-grading chart for brass and bronze castings, showing specifications and material requirements. Specifications, as shown, are approximately equivalent, but may not in all cases be interchangeable for procurement and inspection

Washington on Jan. 14. This 1943 total supply will cover presently known requirements, with a margin for stockpile.

Lead will not be imported from Canada and Australia in 1943 as has been done previously, reducing total imports considerably, while South American imports are taking second place in shipping to more critical materials, he stated. Domestic mines and smelters will have great difficulty maintaining production at the same rate as in 1942, labor and materials being critical factors, it was understood.

Discussion developed reports of success in substituting lead for more critical materials in the following products: Building materials; lead protective coatings for steel and other metals to relieve zinc; high-lead bearing metals and solders; caskets; chemical plant equipment, as a replacement for rubber; paint containers (foil lined) instead of steel; gaskets and washers to replace rubber; pigments to replace other metallic pigments, and instruction plates.

Metallic Bismuth Placed Under Complete Control

WPB has put metallic bismuth under complete allocation and use control, ef-

fective Feb. 1. Exceptions to the order are: deliveries to Metals Reserve Co.; deliveries to other producers or to a distributor if he does not have an excessive inventory; and deliveries to persons whose total receipts during the month are less than 50 pounds.

South American Imports May Provide Antimony Stockpile

Antimony supply and requirement figures for 1943 reveal that the United States position with respect to supply of antimony depends upon South American imports, it was said at the first meeting of the Antimony Industry Advisory Committee held in Washington with Erwin Vogelsang, director of WPB's tin-lead division as government presiding officer. The committee, formed for the purpose of advising WPB on industry problems, represents all segments of the antimony producing industry.

Total of sure imports and domestic primary and secondary production are slightly less than anticipated requirements, but the addition of South American imports, if they reach expected volume, will provide a surplus of antimony. Industry representatives recommended

relaxing conservation Order M-112 which covers allocation of antimony and use restrictions, with special reference to permitting use of greater amounts of antimony in battery grids, in nonacid resisting enamels, and in other antimonial lead uses. WPB pointed out to the committee the necessity for maintaining sufficient control to build a stockpile and to provide for any interruption of imports which might develop.

The group discussed technical problems encountered in various grades of ores and concentrates.

The committee is made up of the following men—V. L. Kegler, president, Texas Mining & Smelting Co., Laredo, Tex.; R. H. Giebel, vice president, Harshaw Chemical Co., New York; R. L. McLean, vice president, McGean Chemical Co., Cleveland; Eugene Becker, Metal & Thermit Co., New York; L. G. Mathews, American Smelting & Refining Co., New York; I. H. Cornell, Bunker Hill & Sullivan Mining and Concentrating Co., Kellogg, Idaho; R. M. Hardy, president, Sunshine Mining Co., Kellogg, Idaho.

Plan Replenishment of Copper Warehouse Stocks

Copper Warehouse Distributors Industry Advisory Committee and WPB officials have formulated detailed plans for the replenishment of the warehouse stocks. These plans were accepted at a recent meeting here with officials of the WPB Copper Division and are expected to be put into effect soon. The consensus of those attending the meeting, over which J. W. Douglas of the copper section presided, was that warehouses are going to play an essential part in the CMP plan.

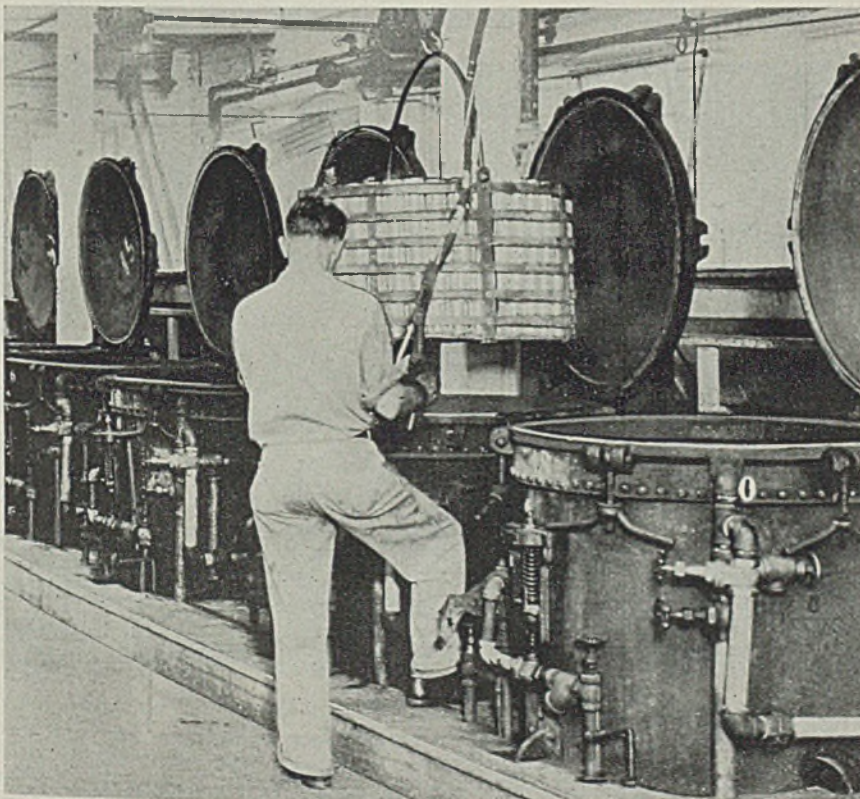
At present nonferrous warehouses are allowed to use an AA-1 rating with which to replenish stocks sold. Since warehouses are selling on ratings down to AA-5, this higher replacement rating should help to replenish their stocks.

Booklet Classifies Tin Mill Extras, Deductions

Jones & Laughlin Steel Corp., Pittsburgh, has issued a booklet covering classification of extras and deductions on various tin mill products, including electrolytic tin plate, coke and charcoal tin plate, manufacturing ternes, special coated manufacturing ternes and tin mill black plate in 29 gage and lighter.

The new publication is a condensation of two previously issued lists covering tin mill black plate and tin plate and special coated manufacturing ternes. These latter lists were issued in 1938 and are now superseded.

FOOD PROCESSED FOR UNKNOWN DESTINATION



SEALED cans of food are lowered into a vertical retort or pressure cooker to be exposed to live steam for the time required to heat-process them. This is a type of goods soon to be strictly rationed. Photo, courtesy, American Can Co.

Elmes Engineering Now Part Of American Steel Foundries

Charles F. Elmes Engineering Works, Chicago, has become a part of American Steel Foundries of that city. The present Elmes organization will remain intact and will operate as a separate unit. Charles F. Elmes will remain as general manager of the company, which manufactures hydraulic presses and special machinery. Business will be conducted at the present address, Morgan and Fulton streets, Chicago.

"Don't let this happen," is the heading on the first of a series of posters being distributed by Genesee Tool Co., Fenton, Mich., designed to teach workers the importance of tool care. The poster shows a tool crib with empty shelves and a sign across the window, reading "Closed due to tool shortage," and "There is only so much tool steel available. Every time a tool is broken, that tool must be replaced if production is to continue. Today, it takes as much as six months to obtain tool replacements."

More than 15,000 tons of steel have been saved through improvements in the manufacture of shells in plants of Pullman-Standard Car Mfg. Co., Chicago, Wallace N. Barker, vice president, announced recently. He said efforts to refine the methods of piercing shell forgings and drawing them to size resulted in savings of as much as 40 pounds per shell. Forgings averaging about 155 pounds each were reduced to an average of 126 pounds.

P. D. Briggs, vice president and general sales manager, and Harry J. Lagodzinski, sales representative, were among 12 new members inducted into the 25-Year Club of Ilg Electric Ventilating Co., Chicago, at the company's annual banquet Dec. 16. Others taken into the club by John M. Frank, president, for completion in 1942 of 25 years of service included F. Cymanowski, Andrew Dallman, J. Dallman, J. Duda, J. Durava, H. Koscierzyzna, S. Novak, J. Novak, L. E. Peterson and E. Wertke. The new members were given engraved gold watches by Mr. Frank.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has discontinued for the duration of the war the research fellowships awarded annually during the past five years.

Glenn-Roberts Co., Oakland, Calif., manufacturer of welders, has opened a branch factory at 2107 Adams street, Indianapolis, to handle expanded requirements of the company's eastern and mid-

western customers. Sales headquarters for this area have been moved from Chicago to the new plant. James E. Vosburgh will head the staff as general manager.

National Mining Co., Pittsburgh, shareholders have approved a plan for liquidation and will be absorbed by the H. C. Frick Co.

Heil Co.'s repair and storage plant in Chicago was virtually destroyed by fire following several explosions which occurred while a gasoline tank truck was being repaired. The plant was a one-story building, 150 x 200 feet, and was a branch of Heil Co., Milwaukee.

Filming of a documentary motion picture showing how Westinghouse is producing implements of war has begun at the Westinghouse Electric Elevator Co., Jersey City, N. J. Being made with the sanction of Army and Navy authorities, the film, entitled "We Shall Win", is designed to show as much as possible about miracles being performed on the production line without revealing military secrets. At the Elevator company, manufacture of mounts for rapid-firing 1.1 inch anti-aircraft guns is being filmed, after which manufacture of vital war

weapons at other Westinghouse plants will be photographed. The sound movie, to be completed by the spring of 1943, will be shown first to company employees, then will be available for showings at schools, clubs and churches. A condensed version will be shown in public theaters.

Cooper-Bessemer Corp. with plants in Mt. Vernon, O., and Grove City, Pa., reports a steady increase in its engine output. Gordon Lefebvre, vice president and general manager, credits the engine erectors at the Mt. Vernon plant with "98 per cent efficiency" mainly due to a five-point job program. Efficiency at the Grove City plant has been increased 18 per cent over the last five months.

Brown Fintube Co., Elyria, O., will produce complete ready-to-use heat exchangers for the duration of the war as a service to users who are unable, due to rush of war work, to obtain equipment from usual sources of supply. The exchangers will be built in all standard types and in capacities to meet practically any heating and cooling requirement.

Manhattan Rubber Mfg. Division, Ray-

DUTCH BOY AND GIRL SPARK DRIVE AGAINST DIRT



CLEANLINESS and good housekeeping at various General Electric Co. works are recognized and encouraged by the appearance of life-size figures of the Dutch boy and girl, "Spic and Span." In other places in the plants where there is marked improvement in neatness and care in the handling of tools, foremen place 6-inch cutouts of the pair with the invitation to "Take one, if your bench is neat and clean." A figure known as "Sloppy Sam," the opposite of "Spic and Span," appears in shops where housecleaning is needed. The cutouts add zest to company's overall program to speed up war production

bestos-Manhattan Inc., Passaic, N. J., has established a 14-room hospital to provide medical care for employes.

Cincinnati Gear Co., Cincinnati, has placed in operation a new plant increasing capacity by 50 per cent.

Ore & Ferro Co., New York, has moved its offices in that city from 44 Beaver street to 30 Broad street.

Consolidation of the Michigan Alkali Co. and the J. B. Ford Co., its affiliate, into one company to be known as Wyandotte Chemicals Corp., is announced by E. M. Ford, president. Other officers of the new corporation are: F. S. Ford and W. F. Torrey, vice presidents; Ford Ballantyne, secretary-treasurer; S. T. Ori, vice president in charge of manufacturing; I. H. Taylor, vice president in charge of sales; G. W. Schwarz, controller; C. B. Robinson, vice president in charge of sales, J. B. Ford Division, and Bert Cremers, vice president in charge of sales, Michigan Alkali Division. Sales departments will continue as separate identities as divisions of Wyandotte Chemicals Corp.

Northern Metal Products Co., Chicago, has purchased one-story building, containing 22,000 square feet.

Albert Ramond, president, Bedaux Co., New York, issued a statement last week saying there is no direct association between the management of this American industrial engineering firm and Charles E. Bedaux, reported arrested in North Africa. Mr. Ramond said financial relations between Mr. Bedaux and the company were severed five years ago. Other interests in America still retained by Mr. Bedaux "are under complete government control."

Paul Caruso, a production line worker for Walter Kidde & Co., New York, was named America's first industrial "Safety Ace" and awarded a \$100 war bond for developing a device preventing accidents and eliminating work-stopping noises. Award was made by National Safety Council's War Production Fund to Conserve Manpower. Caruso's invention has reduced the number of eye injuries resulting from a testing apparatus, and has reduced the noise by 75 per cent.

Largest lens production in its history is announced by American Optical Co., Southbridge, Mass., as it celebrates 110 years of continuous service. Organized in 1833, the company employs over 12,000 men and women. More than 70 per cent of production is for the war.

Small Manufacturers To Meet in Cleveland, Jan. 27

A war production clinic for small manufacturers in northern Ohio—employing less than 500 men and women—will have William L. Batt, vice chairman of the War Production Board, Washington, as the main speaker in Cleveland on Jan. 27.

Arch T. Colwell, vice president, Thompson Products Inc., is chairman, and Fred C. Crawford, president of the company and president of the National Association of Manufacturers, will be the toastmaster.

Speakers during the afternoon will include Major George L. Becker, United States Army Air Forces, central procurement district; Lieutenant Commander William Baker, office of inspection of naval materials; and C. J. Reese, president, Continental Motors Corp., Detroit. Following are the panel subjects and chairmen:

Preventive maintenance, George E. Bechtel, vice president, Trundle Engineering Co.; personnel and training, L. O. Mellon, assistant district representative, WPB; welding, R. J. Kriz, chief inspector, James H. Herron Co.; utilization of idle equipment, Fred Colvin, editor emeritus of *American Machinist*; processing methods and tooling, Howard Jones, works manager, White Motor Co.; inspection, Dr. John W. W. Sullivan, director of training, Cleveland ordnance district.

Planning and scheduling material control, R. R. Stratton, district manager, WPB; heat treating methods, control and facilities, R. R. Abbot, metallurgical engineer, White Motor Co.; salvage of tools, material, B. W. King, president,

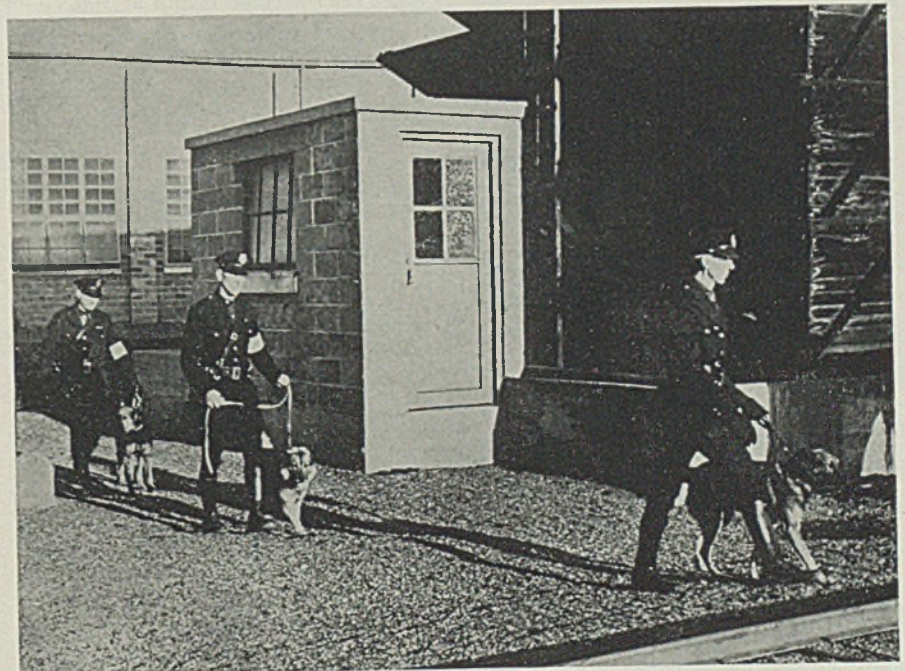
King Tool Grinding Co.; controlled materials plan, Gordon Yule, assistant regional director of priorities, WPB; power, electrical problems, motors, C. A. Harrington, Cleveland Electric Illuminating Co.

Engineers Society of Western Pennsylvania: Annual banquet in William Penn hotel, Pittsburgh, Feb. 8. W. M. Jeffers, rubber director, War Production Board, and Sir G. Campbell, G. C. M. G., minister and special assistant to British ambassador, Washington, are scheduled speakers. J. K. B. Hare, new president of the society and central district manager, Westinghouse Electric & Mfg. Co., Pittsburgh, will preside. Dr. W. N. Jones, director, college of engineering, Carnegie Institute of Technology, Pittsburgh, will be toastmaster.

American Management Association: Management executives will meet with officials of the War Manpower Commission in Palmer House, Chicago, Feb. 10-12 to discuss manpower problems.

National Screw Machine Products Association: Keynote of convention in Hotel Statler, Detroit, Jan. 21-22, will be the industry's 100 per cent participation in war work. The program is designed to furnish constructive ideas on the two major problems facing the industry this year—material and manpower.

TRAINED DOGS AID NIGHT PATROL IN TANK PLANT



DOGS trained by the United States Army are shown with guards at an American Car & Foundry Co. tank plant in Pennsylvania, reported to be one of the first war plants to use this means of protection. The dogs are used in night patrol in searching dark corners

"Trouble-Shooting" Unit Helps Eliminate War Production Snags

WPB has established in the fifth region a "trouble-shooting" unit, Production Engineering Service, which is achieving unusual success in opening up production bottlenecks and increasing the flow of critical war products.

As the result of its test in northern Ohio, the service is now being extended to the entire fifth region, comprising Ohio, Kentucky, western Pennsylvania, and West Virginia.

The unit, comprising 15 highly trained engineers, goes into action whenever any branch of the armed forces certifies that delays are hampering production of certain needed items. An engineer is assigned to the task, with instructions to solve the problem by the quickest, most effective methods possible and report progress within 48 hours. Headquarters are in Cleveland.

In furtherance of the Production Engineering Service's objectives, its engineers are expected to make full use of federal facilities on materials distribution; idle machine-tool equipment; priorities; used machine tools; labor; labor morale; idle plant facilities; new machine tools; manpower, and expediting.

The following actual examples illustrate the methods and results of Production Engineering Service:

A manufacturer of vital bearings had exhausted his resources, and the Air Corps had rejected his final shipment of 10,000 bearings. The PES engineer located an aircraft company willing to advance money against delivery of these essential bearings. He also corrected inspection methods and improved the plant layout to permit production of 5000 bearings a week instead of 1250, and now is working on possibilities for stepping up weekly production to 7500.

Over 160 ships, already launched, were undeliverable for lack of certain essential fittings; the fittings in turn were awaiting electrical equipment. A scheduling program swiftly instituted in the two factories started an immediate flow of fittings to the ships. In another case new ships were being held in port because of a bottleneck on anchor production. The PES engineer found that unduly severe tests at the anchor factory were breaking two-thirds of the anchors tested. With this situation corrected the production pace was resumed and the vessels soon started to sea.

A state law prohibited use of certain equipment vital to shell production.

Within 48 hours the PES engineer was able to have the needed changes made, and production went on at high speed.

A firm employing 1100 men was threatened with complete shutdown for nonarrival of needed bearings. By rearranging schedules and instituting sub-assembly methods in place of production of complete assemblies the engineer was able to keep the entire force working full time until the bearings arrived a week later.

The Production Engineering Service was developed in the district by C. E. Gorey. In the three months it has operated the organization has received 720 requests for assistance; the latest weekly report shows 103 requests.

Iron, Steel Inventories Show Slight Increase

Index of the value of iron and steel manufacturers' inventories, based on the average month of 1939 as 100, was 138.3 in November, 1942, compared with 135.7 for October, and 127.8 in November, 1941.

Iron and steel manufacturers' shipments indexes were 214 during November, compared with 212 for October, and for the previous November, using the same 1939 average month at 100.

Index of value of new orders, based on using January, 1939, as 100, was 266 during November, 1942, compared with 223 for October, and 225 for November, 1941.

Brassert Tells Legislature of North Carolina Resources

North Carolina has sufficient and suitable iron ore and plenty of coal with which to make sponge iron, H. A. Brassert, metallurgist, told members of the North Carolina legislature at a meeting called by Gov. J. M. Broughton to discuss the possibilities of exploiting these minerals.

Mr. Brassert, as pointed out in the Dec. 7, 1942 issue of STEEL, page 84, was commissioned to build the \$450,000 sponge iron pilot plant for the Republic Steel Corp. at Warren, O., the first such plant in this country.

Introduced by Gov. Broughton, Mr. Brassert spoke briefly on the method of producing sponge iron. He stated that North Carolina's iron ore is of sufficient quality and quantity to be used eco-

nomically for making high-grade metal.

At least 65,000,000 tons of coal is recoverable in this state, he said. Gas, derived from North Carolina coal, will be a valuable by-product of the operation, since it emerges from the ore better in heating and illuminating qualities than when it entered. He cited plastics, pharmaceutical products and fertilizers as by-products of the sponge iron process.

Bureaus Consolidated By Carnegie-Illinois

Effective Feb. 1, 1943, present functions and personnel of the bureau of market research, bureau of sales statistics and the sales statistician, and all of the general sales departments of Carnegie-Illinois Steel Corp. in Pittsburgh, will be consolidated into a new commercial research division.

Major activities of the division will cover analyses of product sales by industries, territories and customers, of competition, performance and profits, of distribution and trends, and basic studies required as a sales background.

Francis Juraschek has been named manager of the division. He has been manager of the bureau of market research for the past four years. Prior to that he was consulting editor of *The Iron Age*. His earlier experience includes engineering work in the East and over 20 years of industrial advertising, sales promotion and market research.

Elmer E. Erickson, for many years manager of the bureau of sales statistics, has been named assistant manager of the division. Mr. Erickson joined the statistical staff of the Illinois Steel Co. in Chicago over 20 years ago, and at the time of the consolidation with Carnegie Steel Co. took over the management of the combined statistical staffs at Pittsburgh.

Reuel L. Twitchell, formerly sales statistician, has been named sales analyst in the new division.

Estimate Carloadings Will Increase 2 Per Cent

Great Lakes Regional Advisory Board forecasts a 2.3 per cent increase in carloadings in its territory for the first quarter of 1943, compared with the period last year. The estimate for the present period is 545,118. Estimates for various products follow:

	—First quarter—	
	1943	1942 (Actual)
Iron, Steel	71,066	71,066
Coal, Coke	15,361	16,170
Ore, Concentrates	39,309	39,309
Machinery & Boilers	8,511	8,703

Activity Index Back to Pre-Holiday Levels

WITH production goals now geared to available raw material supplies, the job ahead is to effect the maximum utilization of those materials. In some quarters it is thought the manpower problem may prove to be a serious obstacle.

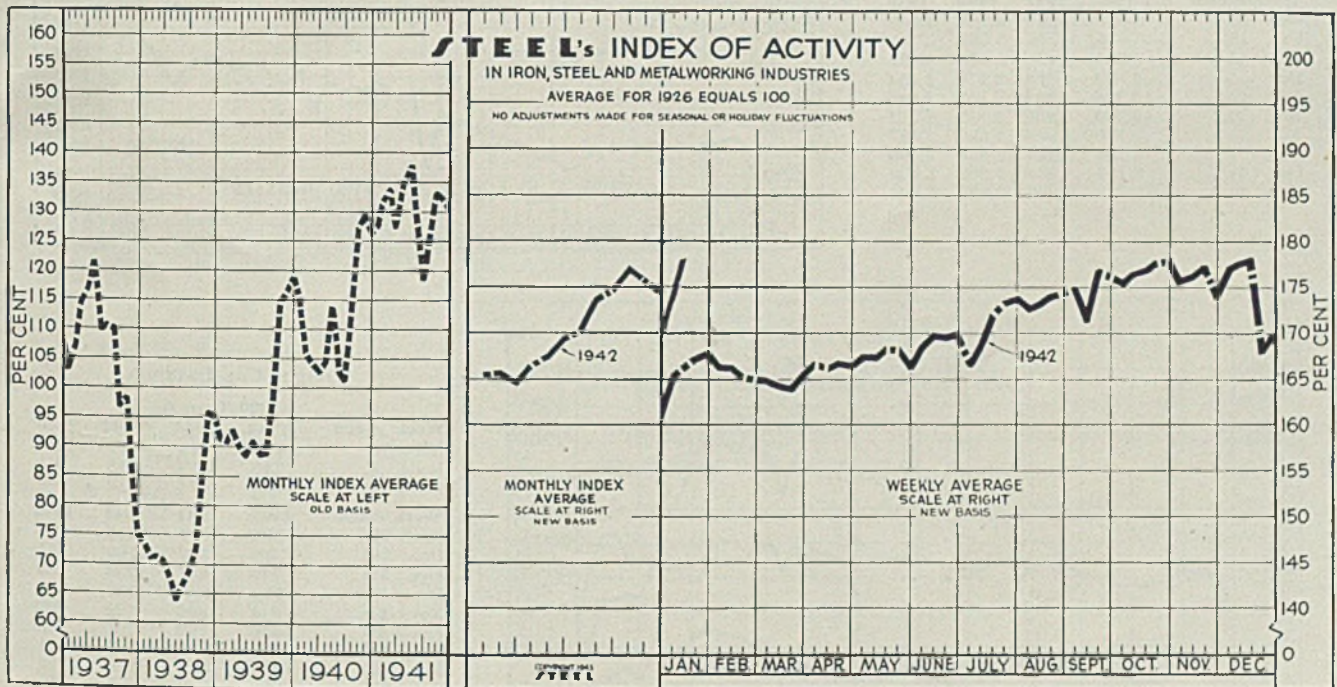
Indicative of the effort to increase the mining of important metals, a WPB advisory committee is urging that mining equipment manufacturers be brought back into their regular line. Some equipment builders have been attracted to the production of ordnance.

STEEL's index of activity climbed 2.2 points to 177.9 during the week ended Jan. 16. The index has recovered

most of the ground lost during the year-end holiday period. The all-time peak established by the index of 178 during the week ended Dec. 19, is only slightly above the current level.

Steel ingot production stood at 99 per cent for the week ended Jan. 16, a gain of 1.5 points over the preceding week's orders. Volume of incoming orders has shown some improvement in recent weeks, but is below previous levels. Total steel output is being rapidly absorbed. Steel scrap collections are off because of unfavorable weather conditions. However, this development is not expected to adversely affect steel production schedules for the immediate future.

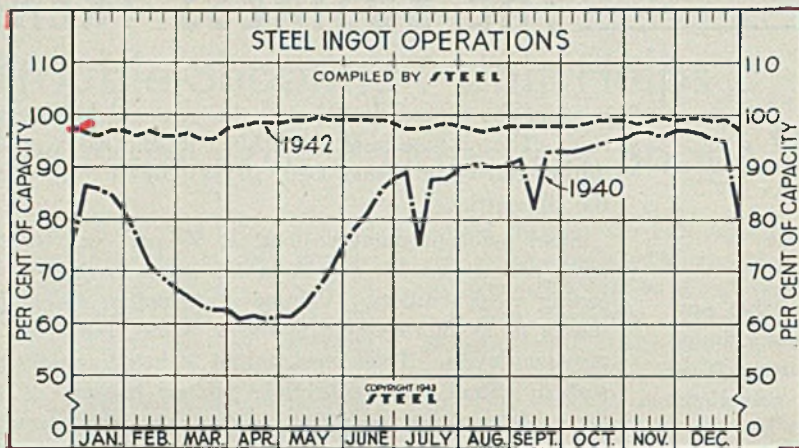
Electric power consumption totaled 3,952,479,000 kilowatts during the latest period, substantially unchanged from the preceding week. Compared with a year ago power output is up 14.5 per cent. A moderate seasonal gain in freight traffic also occurred in the week ended Jan. 16 to reach about 755,000 cars.



STEEL's index of activity gained 2.2 points to 177.9 in the week ending Jan. 16:

Week Ended	1942	1941	Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Nov. 21	177.3	128.4	Jan.	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Nov. 28	174.0	132.2	Feb.	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
Dec. 5	177.1	133.4	March	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
Dec. 12	177.6	134.0	April	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
Dec. 19	178.0	132.9	May	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
Dec. 26	167.8	120.5	June	169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
Week Ended			July	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Jan. 2	170.0	161.0	Aug.	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Jan. 9	175.7	165.6	Sept.	174.8	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Jan. 16	177.9†	166.6	Oct.	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
			Nov.	175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
			Dec.	174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3

†Preliminary.
 Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production

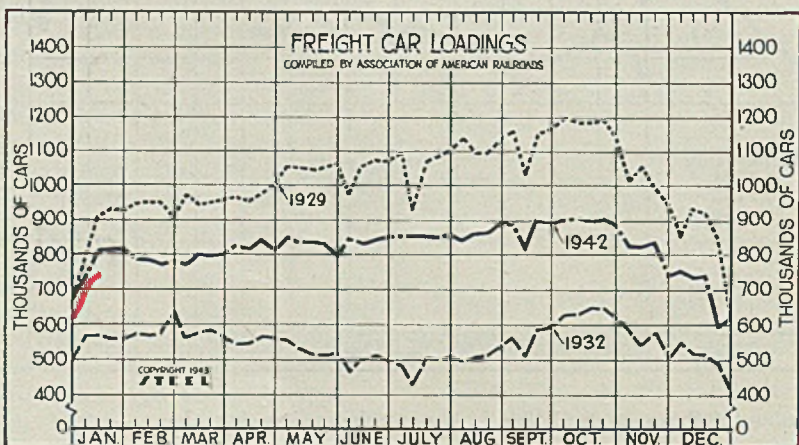
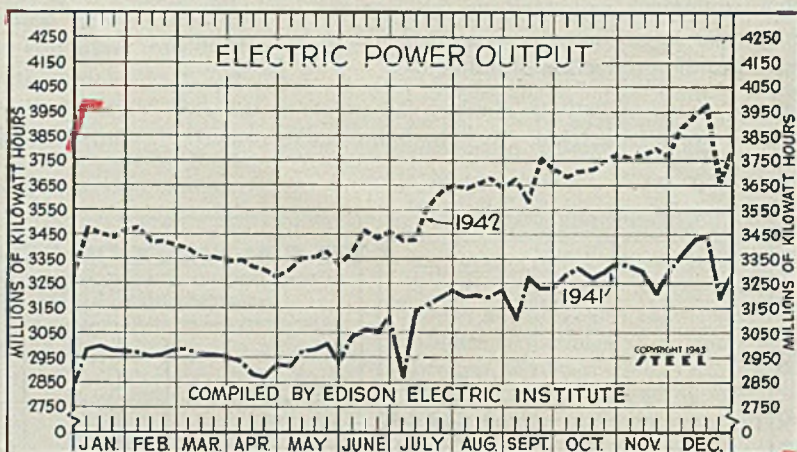


Steel Ingot Operations

		(Per Cent)			
Week ended	1943	1942	1941	1940	1939
Jan. 16	99.0	96.0	94.5	84.5	
Jan. 9	97.5	96.5	93.0	86.0	
Jan. 2	97.5	97.5	92.5	86.5	
Week ended	1942	1941	1940	1939	
Dec. 26	99.0	93.5	80.0	75.5	
Dec. 19	99.0	97.5	95.0	90.5	
Dec. 12	99.5	97.5	95.5	92.5	
Dec. 5	99.5	96.5	96.5	94.0	
Nov. 28	99.0	95.0	97.0	94.0	
Nov. 21	99.5	95.5	97.0	93.5	
Nov. 14	99.0	97.0	96.0	93.5	
Nov. 7	98.5	97.5	96.5	93.0	
Oct. 31	99.0	95.5	96.5	93.0	
Oct. 24	99.0	95.5	95.5	92.0	
Oct. 17	99.0	96.5	95.0	91.0	
Oct. 10	98.5	94.5	94.5	89.5	

Electric Power Output
(Million KW/H)

Week ended	1943	1942	1941	1940
Jan. 16	3,952	3,450	2,996	2,674
Jan. 9	3,953	3,473	2,985	2,688
Jan. 2	3,780	3,289	2,831	2,558
Week ended	1942	1941	1940	1939
Dec. 26	3,656	3,234	2,757	2,465
Dec. 19	3,976	3,449	3,052	2,712
Dec. 12	3,938	3,431	3,004	2,674
Dec. 5	3,884	3,368	2,976	2,654
Nov. 28	3,766	3,295	2,932	2,605
Nov. 21	3,795	3,205	2,839	2,561
Nov. 14	3,776	3,305	2,890	2,587
Nov. 7	3,762	3,326	2,858	2,589
Oct. 31	3,775	3,339	2,862	2,609
Oct. 24	3,753	3,299	2,867	2,602



Freight Car Loadings

		(1000 Cars)			
Week ended	1943	1942	1941	1940	1939
Jan. 16	755†	811	703	646	
Jan. 9	716	737	712	668	
Jan. 2	621	674	614	592	
Week ended	1942	1941	1940	1939	
Dec. 26	592	607	545	550	
Dec. 19	743	799	700	655	
Dec. 12	740	807	736	681	
Dec. 5	760	833	739	687	
Nov. 28	844	866	729	689	
Nov. 21	836	799	733	677	
Nov. 14	827	884	745	771	
Nov. 7	829	874	778	786	
Oct. 31	891	895	795	806	

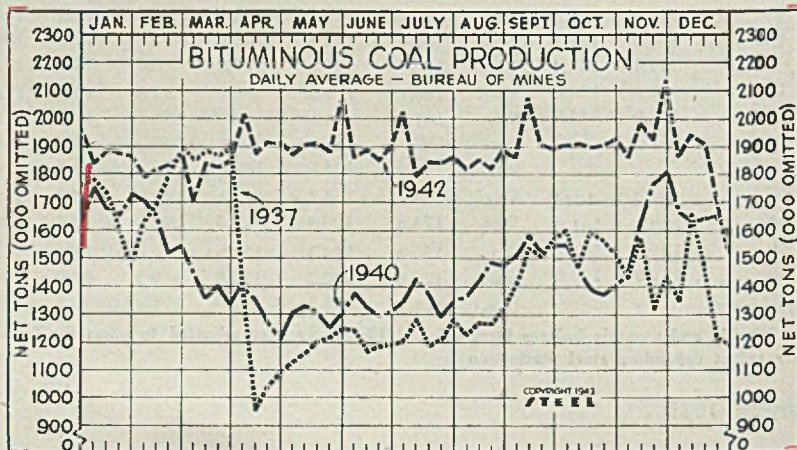
† Preliminary.

Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

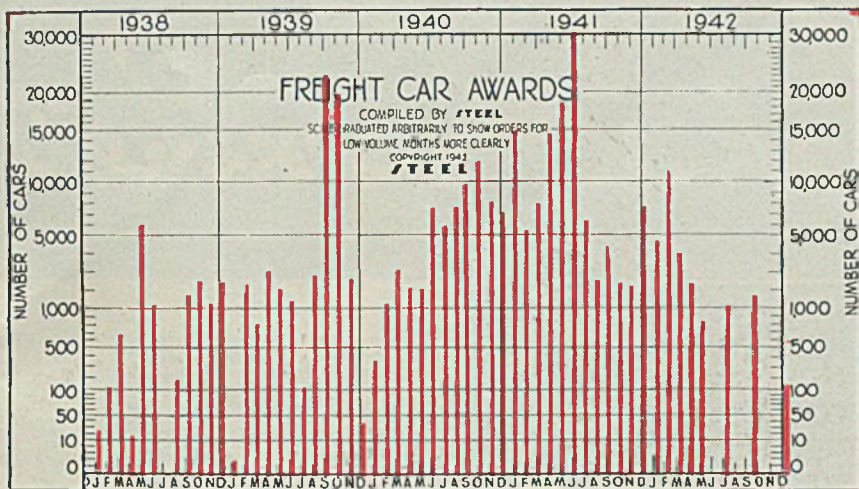
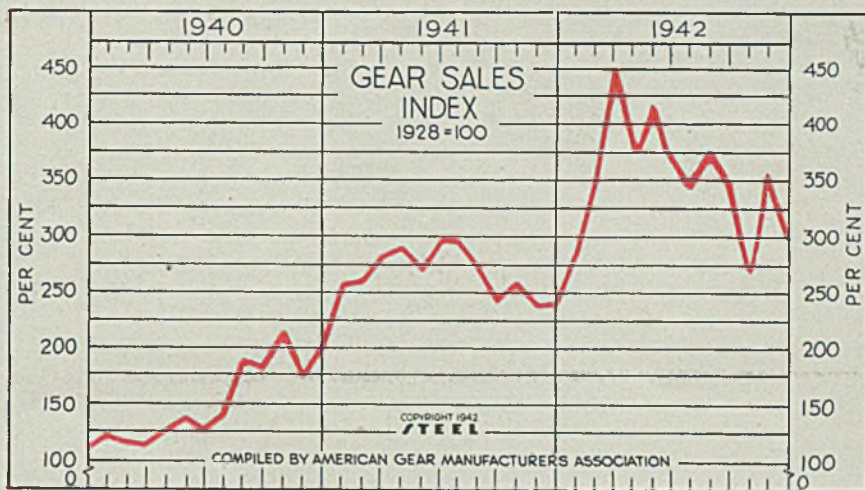
Week ended	1943	1942	1941	1937
Jan. 9	1,830	1,842	1,691	1,780
Jan. 2	1,555	1,960	1,762	1,764
Week ended	1942	1941	1940	1937
Dec. 26	1,720	1,632	1,591	1,230
Dec. 19	1,913	1,792	1,656	1,477
Dec. 12	1,944	1,817	1,645	1,669
Dec. 5	1,853	1,813	1,636	1,347
Nov. 28	2,149	1,958	1,674	1,444
Nov. 21	1,925	1,615	1,815	1,318
Nov. 14	1,989	1,988	1,773	1,580
Nov. 7	1,867	1,826	1,632	1,433
Oct. 31	1,937	1,759	1,444	1,514
Oct. 24	1,902	1,818	1,403	1,569
Oct. 17	1,900	1,817	1,381	1,597



Gear Sales Index

(1928 = 100)

	1942	1941	1940	1939	1938
Jan.	288	259	123	91.0	93.0
Feb.	353	262	116	86.0	77.0
Mar.	455	288	114	104.0	91.0
April	378	292	128	88.0	74.0
May	421	273	133	93.0	70.0
June	373	299	129	90.0	58.0
July	344	298	141	89.0	67.0
Aug.	380	276	191	96.0	76.5
Sept.	351	243	183	126.0	80.5
Oct.	263	261	216	141.0	72.5
Nov.	359	241	173	126.0	72.0
Dec.	300	243	208	111.0	81.0
Ave.	355	269.6	155.0	103.0	76.0



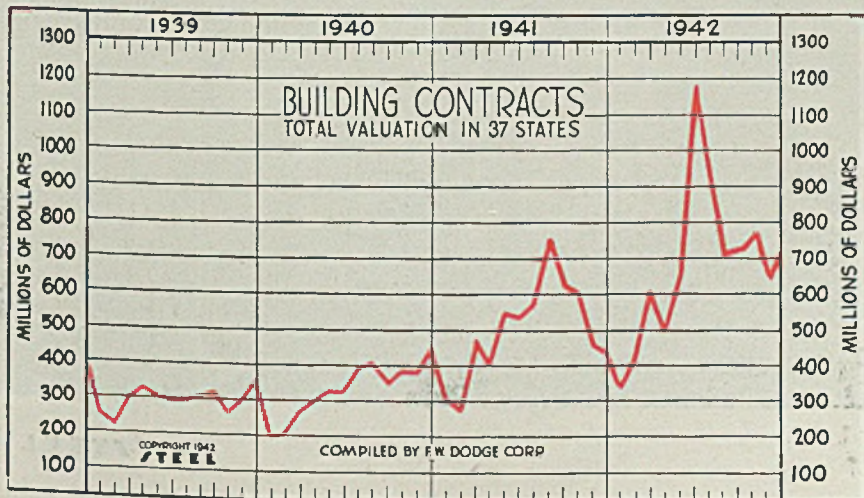
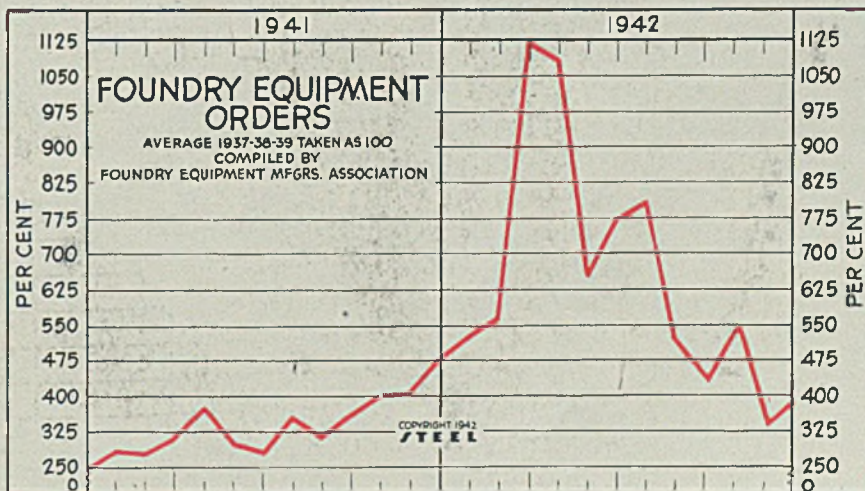
Freight Car Awards

	1942	1941	1940	1939
Jan.	4,253	15,169	360	3
Feb.	11,725	5,508	1,147	2,259
March	4,080	8,074	3,104	800
April	2,125	14,645	2,077	3,095
May	822	18,630	2,010	2,051
June	0	32,749	7,475	1,324
July	1,025	6,459	5,846	110
Aug.	0	2,668	7,525	2,814
Sept.	1,863	4,470	9,735	23,000
Oct.	0	2,499	12,195	19,634
Nov.	0	2,222	8,234	2,650
Dec.	135	8,406	7,181	35
Total	26,028	121,499	66,889	57,775

Foundry Equipment Orders

Monthly Average
(1937-38-39 equals 100)

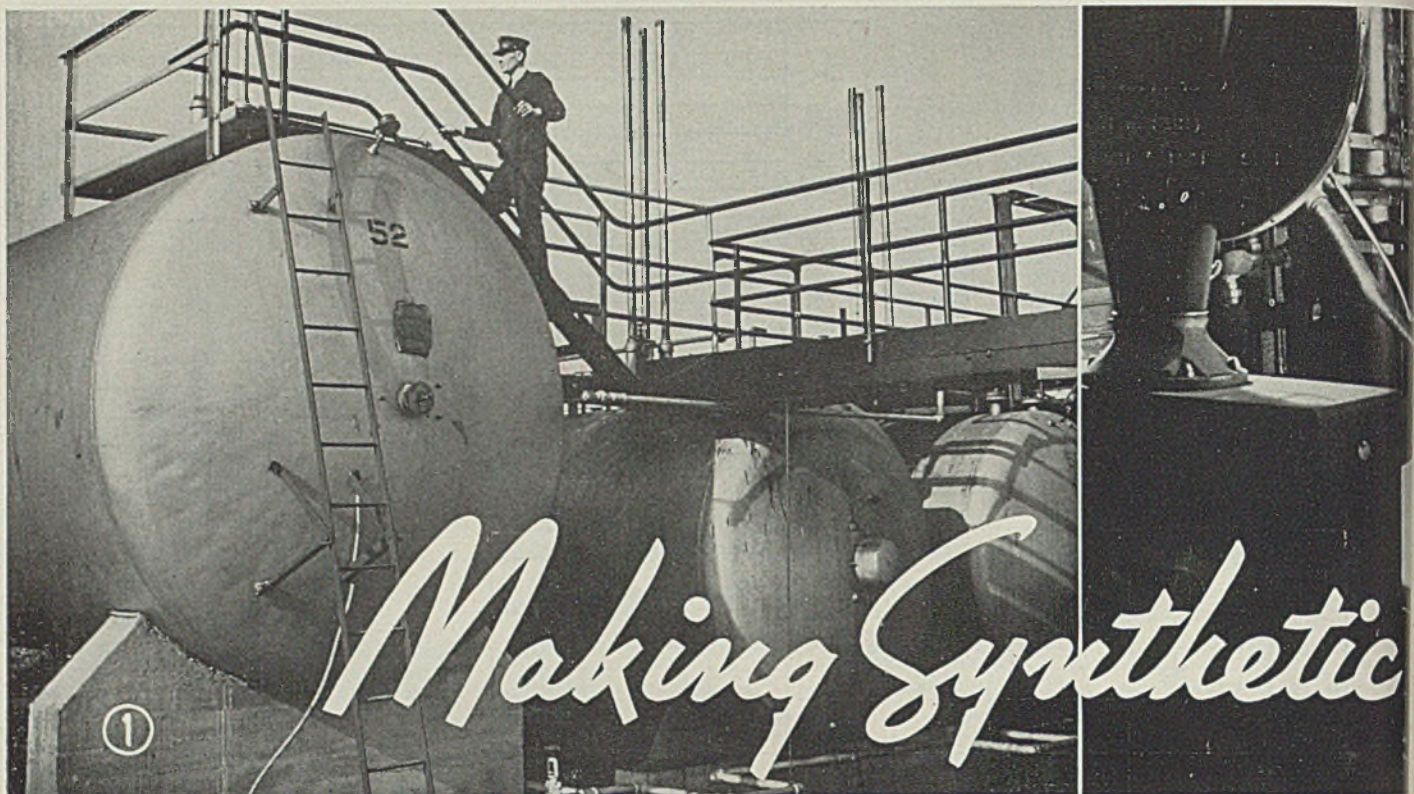
	1942	1941	1940
Jan.	532.7	285.3	149.0
Feb.	567.9	281.1	135.7
March	1122.4	315.2	183.2
April	1089.3	377.2	145.2
May	653.6	298.7	129.1
June	774.0	281.1	164.9
July	800.8	358.1	194.4
Aug.	510.8	312.9	165.4
Sept.	446.4	363.8	161.2
Oct.	540.6	403.8	264.0
Nov.	388.8	408.5	254.2
Dec.	382.5	481.2	257.8
Year	646.7	345.6	184.0



Construction Total Valuation In 37 States

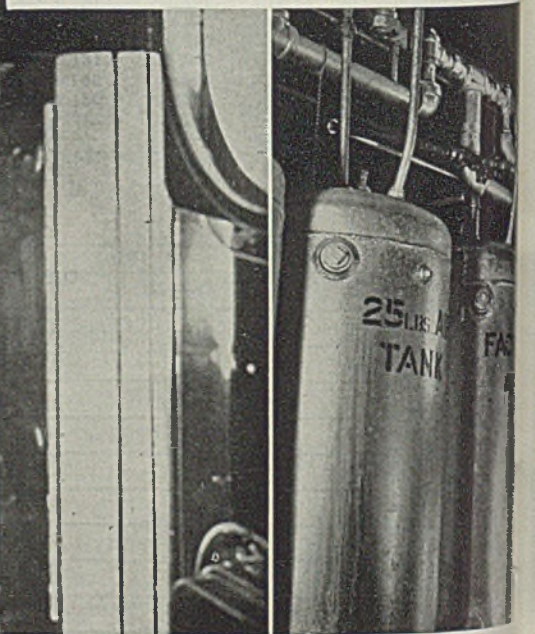
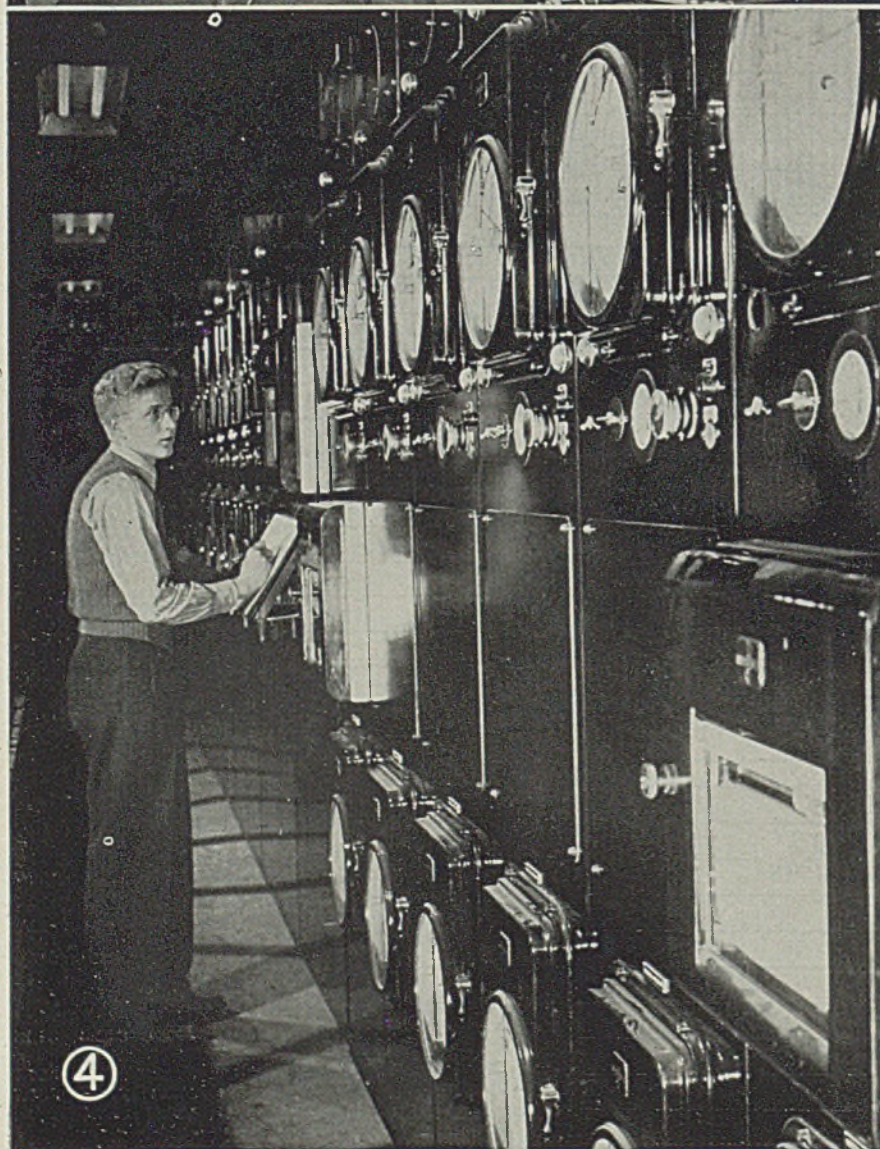
(Unit: \$1,000,000)

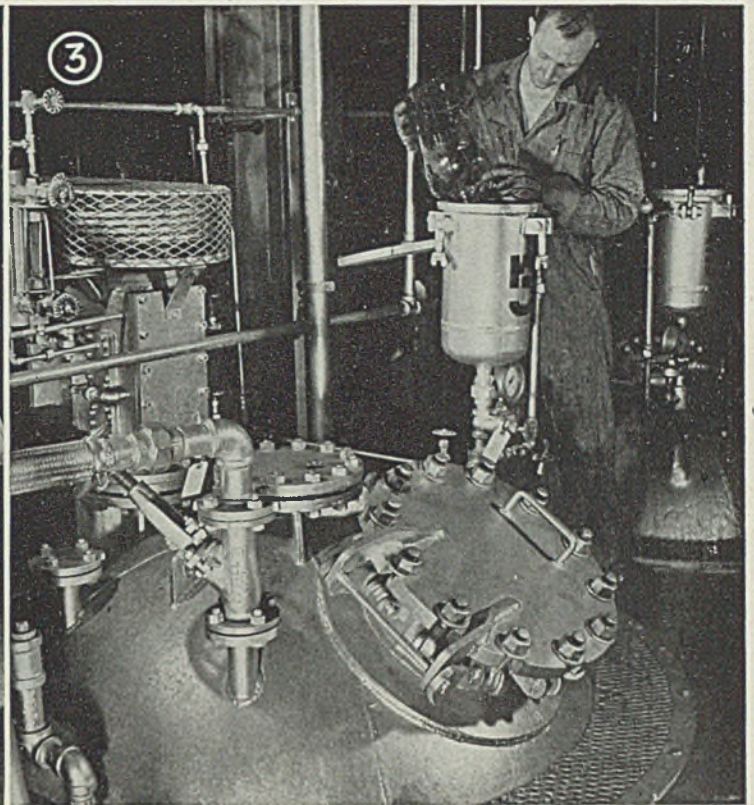
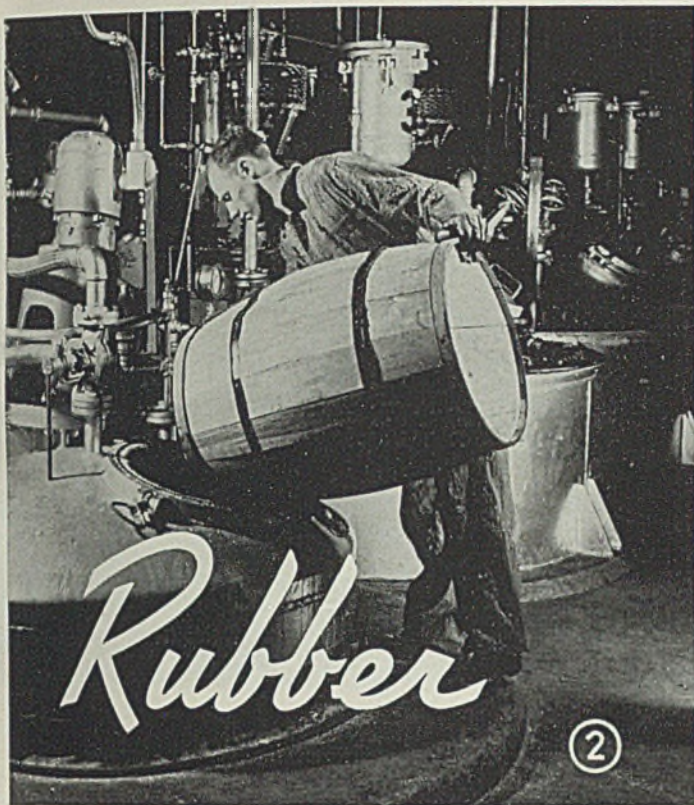
	1942	1941	1940	1939	1938
Jan.	\$316.8	\$305.2	\$196.2	\$251.7	\$192.2
Feb.	433.6	270.4	200.6	220.2	118.9
Mar.	610.8	479.9	272.2	300.7	226.6
April	498.7	406.7	300.5	330.0	222.0
May	673.5	548.7	328.9	308.5	283.2
June	1190.3	539.1	324.7	288.3	251.0
July	943.8	577.4	398.7	299.9	239.8
Aug.	721.0	760.3	414.9	312.3	313.1
Sept.	723.2	623.3	347.7	323.2	300.9
Oct.	780.4	606.3	383.1	261.8	357.7
Nov.	654.2	458.6	380.3	299.8	301.7
Dec.	708.7	431.6	456.2	354.1	389.4
Ave.	\$687.9	\$500.6	\$333.7	\$295.9	\$266.4



Section 10 in a Series on Conservation and substitution

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
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And
Contributing Editor, STEEL

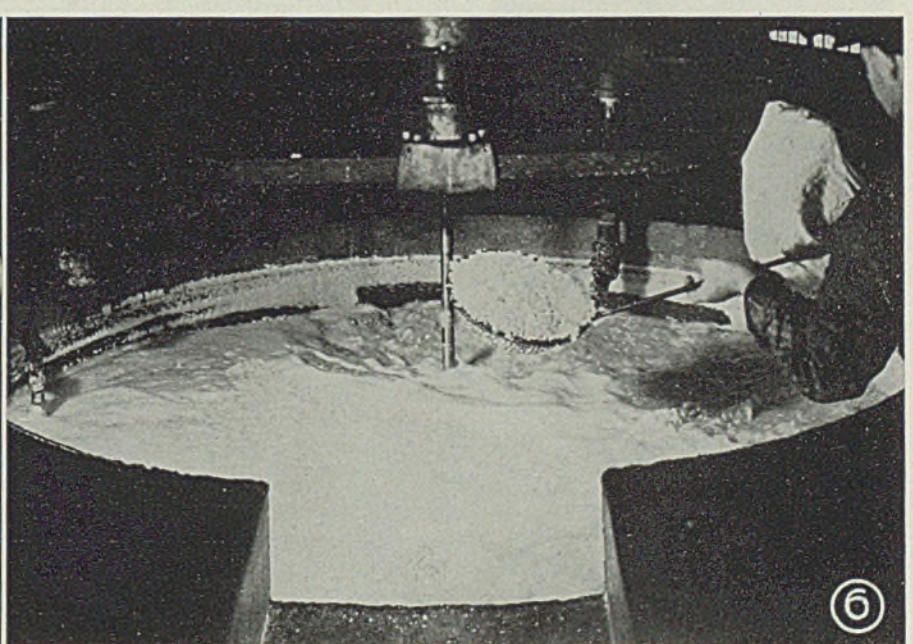
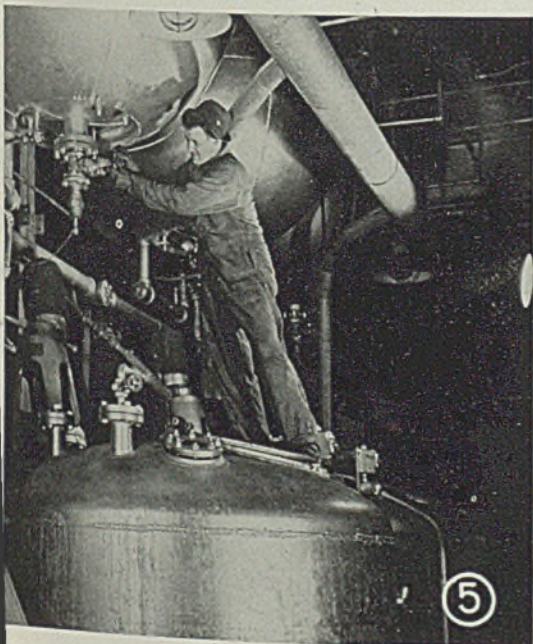


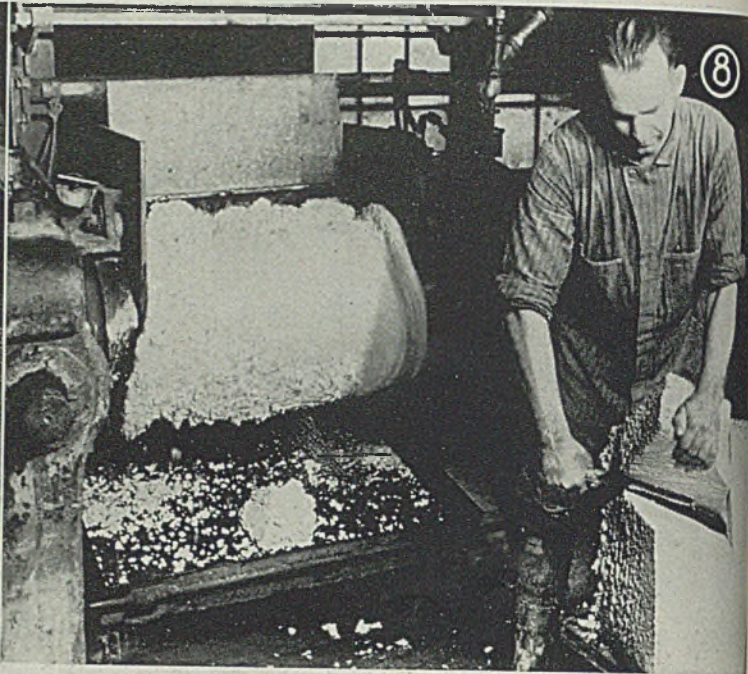


SYNTHETIC rubber to replace our dwindling stocks of natural crude rubber is being manufactured by several companies under various trade names. Ameripol, developed during 16 years of research by B. F. Goodrich Co., Akron, O., is composed entirely of materials found within the United States — principally soap and derivatives of petroleum and natural gas. It has for its basic ingredient butadiene, a liquified gas obtained by "cracking" petroleum. Fig. 1 shows cylinders in which butadiene is stored under pressure at a plant produc-

ing this highly regarded synthetic. The butadiene and other ingredients are first agitated and emulsified in a soap solution under pressure in large steel vessels. This causes polymerization, the process which combines many small molecules to form complex molecular units, like the joining of links to form a chain. The operator in Fig. 2 is charging one of the polymerizers. A catalyst is added, as shown in Fig. 3, to speed the polymerization. Fig. 4 is a view of the control instruments which maintain the temperatures and pressures in the tanks.

From the polymerizers comes a thick, milky, white liquid, similar in appearance and molecular structure to the virgin latex which drips from the rubber tree. This synthetic latex from seven or eight tanks is blended in one large vat to increase the uniformity of the material. It is stabilized in a "blow-down" tank to give the finished rubber resistance to heat and oxygen, the prime enemies of its natural counterpart. Operator in Fig. 5 is standing on a blow-down tank ready to tap a polymerizer tank. The stabilized synthetic latex is passed into another





set of vats, where dilute acids are added to coagulate the Ameripol into solid particles. This process resembles the formation of curd in sour milk.

Next the curd is washed by agitating it in a vat of soft distilled water. In Fig. 6 the operator is holding a strainer full of the rubber particles above the swirling solution. Now the curds are pressed into 110-pound blocks of raw Ameripol, which is readily processed and handled on standard rubber-processing equipment. See Fig. 7. It is sheeted

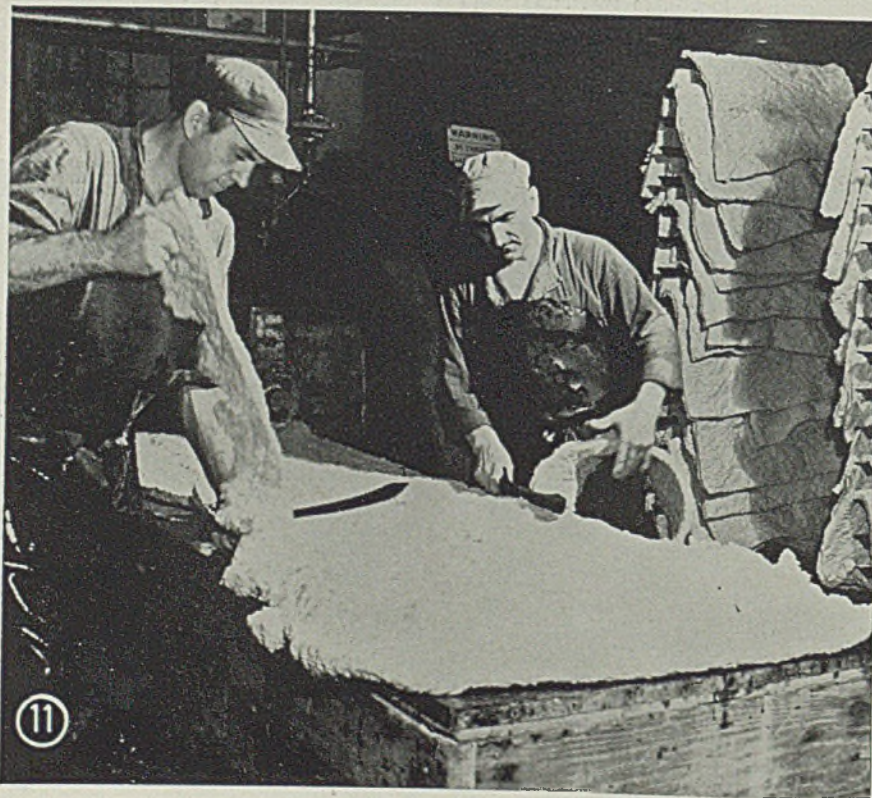
on mills and calendars, extruded in tube machines or molded in multiple forms.

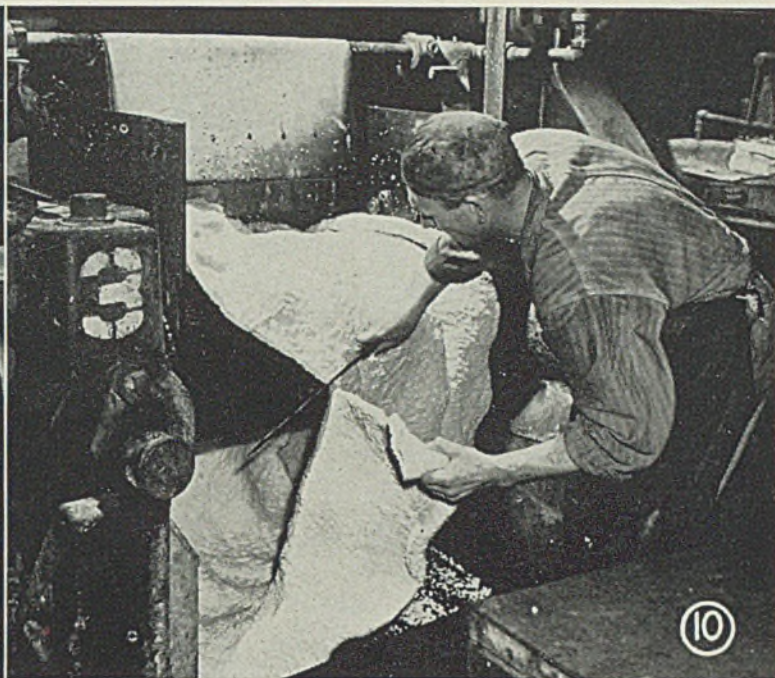
The wash mill operation is the first processing step. Fig. 8 shows a block of raw rubber being cut up into small pieces preparatory to being fed into the mill. Here, under heat and pressure, moisture is wrung out and the lumpy material is squeezed into thin sheets (Fig. 9) before being removed from the mill (Fig. 10). The sheets are then cut to standardized size, as shown in Fig. 11. Note sheets of rubber hanging on rack

in background to cool.

These sheets are next placed in the charging and discharging vacuum drier as shown in Fig. 12. In drying, the rubber changes from flesh color to a light amber. The workman in Fig. 13 is holding a sheet of dried synthetic rubber at left and dried natural rubber (washed crude No. 1 smoked sheet) at right. The corrugated surface is imparted by the wash mill operation.

Ameripol is vulcanized and fabricated into products in the same manner as



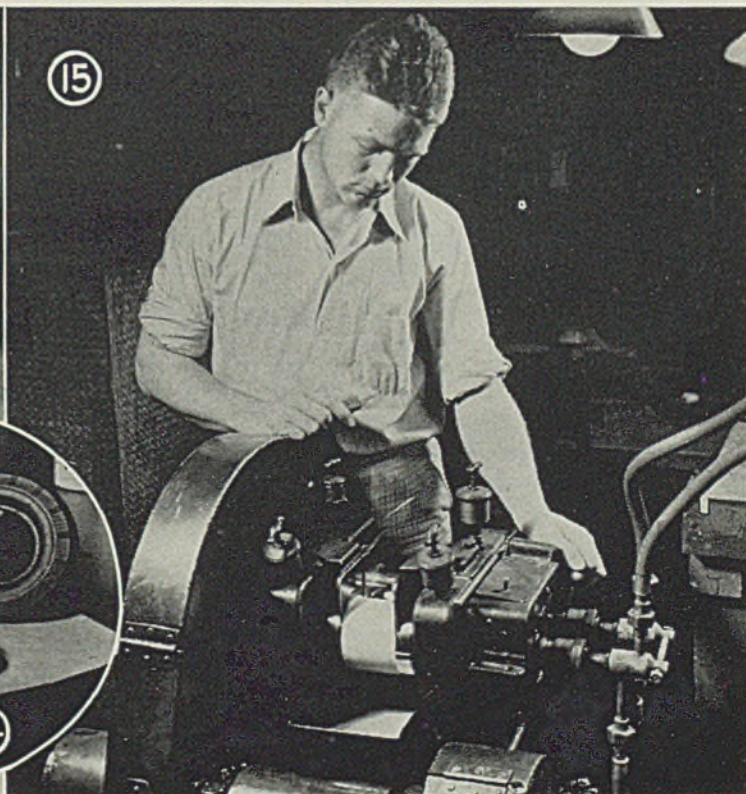


natural crude rubber. An automobile casing made of Ameripol looks exactly like the conventional auto tire but may have a content of from 50 to 100 per cent Ameripol. The first synthetic tires to be sold to the American public in 1940, Ameripol tires are still in service on thousands of cars. Performance reports kept by several hundred leading corporations which have used these tires indicate they maintain the same standards of quality and service as tires of natural rubber.

Fig. 14 shows graphically the oil-resisting properties of Hycar O. R., a form of Ameripol. The two miniature tires shown on edge have been immersed for two weeks in oil at a constant temperature of 160 degrees Fahr. The natural rubber miniature swelled 40 per cent in diameter and increased 180 per cent in volume, while the synthetic miniature showed no effects of its oil bath and retained its original dimensions. Both test tires were originally the same size as the miniature lying in the foreground.

Tests on the miniature laboratory mill in Fig. 15 were the basic controls in the synthetic rubber development. Small samples of each batch are checked on this mill to insure conformity to precise specifications. Figs. 2, 3, 4, 5, 7, 9, 10, 11, 12 are OWI photos by Palmer. Others are from B. F. Goodrich Co., Akron, O.

For further details on natural, synthetic and reclaimed rubber, see STEEL, Nov. 16, 1942, p. 80; Jan. 18, 1943, p. 56.



ASTM Issues 32 New Standards; Some To Save Vital Materials

THROUGH action of its committee E-10 on standards, which in the interval between meetings can act for the society and which must approve all emergency standards, the American Society for Testing Materials has recently issued some 32 new standard specifications and test methods. Of these, 13 are emergency specifications and tests designed to expedite procurement or conservation of critical or strategic materials. All of these new specifications are being printed in separate pamphlet form, and copies can be obtained at 25 cents each from ASTM headquarters, 260 South Broad street, Philadelphia. They will also be bound in the 1942 *ASTM Book of Standards* now in preparation.

Emergency Specification for Malleable Iron Flanges and Valve Parts: This specification, carrying the designation ES-20, covers malleable iron flanges, pipe fittings, and valve parts, including parts to be assembled, manufactured in advance and supplied from stock by the manufacturer or distributor. Processes of manufacture are covered; tests are to be in accordance with the materials specifications listed for cupola malleable iron (A 195), or for malleable iron castings (A 197) and, finally, marking requirements are given.

This standard resulted from the prompt work of committee A-7, which acted on a suggestion from the Conservation Division, WPB, that standardized requirements for these fittings would aid the substitution of malleable iron for copper in some valve parts, also substitution of iron valves for brass valves 2 inches or smaller. This shifting of material has been urged to conserve copper.

Thermal Insulating Materials: Twelve of the emergency specifications cover various types of thermal insulating material in different forms and for service at widely varying temperatures ranging from surface temperature of 200 to 1900 degrees Fahr., depending on type of materials. The serial designations and brief titles are as follows:

- ES— 8 85 per cent magnesia cement.
- ES— 9 Long fiber asbestos cement.
- ES—10 Mineral wool thermal cement.
- ES—11 Expanded or exfoliated mica cement.
- ES—12 Diatomaceous earth cement

(600 to 1200 degrees Fahr.)

- ES—13 Diatomaceous earth cement (1200 to 1900 degrees Fahr.).
- ES—14 Blanket insulating for building purposes.
- ES—15 Blanket insulating for industrial purposes.
- ES—16 Blanket insulating for refrigeration.
- ES—17 Preformed pipe covering.
- ES—18 Preformed block insulation.
- ES—19 Structural board insulation.

The first six specifications cover material in the form of dry cement or plaster which when mixed with water can be applied and dried in place.

Revised Emergency Specifications: The society also announced that approval had been given to modification in the emergency specifications for carbon-chromium ball and roller bearing steels, ES—5, the changes permitting nickel and molybdenum contents of 0.35 and 0.08 per cent respectively, these being considered residual alloys; and requirements on maximum permissible decarburization and surface defects for wire and rods for cold heading are modified.

Emergency alternate provisions which can be invoked by the purchaser where considered satisfactory have been established in some 22 additional ASTM specifications, notably in the field of pipe and tubing. Many of the widely used specifications for boiler and superheater tubes, still tubes for refineries and heat exchanger and condenser tubes are affected since changes in chemical composition conserve critical alloys, and other changes will expedite procurement and increase production.

An important emergency provision in the specification covering carbon-steel forgings for locomotives and cars (A 236) includes two new higher strength classes with tensile ranges from 100,000 to 130,000 pounds per square inch and elongation from 13 to 18 per cent. Standardization requirements for this material which can be used for main and side rods, straps, crank pins, etc., will assist materials engineers of a number of railroads whose designs call for this higher strength material.

"Regular" New Specifications: Eighteen of the new tentative specifications and tests announced were developed in regular course by the various ASTM technical committees. The new recom-

mended practice for making torsion tests of cast iron (A 260) covers the use of this method in connection with applications for crank shafts, couplings and similar service. From the torsion test result, values for other important properties can be easily computed.

Magnetic Properties: Three of the new methods developed by the society's committee A-6 on magnetic properties cover permeability of feebly magnetic materials, permeability and core loss of flat-rolled magnetic materials at low alternating inductions using 28-centimeter specimen, and permeability and core loss of flat-rolled magnetic materials using 28-centimeter specimen.

Paint, Varnish and Related Products: One of the most active ASTM committees, D-1 on paint, varnish, lacquer and related products, has had an extensive research and test program under way in connection with the accelerated tests of preservative coatings. As a result of this work, four new tentative methods for evaluating paints have been agreed upon and published—these all apply to exterior paint of the linseed oil type and give methods of evaluating the degree of chalking (D 259), checking (D 660), cracking (D 661), and erosion (D 662). There has been urgent need for a uniform system of reporting deterioration of coatings, which will now be provided by these standards.

A new specification for isopropyl acetate (D 657) covers low-boiling solvents, the use of which has greatly increased due to the needs of the armed services for quick-drying coatings.

Plastics: Three new tentative standards were approved as a result of active work in committee D-20 on plastics as follows:

D 695—42 T,—Method of test for compressive strength of plastics.

D 696—42 T,—Method of test for coefficient of linear thermal expansion of plastics.

D 697—42 T,—Method of test for water vapor permeability of plastic sheets.

The group of technologists representing leading consumers and producers of plastics on committee D-20 has worked intensively to develop satisfactory tests and has accelerated their work because of the national emergency, which has stressed the necessity of adequate evaluation of these materials so critical in a number of uses. The test for compressive strength is intended for determining the comparative compressive properties of organic plastics in the form of test specimens of standard shape when tested under defined conditions of pretreatment, temperature, humidity and

(Please turn to Page 67)

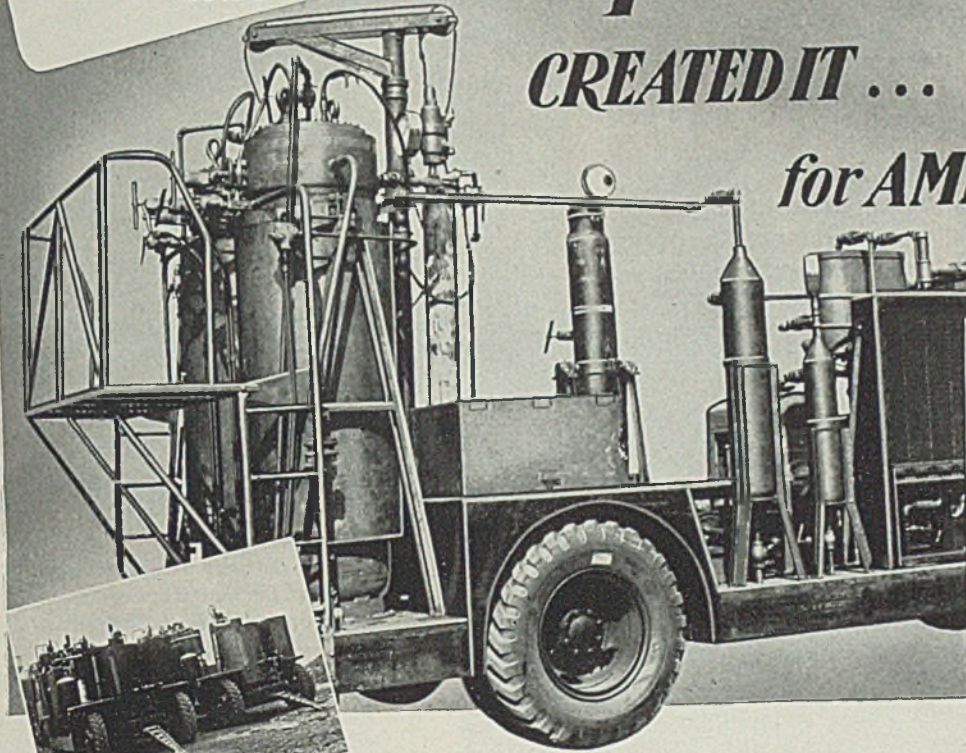


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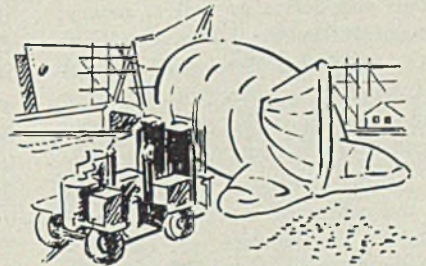
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By WEST SHEA
Manager
Materials Handling Equipment Section
Union Metal Mfg. Co.
Canton, O.

skid, pallet handling system

... is extremely flexible, accommodates wide variety of processing and storage requirements, enables use of overhead handling facilities as well as power and hand trucks

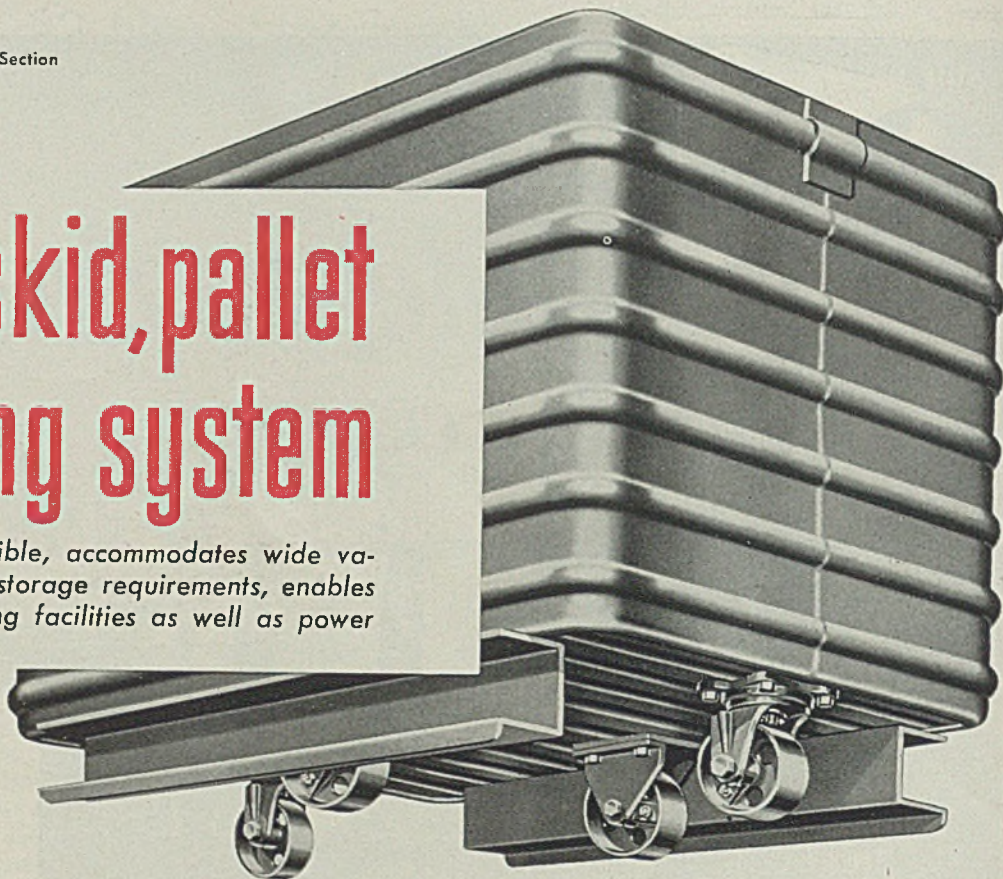


Fig. 1—To permit easy movement by hand for short distances, casters are provided. The channels on bottom facilitate stacking to save floor space

Fig. 2. (Below)—Boxes are welded to platform to handle small parts. Z-clips at top permit stacking

MATERIALS handling equipment of high strength and wear resistance is a must if today's high rate of production of vital war materials is to continue and be increased. When it is necessary to remove pallets and skids and boxes from service to repair them, production schedules are disrupted and output drops. To replace such equipment is expensive in materials and delays as well as money, points out Union Metal Mfg. Co., Canton, O., which has developed an integrated handling system, an important feature of which is the extremely long life built into the equipment.

Its double corrugated steel skids, boxes and pallets are especially designed to eliminate maintenance and early replacement. A typical example is a steel skid platform with double free-flowing

corrugations for even greater strength and longer life. See Fig. 4.

The major problem in producing a steel skid platform with double corrugations is that a sheet of metal loses some of its flexibility every time a corrugation is put into it. The more and deeper are the corrugations, the less flexible is the sheet. When making a skid platform in which the metal is bent at right angles to form the legs, the difficulty has been to extend the corrugations over the sides without rupturing the steel at the bends. Methods have now been developed by The Union Metal Mfg. Co. to cause the metal to flow freely in the dies. Full strength of the steel is retained even though double, full corrugations are used where only single, full corrugations have heretofore been possible. And the working of the steel actually increases its ultimate strength or point of failure. The result is a steel skid platform which has an exceptionally long life because it will withstand the punishment of hard usage.

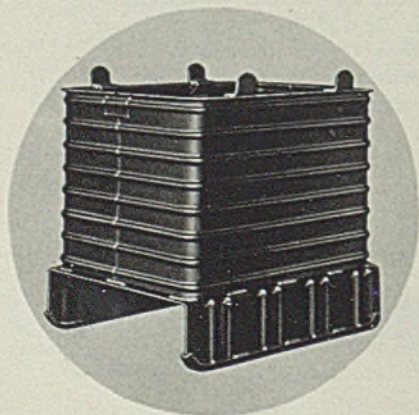
The double corrugations on such a skid platform flow in a gradual, uninterrupted curve over the bends and down the legs as shown in Fig. 4. The center rib acts as an integral bar brace, and when this rib turns down the leg, it gives exceptional strength to the knee proper, where the blows, bumps and

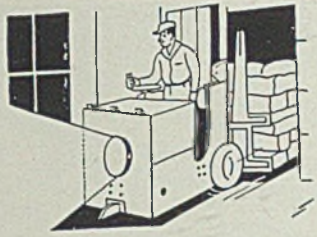
punishment inflicted on the legs of a lift truck platform are absorbed. The center rib and the dual corrugations make an unyielding, rigid support for both leg and deck of the platform.

If a smooth top surface is desired, a sheet of metal of the required thickness is securely welded to the deck. To facilitate passage over uneven floors, the tops of ramps or other obstructions, a portion of the platform legs (sides of the skid) can be cut away to form feet. This affects the stability and rigidity of the platform only slightly, if at all.

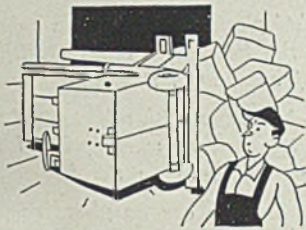
To protect floors and improve the bearing surface of the legs, runners made of either channels or angles can be welded to the legs at the bottom where they contact the floor. If the runners are extended up to the deck, they also serve as bumpers. Bars, pipe or rods are best handled with side stakes, and channel or pipe stake pockets can also be welded to the skid platform legs.

To handle small material and parts





Emergency Lights. A Midwestern manufacturer has a bright idea for emergency lighting. He equipped a number of his battery industrial trucks with headlights and conventional electric outlets. Then he installed 32-volt lighting circuits at various key points in the plant. During power failures each truck proceeds to a designated point, the line is plugged in and the emergency lights go on.



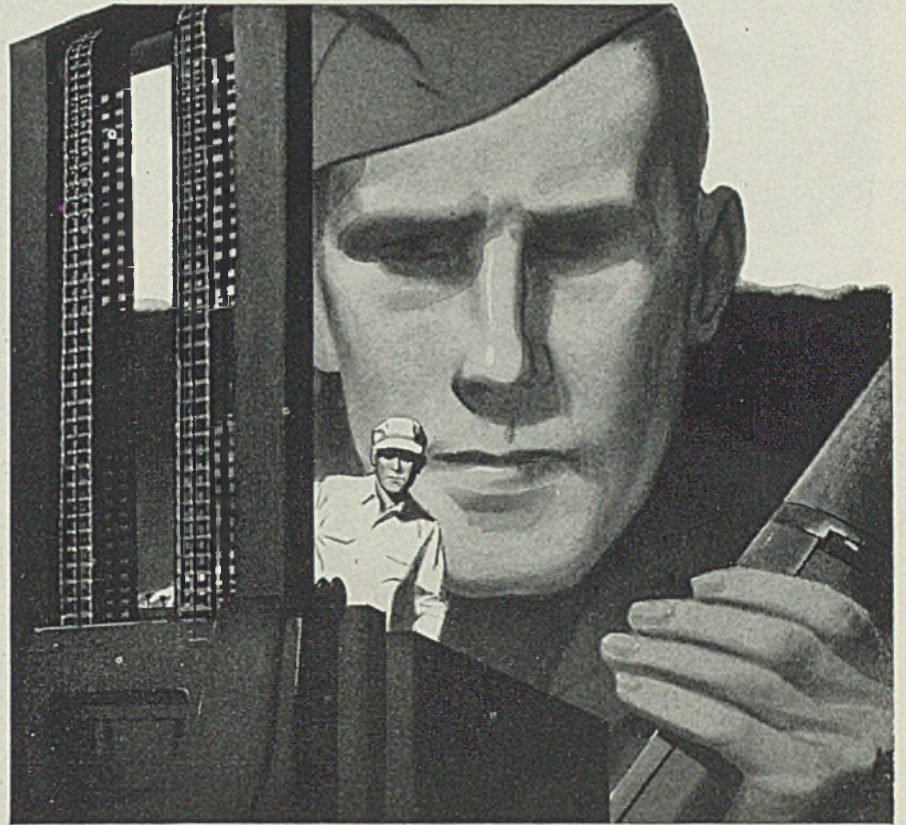
Turnover. One of the reasons experienced industrial truck operators prefer alkaline batteries is that they know the steel construction of these batteries withstands rough usage. They have had their share of accidents in which the trucks overturned without damage to the batteries. And they know by experience that the common electrical accidents don't damage them either.

Quick Battery Exchange.

An important reason for the ability of battery industrial trucks to provide dependable 168-hour duty lies in the fact that the batteries work in relays, as railroad locomotives do. Like the train, the truck maintains a schedule. Like the locomotives, one battery furnishes motive power while another is charged and serviced. And with modern power hoists, exchange of batteries is a matter of only a minute or two.

Edison Storage Battery Division
Thomas A. Edison, Inc.
WEST ORANGE, N. J.

POWER for Production



In production, it's what gets done that matters! And for *maximum* production there is nothing more important than *uninterrupted* handling of materials. Of course, man power is essential; so are plant and equipment. But none of these can work at full capacity unless there is a smooth, bottleneck-free flow of materials all the way through receiving, stores, process, assembly and shipment.

It's self-evident, therefore, that the battery industrial trucks in our war industries need the most dependable, trouble-free storage batteries that American inventive genius has produced. It's reassuring that so many of them—a majority in fact—are powered by the *alkaline* type of battery, an invention of Thomas A. Edison. No more durable, reliable portable power source is known.

INDUSTRY NEEDS THE DEPENDABILITY OF

Edison Alkaline BATTERIES

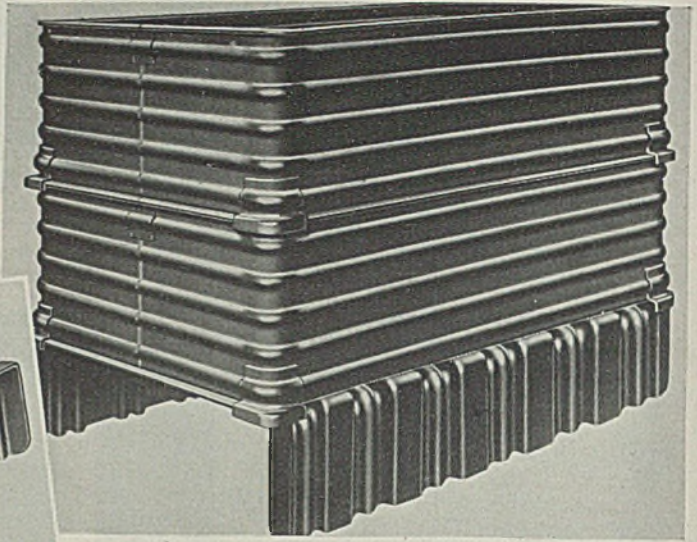
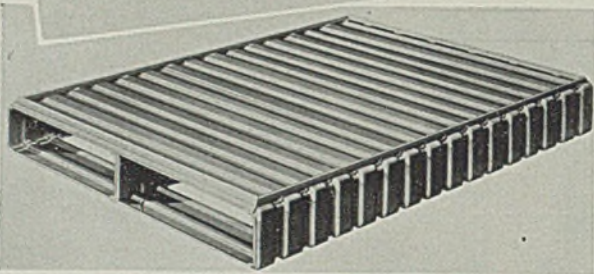
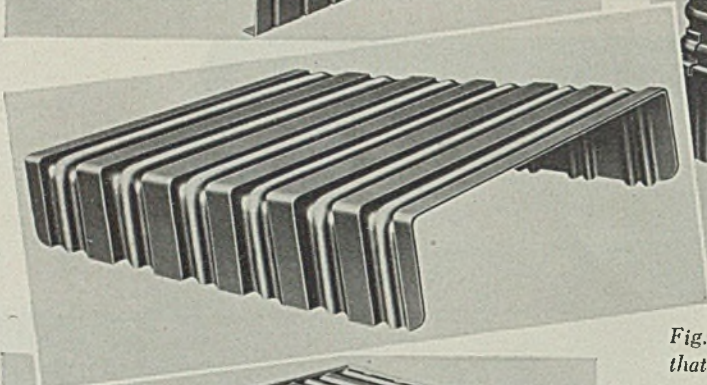
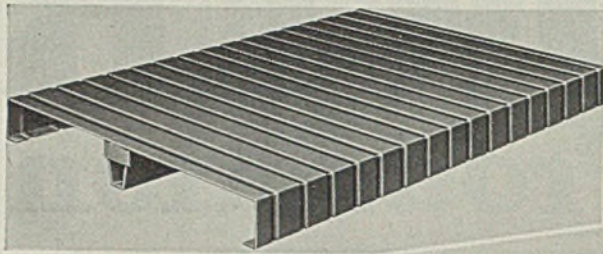


Fig. 3. (Upper left)—Single-face pallet built to transport parts that do not require the added rigidity obtained with a bottom deck

Fig. 4. (Center, left)—Basic skid platform unit features a double corrugation that extends over the bends and down the legs to produce a unit of exceptional strength

Fig. 5. (Bottom, left)—Double-face pallet with solid top and solid or slatted bottom. This type is necessary where pallets loaded with odd-shaped parts are to be tiered

Fig. 6. (Directly above)—Box sections can be placed on plain skid to form box of any depth desired. Corner stacking boots allow units to be tiered to ceiling

which do not stack solidly, boxes of any size can be welded to the platform as shown in Fig. 2. To permit stacking of these units in order to conserve storage space, tiering angles are fastened inside legs. If such angles interfere with lift-truck clearance, Z-type clips are welded around the top edge of the box, see Fig. 2. Legs of the platform above then rest on these clips. Crane lifting straps also can be welded or riveted to the box and skid legs. For heavy-duty work, these straps reinforce the welds holding the box to the platform and securely tie the two units together for crane handling. Boxes without skid legs can also be fitted with crane lifting lugs and commercial or I-beam channels welded on the bottom for lift-truck or hand-truck handling.

If mobility of equipment to handle small parts in process for short distances is a requirement, boxes with casters usually answer the need. These mobile boxes can be provided also with means by which a fork truck or ordinary lift truck can be used for long hauls. Such boxes can be stacked to save floor space if equipped with channels as in Fig. 1.

A tiering dump box suitable for use by lift trucks with revolving forks has a special fork pocket welded to the underside. This permits the box to be lifted, revolved for dumping, then

righted again since both of the forks will be hooked into the pockets. The stacking brackets assure safe tiering. For increased floor mobility, this box can also be equipped with casters.

For great flexibility, boxes of varying depth are formed by detachable box sections which can be placed on the platform and are held firmly in place by lugs or corner boots. Additional box sections can be placed in position to form a box of any desired depth. Fig. 6 shows a skid on which are mounted two of these box sections, held rigidly in place by corrugated corner boots which nest over the corners of the platform or box sections. Where production flow is constant and types of products vary continually, and also where the storing of finished or semifinished goods is not a problem, these standard all-steel skids and detachable box sections equipped with corner stacking boots are particularly desirable. The skid can be used alone or as a skid-box unit, whichever the case may require. The box can be made deeper simply by adding other sections.

Steel pallets with single corrugations and designed especially for hand-pallet or fork lift truck handling are also advantageous for many handling jobs. They are particularly suitable for inter-

plant shipment of materials and can be marked for return to the vendor.

Fig. 3 shows a single-face pallet built to transport parts that do not require a bottom deck. The double-face all-steel pallet in Fig. 5 has solid top and solid or slatted bottom face. These pallets permit tiering of all types of products, including kegs, barrels and tote pans, with maximum safety.

Simple modifications make it possible to combine skids, box sections, and tiering skid boxes so that all of them can be tiered in the same stack. This is done by placing Z-bracket clips on top of each box section. No clip is necessary on the skid because the corner boots on the box sections fit down over and position the box section on the skid.

Skids can be provided with crane eyes so that skid boxes tiered in any combination can be lifted and moved about as a unit by means of a crane. This greatly increases the flexibility of the system.

Pallets can also be combined with skids, box sections and tiering skid boxes in a similar manner. No clips or fixtures need be added for the pallet can be stacked on top of another pallet load, or a box section can be placed on the pallet, or a skid box or another pallet combination can be tiered on top of that.

(Concluded Next Week)

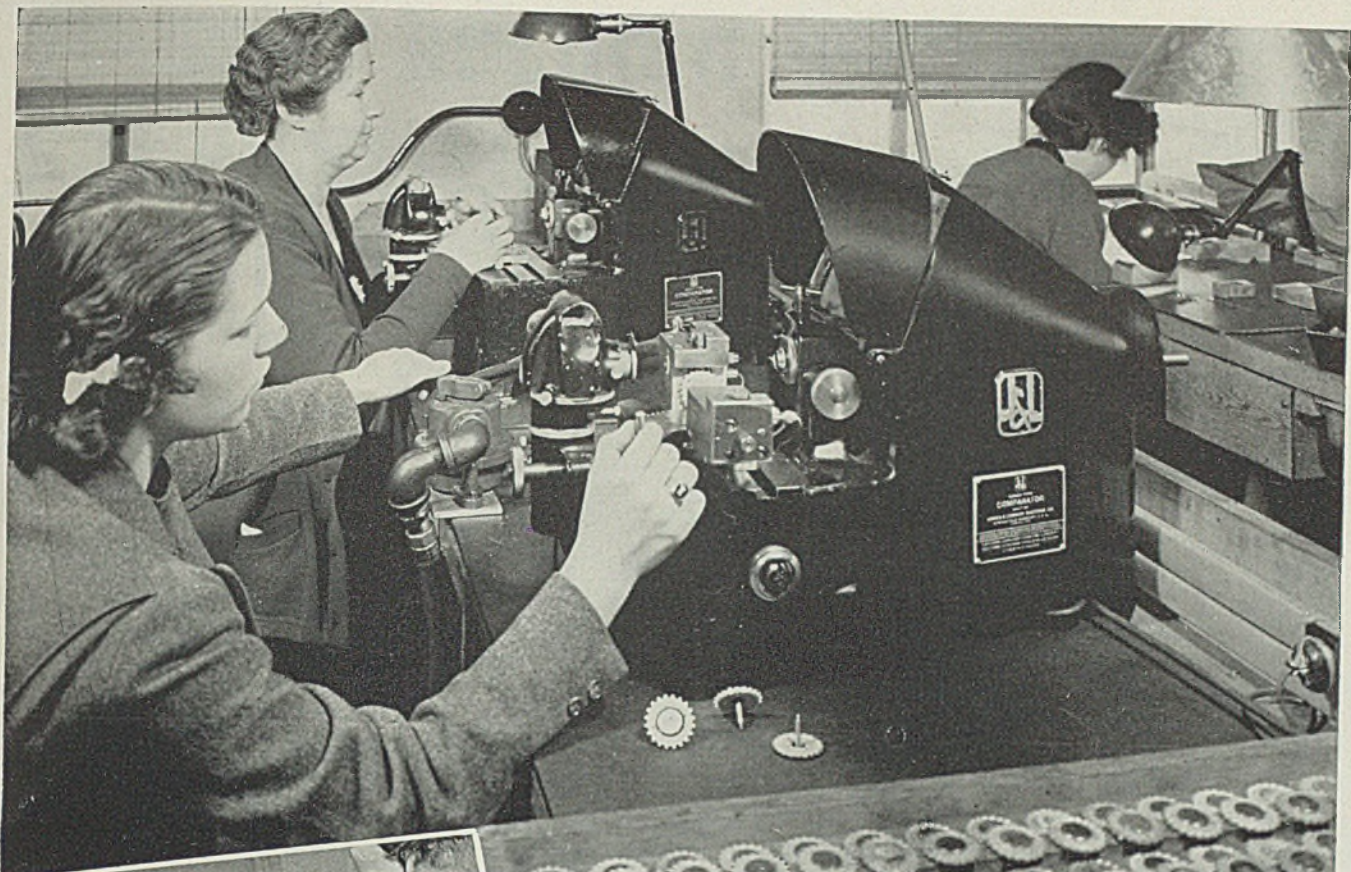


Photo Courtesy International Business Machines

Modern inspection by optical projection saves time and money

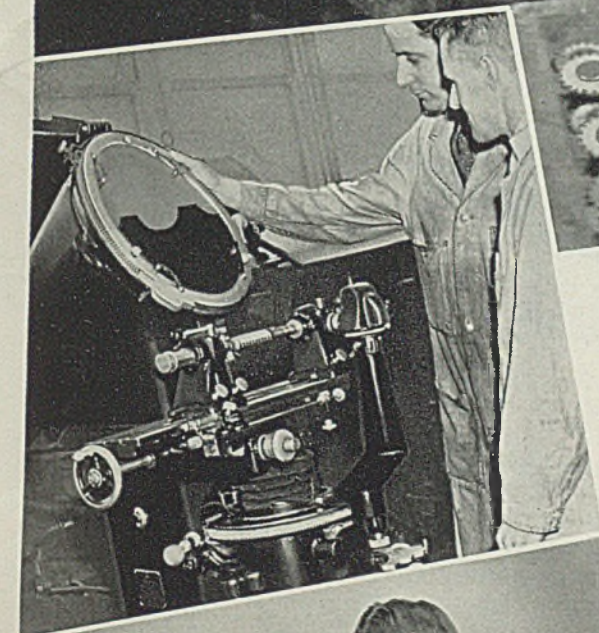
Jones & Lamson Comparators are available in Pedestal, Bench and other types to meet every need in the field of Inspection by Optical Projection. We shall be pleased to study your problems and apply to them the accumulated experience of more than twenty years in this field.

Profit-Producing  Machine Tools

JONES & LAMSON MACHINE COMPANY

SPRINGFIELD, VERMONT, U. S. A.

Manufacturers of: Ram and Saddle Type Universal Turret Lathes · Fay Automatic Lathes · Automatic Thread Grinders · Optical Comparators · Automatic Opening Threading Dies and Chasers.



Resistance Welding underwater

... saves critical tin by eliminating soldering, produces better joint by retaining full flexibility of stranded cable connections

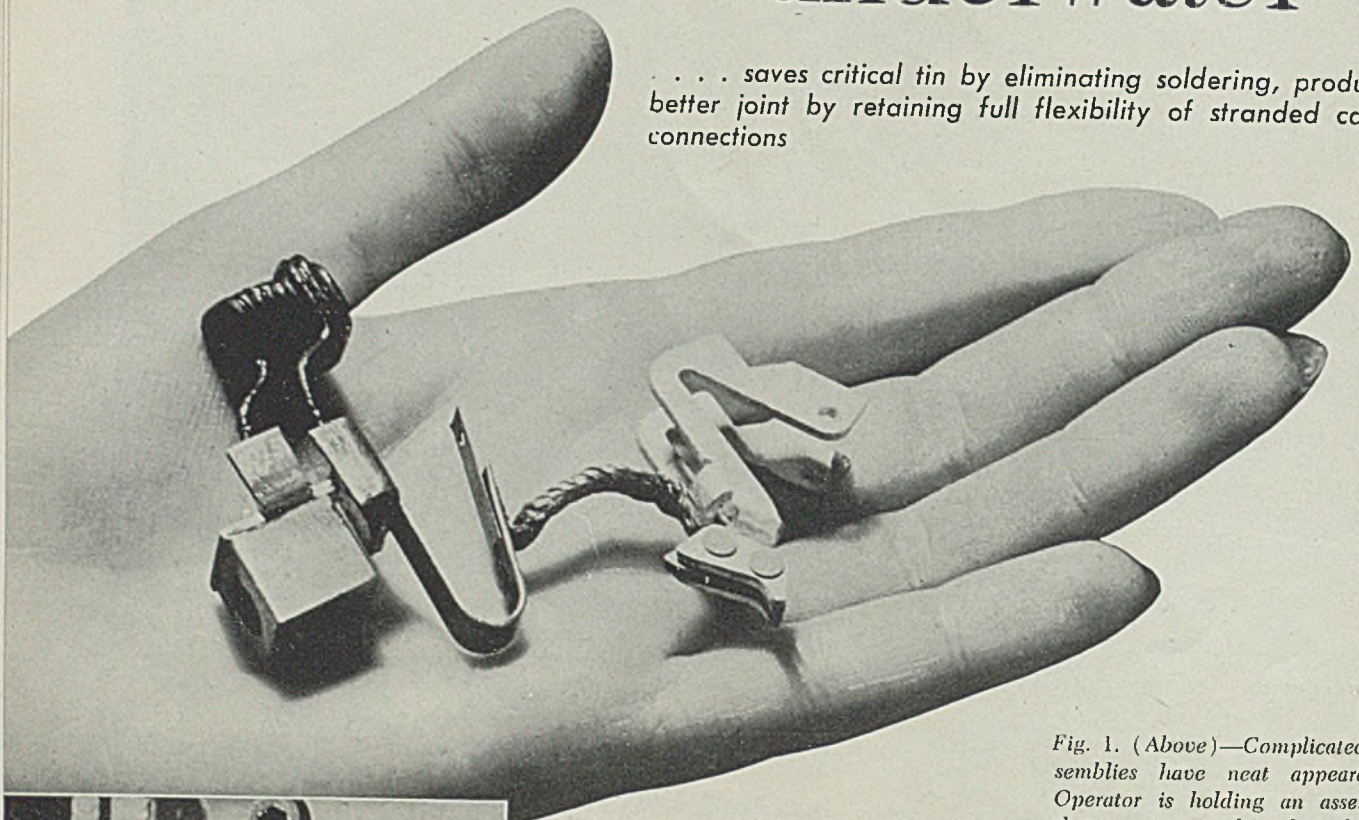


Fig. 1. (Above)—Complicated assemblies have neat appearance. Operator is holding an assembly that requires a short but flexible cable. Solder or brazing would fill a portion of the cable with the material used to make the connection, reducing its effective length. Properties of the different parts remain unchanged when assembled with underwater resistance welding

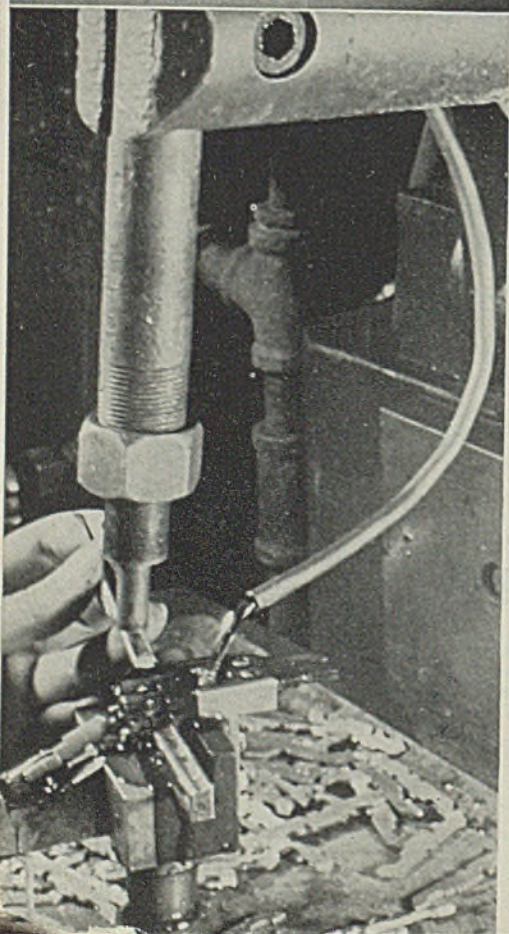
UNDERNEATH resistance welding is a simple modification of the standard resistance welding process. At the East Pittsburgh works of the Westinghouse Electric & Mfg. Co., this process has replaced many of the terminals. This modified process has permitted important savings in production costs by raising the output and improving the quality of the finished product.

The process consists essentially of welding by means of special tips and having a stream of water play on the stranded wire close to the electrode during the operation. Water is applied at a rate sufficient to keep the work cool and to prevent oxidation at the weld.

The machines are usually designed with one fixed and one movable electrode with a special jig fastened around the stationary terminal to hold the parts firmly in their relative positions for welding. Fig. 2 shows details of such a set-up. Electrode tips now used are made

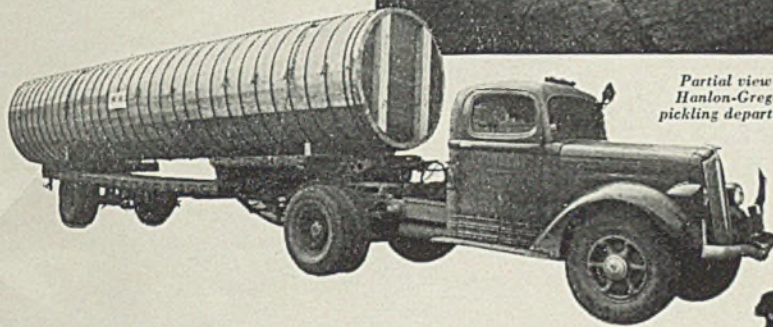
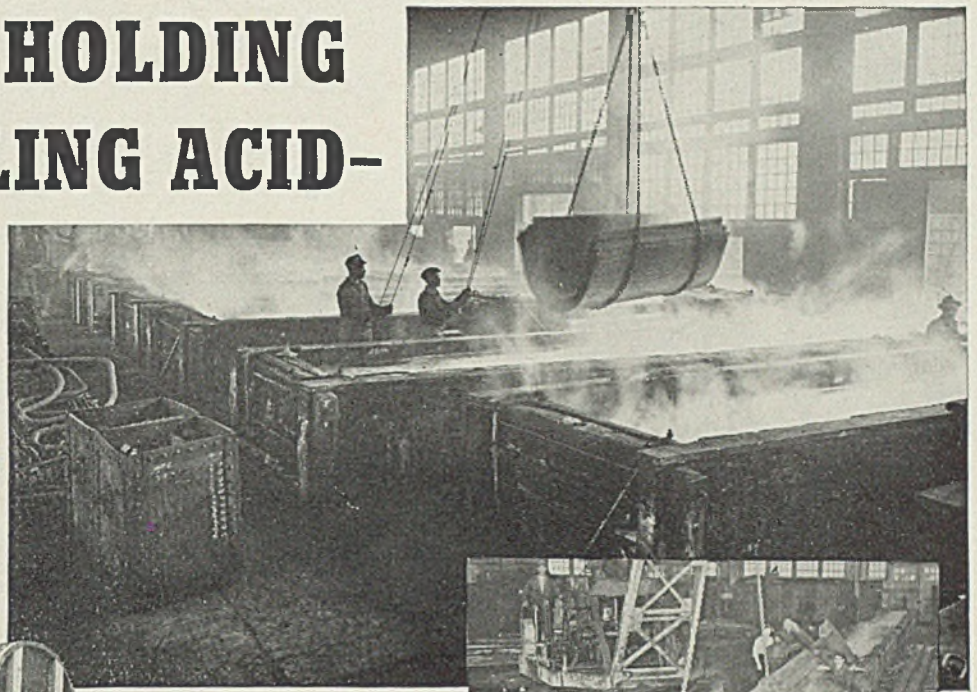
Fig. 2. (Left)—Welding under water speeds production and improves quality. The continuous stream of cooling water passing across the fixture does not interfere with placing of parts. The cupalloy tip in the upper (moving) holder, as well as the stationary tip and fixture, may be changed quickly for different types of assemblies

of carbon, molybdenum and cupalloy. Cooling the electrodes by mounting them in water-cooled holders increases tip life. It has been found that a cupalloy tip with a molybdenum insert is most satisfactory for welds not requiring flux. Carbon tips are required where flux is

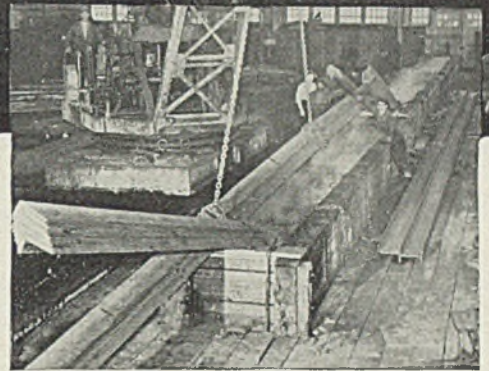


YEARS OF HOLDING HOT PICKLING ACID-

...yet these
FLEMING Tanks
are still going
strong!



Partial view of
Hanlon-Gregory
pickling department.



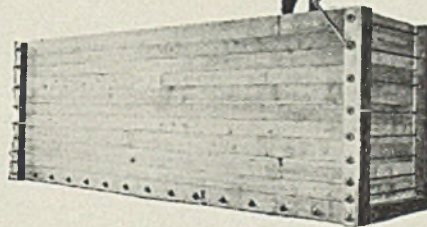
Here's a twenty-year service record significant to every user of pickling equipment!

It's a record shared by the Fleming Tank Company (3046 Penn Avenue, Pittsburgh, Pa.) and Monel.

Tanks built by Fleming . . . using Monel tie-rods throughout . . . were first installed in the Hanlon-Gregory Galvanizing Co. plant, Pittsburgh, in 1923.

These pickling tanks gave such trouble-free, economical service that in 1934 similar equipment was installed. Many of these tanks are still in service, despite wear and constant exposure to the corrosive effects of 188° sulfuric acid solution.

Unusual sizes and shapes pose no problem to Fleming. The cylindrical tank for chemicals and the pickling tank under construction are examples of this expert's ability to build the *right* tank for every job. And the same care is observed in choosing materials as in the actual construction.



Cross-section of three tie-rods used for 12 months in a large steel sheet mill. The two non-Monel rods on the right, while still unchanged in diameter, are weakened by a change in their metal structure caused by corrosion. The Monel rod at the left is uniform and unchanged.

Monel tie-rods and fittings have been selected by Fleming for use in *all* pickling tanks for the past two decades. Monel's *extra* resistance to corrosion, plus its *extra* strength make it ideal for pickling use.

Pickling crates, baskets, and other equipment are made of this same corrosion-fighting metal.

MONEL CARRIES ON—without waste! There need be no loss of Monel when pickling tank tie-rods must finally be replaced. The Monel may be re-worked and used for pins and other fittings . . . keeping every ounce of this valuable . . . and now restricted . . . metal at work.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street
New York, N. Y.

★ ★ ★ ★

INCO NICKEL ALLOYS

★ ★ ★ ★

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • NICKEL • "Z" NICKEL
Sheet . . . Strip . . . Rod . . . Tubing . . . Wire . . . Castings

History

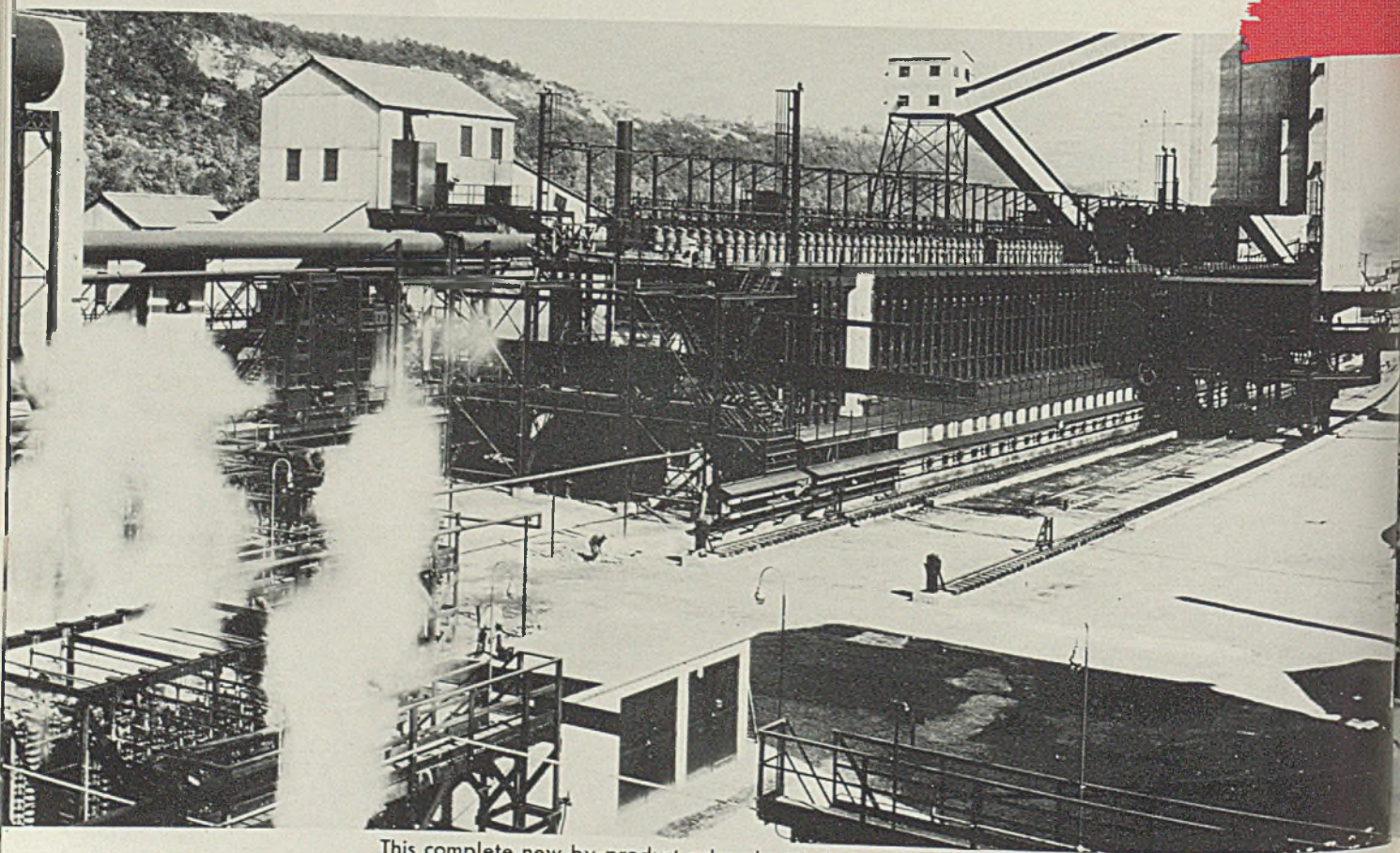
is being made . . .

in coke plants, too

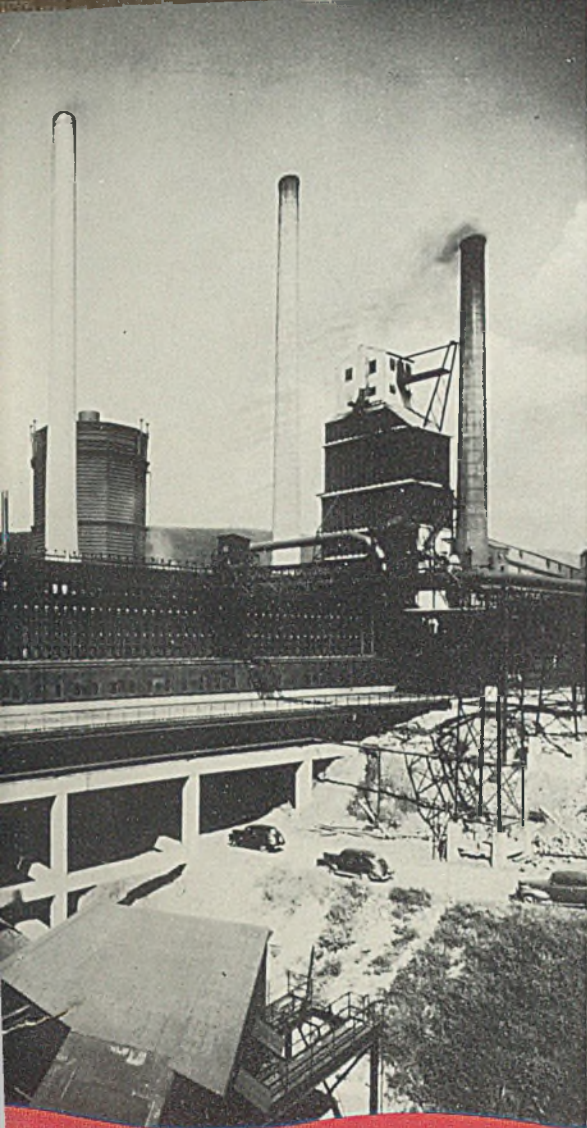
New coke oven plants by Koppers will produce in excess of 5,000,000 additional tons of coke per year, together with all the by-products. This is vital to

the growth of America's war effort.

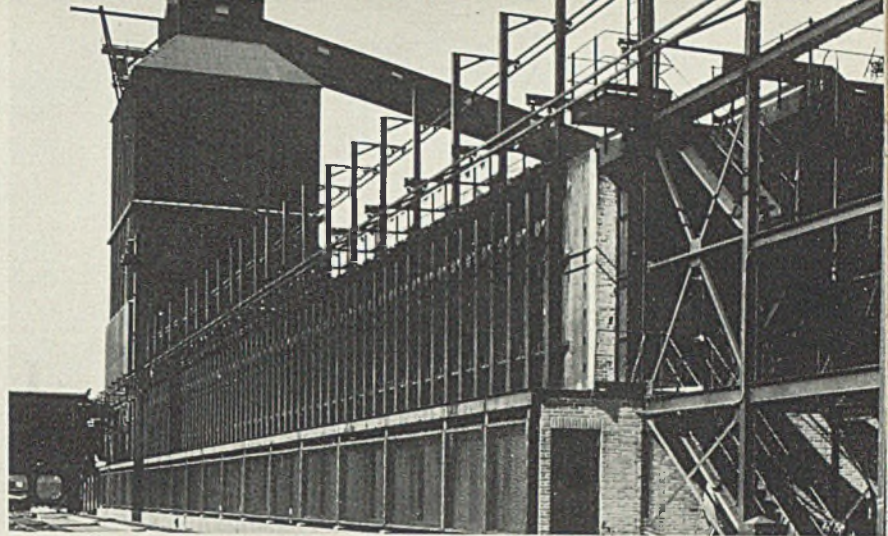
Shown on these pages are five of these new plants which have invaluable new features.



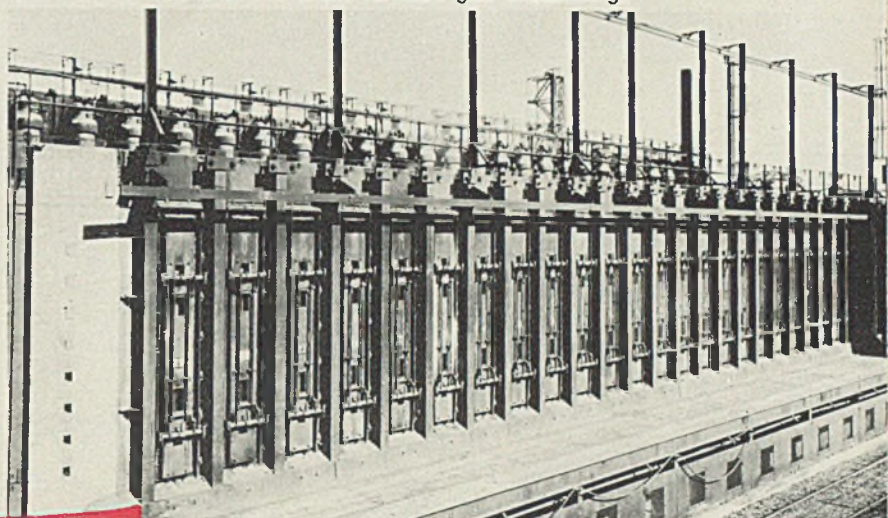
This complete new by-product coke plant includes all of Koppers' latest designs for coke oven, by-product and material handling equipment.



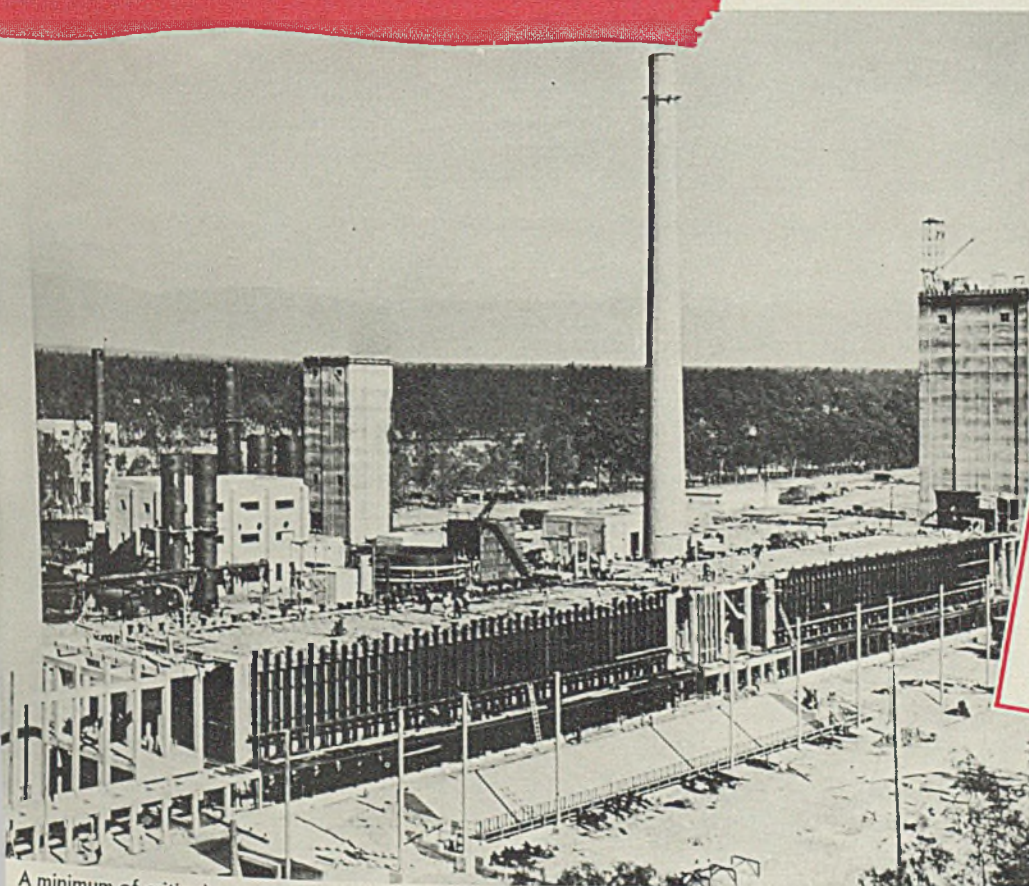
In this installation, Koppers engineered and erected a battery of coke ovens to conform to a restricted site.



In these large ovens, Koppers internal enrichment of blast furnace gas used for underfiring made possible coking rates never approached before with blast furnace gas underfiring.



The Koppers gas recirculation heating system enabled a gas company to underfire these ovens with refinery still gas.



A minimum of critical materials was used in this installation of two batteries of 45 ovens each. Construction was carried out with only about 50% of the usual amount of steel.

KOPPERS COMPANY
 PITTSBURGH, PA.
 Engineering and
 Construction Division

At Bristol

*We've had our coats off
... since before the Civil War!*



Making Brass to win a war is a job that Bristol has helped to do *five times* in its life. So any sudden demand finds us with our coats off and sleeves rolled up, ready to roll in high gear right from the start. And that's why, today, this plant is exceeding peacetime speed-limits by greater and greater margins, in the production of high-quality sheet, rod and wire for shells, cartridges and other war material.

In fact, *action* has always been the word for Bristol. Brass-fabricators know they can always get it from this compact organization which never

hid behind a roll of red tape in all its ninety-two years of operation. At Bristol, they know they can get their questions answered on the dot, and that the answers are on the button. And they appreciate the fact that no Bristol executive keeps them waiting on the phone or in the office. Time is saved and the product is right — be it sheet, rod or wire.

If you like to get your brass business done punctually and definitely, on friendly, informal, enjoyable terms, we'll be glad to hear from you, when the war is won.

THE *Bristol Brass* CORPORATION

MAKERS OF BRASS SINCE 1850 : BRISTOL, CONNECTICUT

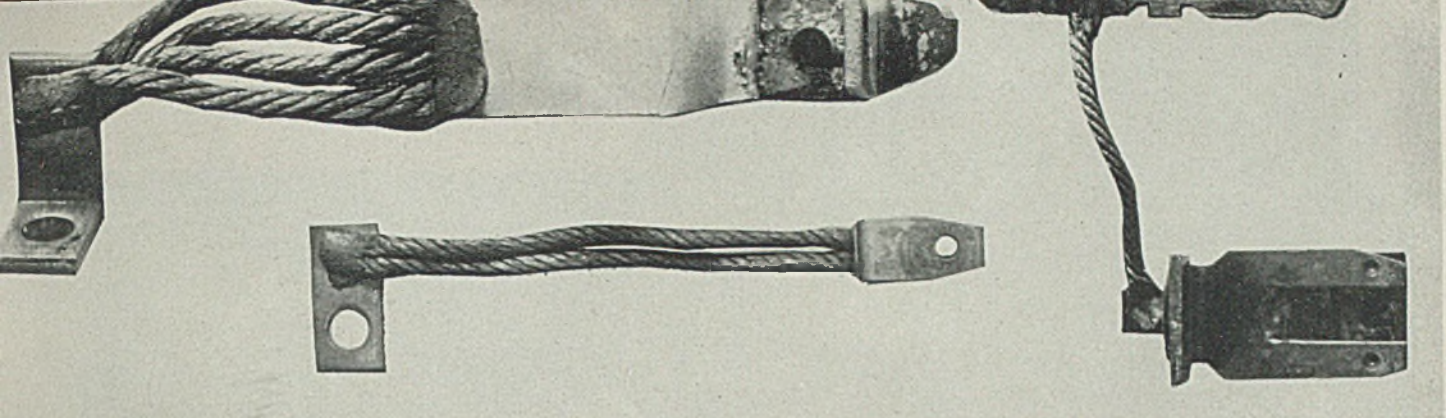


Fig. 3—Neat appearing, completed welds have exceptionally strong unions. Here a 1176-strand cable of 0.002-inch wires was welded to Riverside bronze and to bimetal in the center assembly, while a total of 3640 strands of 0.003-inch wire were welded to tinned copper lugs in the large assembly at top. Bottom pieces are welded to 2352 strands of 0.002-inch wire

used. Inserts that contact the wire are grooved to prevent flattening the cable.

After the parts have been inserted in place in the lower electrode jig, the operator initiates the lowering of the upper electrode by pressing a foot-pedal. The welding cycle is completed automatically, once started. The welding machine is air operated and is timed by electronic controls, which insure a high-quality weld by giving precise current intervals. The completed assembly may be removed from the jig immediately without the use of pliers or gloves, for the water stream has confined the heat to the point of weld.

Fig. 3 shows typical welds in this manner. With time values based on a 60-cycle current and a small stream of water playing on the wire adjacent to the weld, the technical data for upper end of the bottom assembly in Fig. 3 is as follows: 2352 strands of 0.002-inch wire are welded to 0.037-inch thickness of copper; time was 38 cycles; current was 14,400 amperes; 400 pounds electrode pressure was employed. Cupaloy tips with molybdenum inserts were used on both

top and bottom electrodes. The lower end of the same assembly had the same 2352 strands of 0.002-inch wire welded to two pieces of 0.020-inch thick tinned copper. Time required was 26 cycles with current of 14,400 amperes and 400 pounds electrode pressure. Flat surface tips were used on both molybdenum inserts. The product of current and time, of course, is proportional to the size of the weld being made.

Not only has this job gone from a hand operation to a more or less mechanized production-line operation which has decreased the cost of production, but a vast improvement in the quality

and appearance of the completed parts has been made as well. A comparison of completed assemblies shows an important difference in flexibility of the wires near the fastening points. These wire cables made by underwater resistance welding remain flexible to the point of weld, while in either the soldering or brazing process the molten metal cools rapidly after being drawn into the hot cable by capillary action. The resulting rapid quench makes the cable connections much stiffer and more brittle.

Cooling the parts with water not only makes handling easier but the welding heat is prevented from running into areas adjoining the weld. Thus the original properties of the individual parts are not changed, and maximum flexibility of the copper cables is retained.

The savings and results of this process have made underwater resistance welding a standard part of quantity production at this plant. Other applications of resistance welding are also being utilized to improve the quality of small parts for electrical products.

Floor Masking Material Solves Cleaning Problem

Accumulated spillage and overspray now can be removed speedily from paint-room floors with the use of Dura-mask, a new floor masking material, recently developed by Turco Products, Inc., Los Angeles.

Looking and handling much like paint, the thick white liquid can be applied to the floor with a kalsomine brush. It dries quickly to a hard, durable, nonskid surface which cannot be injured by ordinary foot or truck traffic, it is said.

When the accumulation of paint on the protective coating is so great as to require its removal, the floor mask can be dissolved with water and the paint film mopped away. It can be used on airplanes and cabinets, for example, where a harder surface is needed than that provided by ordinary protective

coatings, and where the surface must be protected from finger marks. It can be written upon with an ordinary lead pencil. Inspectors can mark it with rubber stamps or dimensions can be layed out on its surface, the company reports.

New Division To Make Industrial Washers

A new line of industrial washing machines soon will be offered by its new division, the Metal Washing Division, according to American Foundry & Equipment Co., Mishawaka, Ind. These will be for the removal of chips, dirt, grease and oil from machine parts, stampings and other manufactured products.

Batch type machines will be offered as well as large continuous conveyor and monorail-spray types to incorporate such sequences of operations as wash and rinses; or wash, rinse and dry, or

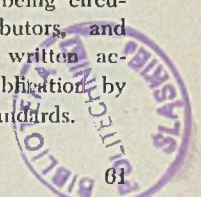
special processes for the surface treatment of metals.

The machines will be suitable for solvent-emulsion degreasing or alkali cleaning. They will be steam, gas or electrically heated the company reports.

Approval of Standard On Hot-Water Boilers Sought

A recommended commercial standard for hand-fired hot water supply boilers, TS-3406, is now being circulated to the industry for written acceptance, according to the United States Department of Commerce, National Bureau of Standards, Washington.

This standard was adopted at the general conference held in Washington Dec. 4 of last year. It is being circulated to producers, distributors, and users of these boilers for written acceptance as a basis for publication by the National Bureau of Standards.



By WALTER MIKELSON
General Engineering Department
General Electric Co.
Schenectady, N. Y.

Fig. 1—Surfaces of four sample blocks of 18-8 chromium-nickel stainless steel having the same order of magnitude of overall root-mean-square roughness but decidedly different appearance

surface finishes

... on machined parts; their inspection and comparison



THERE IS a widespread need at the present time for a practical, rapid and reliable method for the designation of machined surface finishes from both the design and production viewpoints.

Raw materials and completed products must be manufactured in larger quantities than ever before with no sacrifice in quality. This turn toward more efficient national production and toward making the greatest possible use of our present production facilities means that manufacturers who were heretofore entirely independent, are now co-operating and working together toward the common end of producing satisfactory products in the least possible time. Engineering ideas are exchanged, production facilities are combined, and subcontracting of machined parts is widespread.

The successful completion of a manufactured product having particular surface finish requirements depends to a considerable extent upon clear understanding of surface finish requirements between manufacturers, and between engineering, designing, and production groups in any one manufacturing plant. An approach to this problem which the General Electric Co. has used for the

past ten years, is that of describing these finishes with the aid of actual finish specimens. Not only has this method been found valuable in maintaining quality at low cost in our production equipment in the past, but now, more than ever, its value has become apparent.

The performance of a machined surface from the finish viewpoint depends upon the dimensional characteristics of the surface irregularities. These characteristics can vary considerably and depend both upon the material and upon the method of finishing used. The most important characteristics are:

- Surface roughness
- Surface waviness
- Direction of irregularities in the surface plane
- Pattern of the irregularities
- Surface profile
- Contact area with mating parts

As defined by the Proposed American Standard on "Surface Roughness," (1) "surface roughness" is the root-mean-square height of the surface irregularities whose peaks are closer together than

Presented as a conference paper for discussion at a recent A.I.E.E. meeting, and released for publication by the American Institute of Electrical Engineers.

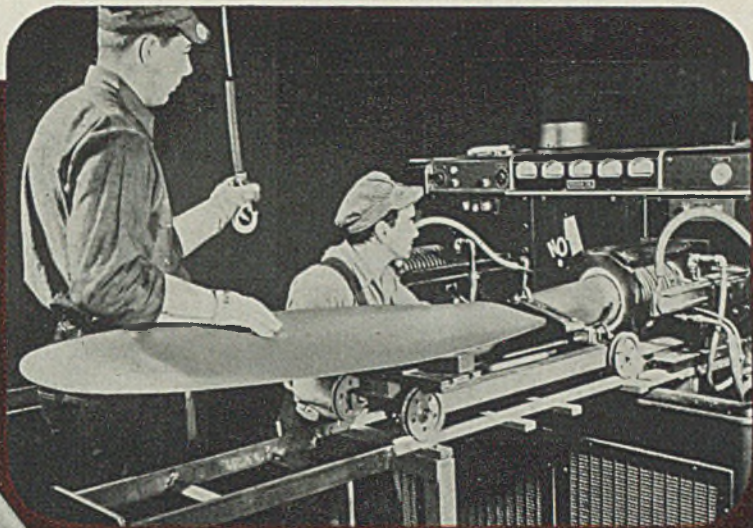
1/32-inch; and "surface waviness" is the height of deviations whose peaks are farther apart than 1/32-inch. The other terms are believed to be self-explanatory.

Instruments are now available which can be used to measure some of these characteristics and these should aid materially in obtaining much needed data on surfaces and their behavior. Of these, the most widely used are stylus or needle-type instruments which measure surface roughness as defined above. Although these instruments have proved themselves valuable when properly used, their use in production has in some cases led to the misconception that surface finish and surface roughness are synonymous.

The performance of a surface, however, depends not only on the roughness but to some extent on each of the several dimensional characteristics mentioned which describe the finish. The relative importance of each is dependent to a large degree on the use to be made of the surface.

Although little quantitative data are available and much more research work must be done on the effect of different finishes on performance, significant results have been obtained by a few experiments in the field. Dayton, Nelson, and Milligan (2) have obtained results on bearing performance of journals varying in roughness from 1 to 10 microinches, and these investigators observed no consistent correlation between performance and roughness.

Schurig (3) reported tests where a



**Heated by TOCCO
to 2000° F.
in 115 SECONDS
for forging!**

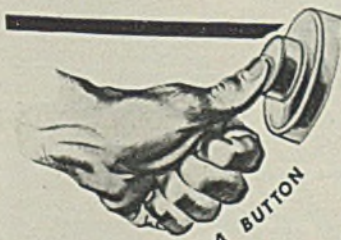
At the push of a button, the electrical induction of a cool, compact TOCCO machine goes to work on the shank of airplane propeller blades. In 115 seconds, the $4\frac{5}{16}$ " diameter by $9\frac{1}{4}$ " long tubular section heats to 2000° F., ready for upsetting.

That's typical of the SPEED of processing with TOCCO induction heat.

Versatile TOCCO units like the one shown are on the offensive all along the war production front ...blasting traditional schedules...saving valuable hours in hardening, annealing, heating and brazing operations. And the same standard units, with a simple change in work fixture, will cut costs and improve products for the post-war battle of competition.

Write for the new TOCCO booklet.

THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio



JUST PUSH A BUTTON

TOCCO

World's Fastest, Most Accurate Heat-Treating Process

**HARDENING
ANNEALING
BRAZING
HEATING for
forming and forging**

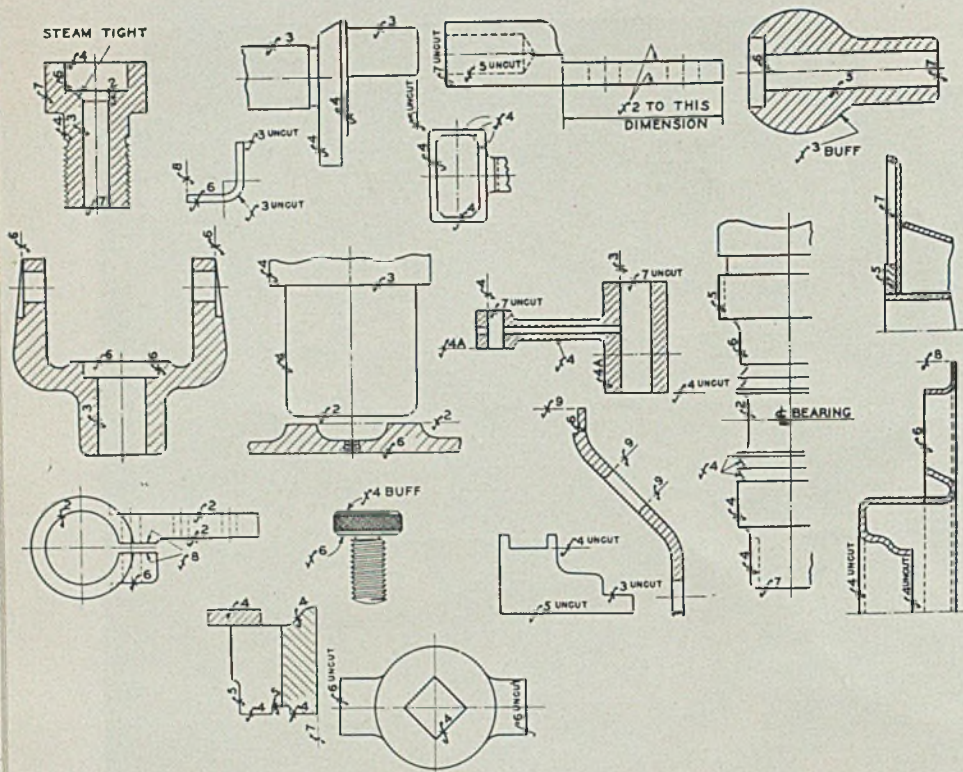


Fig. 2—This shows how surface-roughness symbols are used on engineering drawings of General Electric

based on load-carrying tests of metal-sprayed steel shafts having a porous surface compared with hardened steel shafts.

Wulf (5) points out that surfaces of the same material, finished by different methods but all measuring two micro-inches root-mean-square roughness, sometimes behave differently with respect to strength, friction, corrosion, and erosion. The susceptibility of material to fatigue failure is likewise considerably affected by many of the characteristics of the surface finish.

Practical instruments are not yet available which adequately measure all dimensional characteristics of a surface. More research work remains to be done before the importance of these characteristics to the performance of surface can be evaluated. In the meantime, some simple, practical method is needed to specify surfaces in design and production in a way which takes into account as many of the characteristics involved as possible.

The General Electric system makes use of sample gage specimens. In many respects it is similar to the system that has been announced by the Army Ordnance Department (6) except that the symbols describing the specimens designate a specific value of surface roughness, rather than a wide range of values

grit-blasted journal was compared with a polished and ground journal of one-third the roughness. When tested in an Almen machine, the grit-blasted journal was found to take three times the load of the ground specimen without seizing. Schurig also describes oil-lubricated bearing surfaces, dry rubbing surfaces such as collector rings on electric generators, stationary contact surfaces, and joints

in which the various dimensional characteristics of a surface assume different degrees of importance.

Tests made by Shaw (4) suggest that a smooth surface is not always better than a rough one. This conclusion is

Fig. 3—Specifications for surface roughness employed by General Electric

FINISHED SURFACES			SPECIAL PURPOSE SURFACES	
FINISH SYMBOL ***	TYPICAL METHODS OF PRODUCING (DOES NOT INCLUDE ALL METHODS)	APPROX. REL. COST		
f 1	GENERALLY HARDENED, GROUND, LAPPED AND/OR HONED.	100	THE TERM "SPECIAL PURPOSE SURFACE" IS USED WHERE THE RESULTANT SURFACE IS A STANDARDIZED BASIC SURFACE PLUS AN EXTRA OPERATION OR PROCESSING, OR WHEN THE BASIC SURFACE IS A PART OF A SPECIALLY PRESCRIBED PROCESS, OR WHEN THE PURPOSE IS UNUSUAL AND NOT LIKELY TO BE UNDERSTOOD AS GENERAL TRADE PRACTICE, ETC.	
f 2	GROUND OR TURNED SURFACE, LAPPED TO ELIMINATE TOOL MARKS OR DIE CAST, MOLDED, DRAWN OR EXTRUDED, ETC.	90	SUCH SPECIAL PURPOSE SURFACES APPLY ONLY WHERE A BASIC SURFACE DOES NOT MEET THE REQUIREMENTS.	
f 3	FINE GROUND, TURNED, SCRAPED, BURNISHED, PLANISHED, REAMED, ETC. OR DIE CAST, COINED, MOLDED, PUNCHED, DRAWN, ETC.	50	THE FOLLOWING EXAMPLES ILLUSTRATE SOME METHODS OF INDICATING SPECIAL REQUIREMENTS OR OPERATIONS IN ADDITION TO THE f NUMBER:	
f 3½	FINISH GROUND, TURNED, REAMED OR SCRAPED OR DIE CAST, COINED, MOLDED, PUNCHED, DRAWN, ETC.	40	f 4 S.T. 1195	WHERE UNUSUAL DEPARTMENTAL REQUIREMENTS OR SPECIAL INFORMATION IS SPECIFIED BY SUPPLEMENTARY INSTRUCTIONS
f 4	ANY MACHINE TOOL USING LIGHT CUT OR DIE CAST, MOLDED, PUNCHED, FORGED, DRAWN, ETC.	30	f 7 MACHINE FLAME CUT	WHERE ENGINEERING INSTRUCTIONS FOR SPECIFIC AND WARRANTED REASONS, RESTRICT THE METHOD OF OBTAINING THE REQUIRED FINISH TO ONE WAY OR ONE PROCESS.
f 5	LIGHT FINISH TOOL CUT, MEDIUM GROUND, FILED, PROFILED, PLANISHED, BROACHED, COUNTER BORED, SPOT FACED, ETC. OR DIE CAST, MOLDED, PUNCHED, SAND CAST, FORGED, DRAWN, ETC.	20	f 4 UNOUT Δ	EXTRA OPERATIONS OR FINISHES MADE ON THE SAME BASIC SURFACE.
f 6	FINISH TOOL CUT, MEDIUM GROUND, FILED, PLANISHED, DRILLED, PROFILED, COUNTER BORED, SPOT FACED, ETC. OR FORGED, MOLDED, DIE CAST, SAND CAST, ETC.	15	f 3 POLISH	
f 6½	TOOL CUT, ROUGH GROUND, TURNED, DRILLED, FILED, SAWED, COUNTER BORED, ETC. OR FORGED, MOLDED, DIE CAST, SAND CAST, PUNCHED, ETC.	10	f 3 BUFF	
f 7	TOOL CUT, ROUGH GROUND, SAWED, BLANKED, NIBBLED, ROLLED, FLAME CUT, ETC. OR FORGED, MOLDED, DIE CAST, SAND CAST, ETC.	5	f 3 MIRROR	
f 8	ROUGH TOOL CUT, PARTING CUT, SAWED, SHEARED, FLAME CUT, NIBBLED, ETC. OR FORGED, MOLDED, SAND CAST, PUNCHED, ETC.	3	f 3 SCRAPED	
f 9	FLAME CUT, SHEARED, CHIPPED, ROUGH FORGED, ETC. ROUGHER THAN f 8, BUT NOT MORE THAN TWICE AS ROUGH.	1	f 7 PAINT	WHERE THE ULTIMATE PURPOSE OF THE SURFACE IS GIVEN TO OBTAIN THE BASIC SURFACE AT THE LEAST COST.

Δ WHERE "UNOUT" IS USED WITH THE "f" NUMBER IT IS TO BE INTERPRETED THAT THE SPECIFIED DEGREE OF SMOOTHNESS IS TO BE OBTAINED IN THE PROCESS OF MOLDING, CASTING, FORGING, PUNCHING, ETC. WITHOUT MACHINING AND THEREFORE NO "STOCK ALLOWANCE" SHALL BE PROVIDED.

NOTES

NOTE 1: THE QUALITY OF THE FINISHED SURFACE DESCRIBED BY THE FINISH SYMBOL IS DEFINED BY APPROVED SPECIMEN PIECES WHICH HAVE BEEN PREPARED.

NOTE 2: THESE SURFACE SPECIMENS REPRESENT THE ROUGHEST SURFACE ACCEPTABLE UNDER EACH "f" NUMBER REGARDLESS OF METHOD OR MATERIAL USED ON THE FINISHED PRODUCT. FINER SURFACES ARE ACCEPTABLE IF MADE AT NO EXTRA COST EXCEPT WHEN A PARTICULAR CHARACTERISTIC OF A SURFACE IS SPECIFIED. (THE USE OF THE SYMBOL "A" WITH THE FINISH SYMBOL TO INDICATE AN UNOUT SURFACE IS NOW OBSOLETE. WHERE IT HAS BEEN USED, AND DEFINITE PLANNING INSTRUCTIONS ARE LACKING, CHECK WITH THE RESPONSIBLE APPARATUS ENGINEER.)

NOTE 3: ALL COMPARISONS TO BE MADE BY VISUAL AND FEEL METHODS.

NOTE 4: THE RELATIVE COST OF DIFFERENT SURFACES SHOULD BE ESTABLISHED BY EACH PLANNING DEPARTMENT BECAUSE IT DEPENDS ON THE QUANTITIES INVOLVED, THE MATERIAL, METHODS, AND MACHINES USED.

NOTE 5: WHETHER OR NOT TO ALLOW STOCK FOR FINISH DEPENDS UPON THE DIMENSIONAL TOLERANCES SPECIFIED, OR THE MACHINING REQUIRED, OR THAT WHICH EXPERIENCE AND PLANNING DICTATES.

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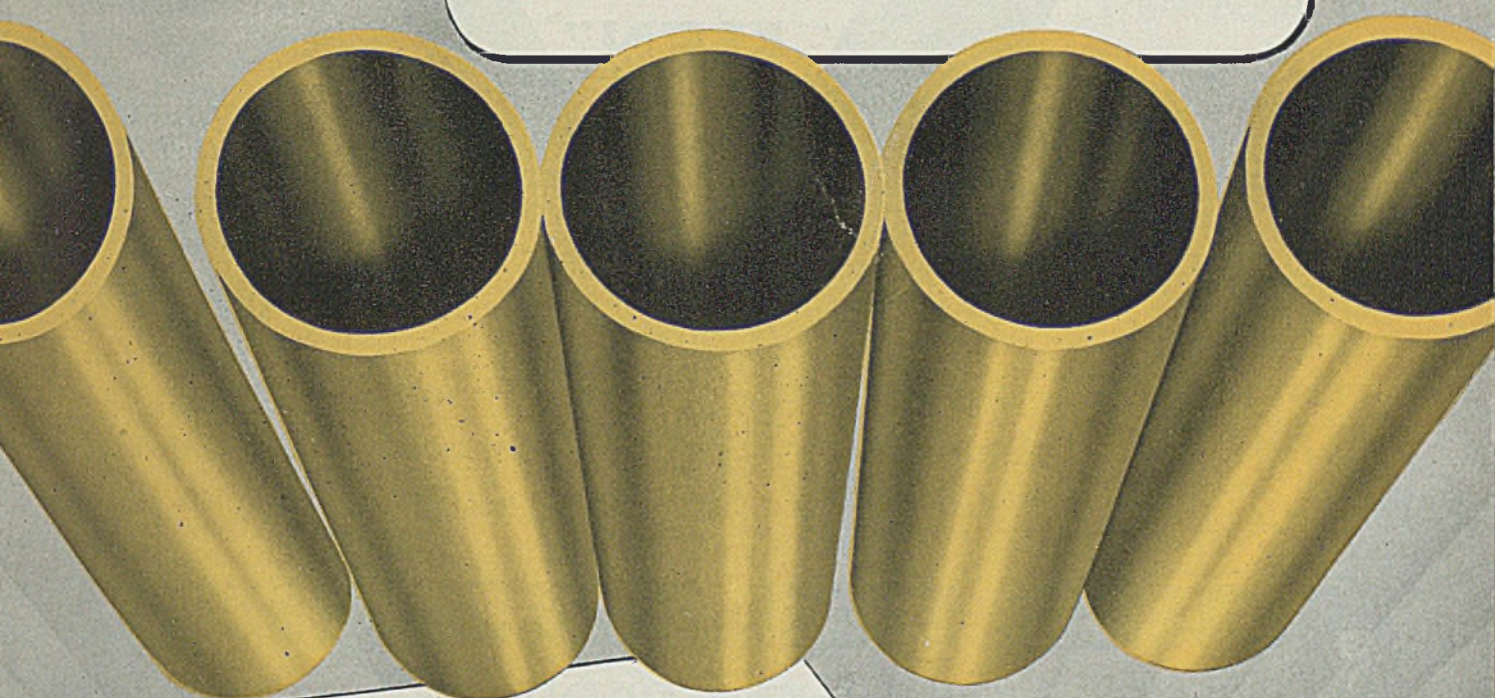
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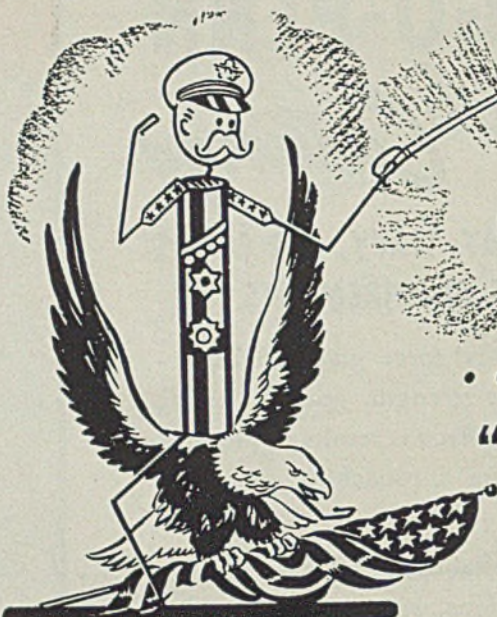
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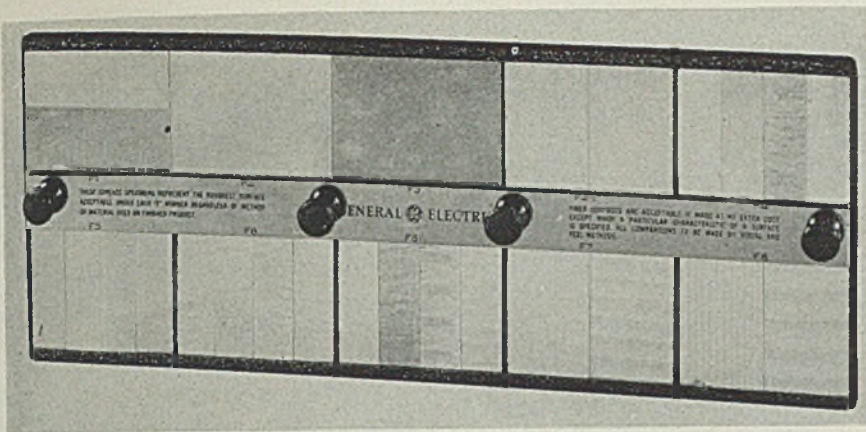


Fig. 4 — Machined-surface-finish specimens in panel for comparison checking of surface finishes

for various applications.

The symbol used is an "F" with an attached number, for example, F¹, F², F³. There are ten degrees of roughness, varying in 2-to-1 steps from 4 to 2000 microinches rms. Each symbol may apply to one or more sample finishes, but all are machined to the same roughness on a metal specimen block, to illustrate differences in surface characteristics encountered in practice.

For example, two surfaces are represented on the smoothest specimen, one of which is lapped, the other honed. A group of four specimens having a roughness of approximately 125 microinches is shown in Fig. 1. The complete set of gage specimens is shown in Fig. 4.

Available to Shop Men

These specimens are available to design engineers, draftsmen, shop mechanics, and inspectors. They are used:

To indicate to the design engineer and to the draftsman the smoothness and appearance of various degrees of finish, and to permit the selection of an exact degree of smoothness for the functional purposes intended.

To enable the shop mechanic to visualize the degree of roughness designated on a drawing.

To enable the shop mechanic and inspector to inspect the product surfaces by comparing them with the proper specimen.

The method of designation of surface finish on a drawing is shown in Fig. 2. The proper "F" symbol is applied to the surface to be machined. The "F³ uncut" designation means that the specified degree of smoothness is to be obtained in the process of molding, casting, forging, punching, etc., without machining.

In general, the method of machining is not specified. Where this is necessary, however, the method is added to the numeral, for example, "F⁴ buff." An instruction sheet on the correct method of use of these symbols is shown in Fig. 3. It will be noted that allowances have been made for any special cases which may arise.

In the inspection of machined surfaces

the mechanic and inspector compare the finished surface with the gage specimen which most nearly approaches the appearance of the machined product. The method of inspection in all cases consists of comparison by sight and feel with the standard surface. The surfaces represented illustrate our standard "run of the mill" finishes. When finishes differ widely in appearance from the samples shown, special gages are made up. They are numbered in the same manner as the standard set and are built to measure the same roughness.

The continued use of this system for the past ten years has accelerated production planning and tooling, and promoted uniformity and interchangeability of parts at minimum cost and delay. We recognize this as a practical step for present production needs and offer it as a suggestion to those who may have similar surface finish designation and inspection problems to solve at this time. The merit of the method lies in the fact that it accurately portrays many of the dimensional characteristics of a surface. A sample finish specimen is actually representative of the finished product and, hence, most useful to design and production personnel, and very simple to interpret.

References:

- (1) A Proposed American Standard on "Surface Roughness" was developed by the Sectional Committee on Classification and Designation on Surface Qualities (B⁴⁴) under the auspices and procedure of the American Standards Association and was issued for a trial period not to exceed two years. It was published March, 1940, by the A.S.M.E., 29 West 39th Street, New York, N. Y.
- (2) "Surface Finish of Journals as Affecting Friction, Wearing-In, and Seizure of Bearings" by R. W. Dayton and H. R. Nelson, and L. H. Milligan, presented at the Cleveland Convention of the American Society of Mechanical Engineers on June 8, 1942.
- (3) "How Should Engineers Describe a Surface?" by O. R. Schurig, *Mechanical Engineering*, October, 1940.
- (4) "Metal Sprayed Surface in Relation to Lubrication," by Harry Shaw, a paper presented at Manchester, Oct. 20, 1937, and reprinted by Metallizing Engineering Co., Inc., 21-07-41st Ave., Long Island City, N. Y.
- (5) "Friction, Fuzz, and Hair Oil," by John Wulff, *Technology Review*, May, 1940.

- (6) "Standards for Ordnance Finishes," by Mary R. Norton, presented at the Cleveland Convention of the American Society of Mechanical Engineers on June 9, 1942.

Welding Contest Open to All Engineering Students

Response from colleges to the announcement of a \$6750 Annual Engineering Undergraduate Award and Scholarship offered by the James F. Lincoln Arc Welding Foundation, Cleveland, indicates their approval and commendation, according to A. F. Davis, secretary of the foundation. However, he points out that some institutions with potential candidates have mistakenly assumed student contestants must have had previous connection with welding, either practical or academic, in their course of study.

"Participation in the contest is open to all students of engineering in all departments and the emphasis of the program is 'Design for Arc Welding' and not on the technique of welding," Mr. Davis states. "The necessary background can be acquired by any student in a very few hours of reading."

New ASTM Standards

(Concluded from Page 50)

testing machine speed. The test specimen may be compression or injection-molded into its final form or it may be machined from sheets, slabs, plates, rods or similar shapes prepared by any suitable method.

The test for coefficient of linear thermal expansion in its scope indicates that under conditions of industrial applications, the thermal expansion of a plastic is composed of a reversible component on which are superimposed changes in length due to changes in moisture content, curing (degree of polymerization), loss of plasticizer or solvents, release of stresses and so on. This method is intended to determine the reversible linear thermal expansion under exclusion of these accidental factors.

However, in general it will not be possible to exclude all these accidental factors, and for this reason the method can be expected to give only approximate values.

The test for water vapor permeability applies to paper, paper board, transparent sheeting, plastic sheeting and other sheet materials.

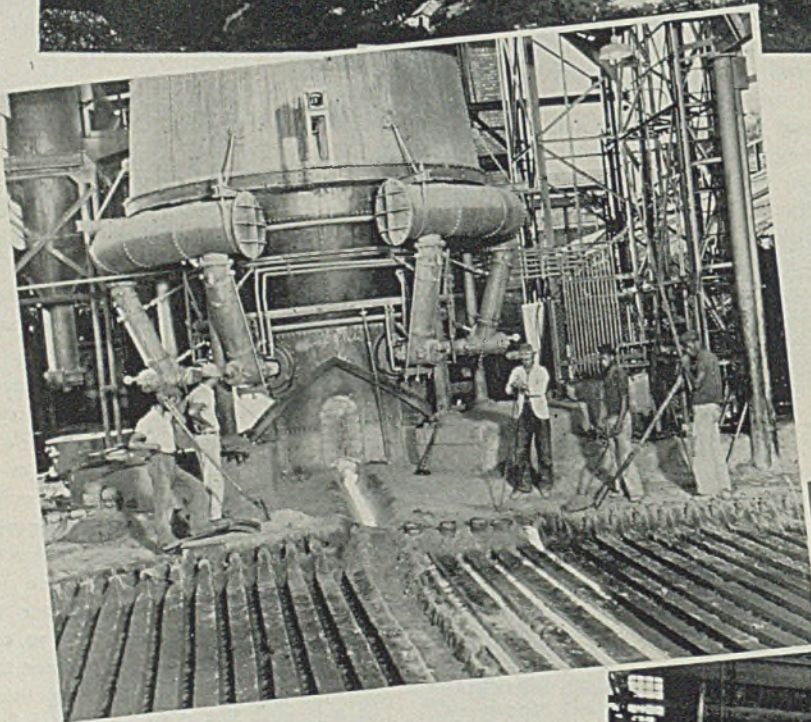
BRAZILIAN



Top left—Three hand-filled charcoal furnaces supply pig iron for cupolas serving the centrifugal pipe machines

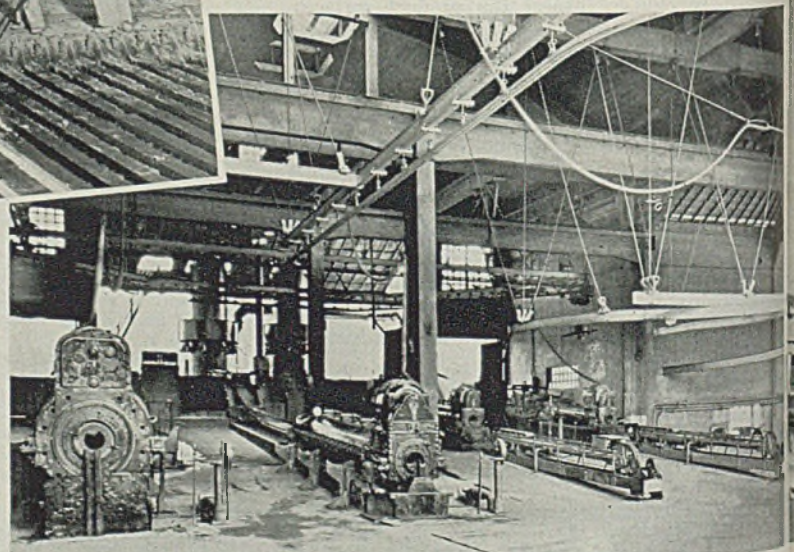
Directly above—General view of plant of Companhia Ferro Brasileiro. All buildings were erected by the company

Immediate left—Iron from charcoal stacks is cast into sand pig beds. Notation on tuyere breast plate above iron notch reads: "Danger of Life"



Immediate right—Centrifugal machines with rotary chills are used for cast pipe production. Two 7-ton cupolas, shown at rear, serve four machines and one spare

Opposite page—Cast-iron stockyard. Pipe is transferred from finishing department by an outside, overhead crane



By GASTON A. MAIGNE
General Manager
Brazilian Iron Co.
Caete, Minas Geraes
Brazil

PIPEMAKER

Operates Four Charcoal Stacks

COMPANHIA Ferro Brasilerio (the Brazilian Iron Co.) which was started in 1925 by Dr. Jose Brandao and subsequently reorganized and enlarged in 1937, has its plants located close to the railroad station of Jose Brandao serving the village of Caete, state of Minas Gersaes, on the Santa Barbara narrow gage line of the Estrada de Ferro Central do Brasil or the Central R. R. of Brazil.

The company manufactures pig iron, centrifuged cast-iron pipe of all types and cast-iron pipe fittings and does some jobbing work. It operates four blast furnaces with an average total capacity of 130 metric tons (128 tons) of pig iron per day, one centrifugal casting shop, a cast-iron foundry and various auxiliary departments such as a power house, machine shop, etc. The company owns its own iron ore deposits as well as large tracts of land covered with forests from which is derived the necessary wood for the manufacture of

charcoal for its own consumption.

Three of the company's blast furnaces are located at the Gorceix plant and one in Caete. Each stack averages daily from 30 to 35 metric tons (29.52 to 34.25 gross tons) of pig iron similar to Swedish pig although a little higher in phosphorus.

An average analysis of the pig iron produced is as follows:

Element	Per cent
Total carbon	3.0 to 4.0
Silicon	1.8 to 3.0
Manganese	0.2 to 1.0
Phosphorus	0.2 to 0.3
Sulphur	trace

Ores are extracted from a deposit located in Gorgo Soco on the Santa Barbara division, 18 miles from the plant. The ore layer covers the south side of a hill and is extracted easily. It is transported by truck to railroad cars spotted on a siding close to the border of the deposit.

Two principal classes of ores are available, one called "chapinha" and the

other "canga". The first is a flaky Itabirite generally found on the lower part of the layer. It contains some fine sand, is friable and averages from 60 to 65 per cent iron. The second grade, which forms the top part of the layer, is more compact and has an iron content of 50 per cent. The output of these ores varies between 5000 and 6000 metric tons (4921 and 5825 gross tons) monthly. Some ore also is mined from the Trindade mine located a few miles farther than Gorgo Soco.

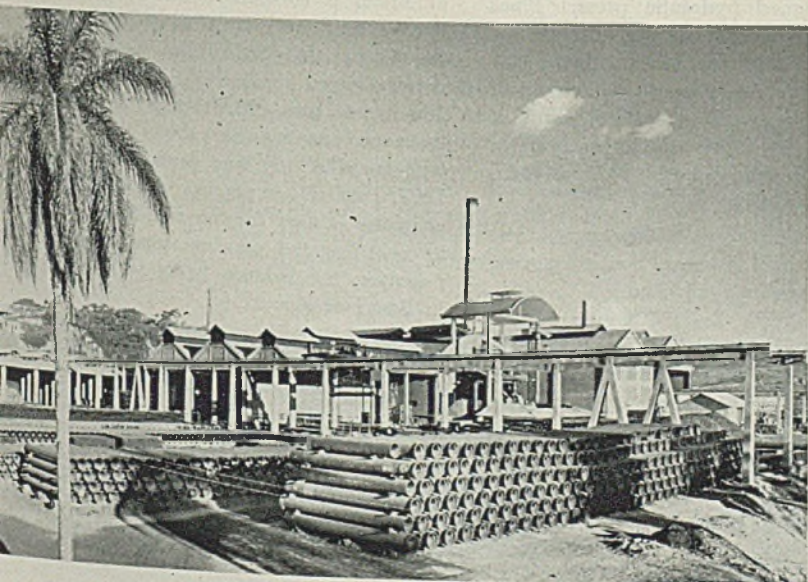
Charcoal, which is used for operating the blast furnace, is made on the premises of the company from various exotic woods. The wood is burned in old style stacks of 52 to 65 cubic yards each yielding about 26 cubic yards of charcoal. This product is conveyed to the plant by railroad, truck and mule packs. The yearly output approximates 260,000 cubic yards or about 40,000 metric tons (39,368 gross tons).

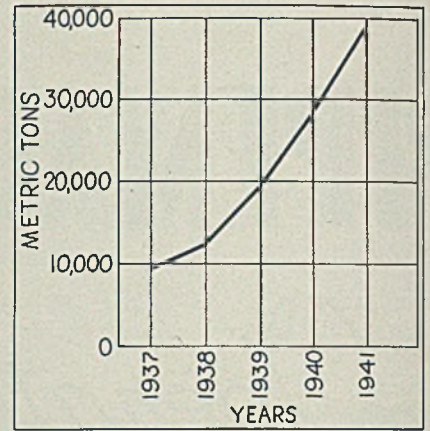
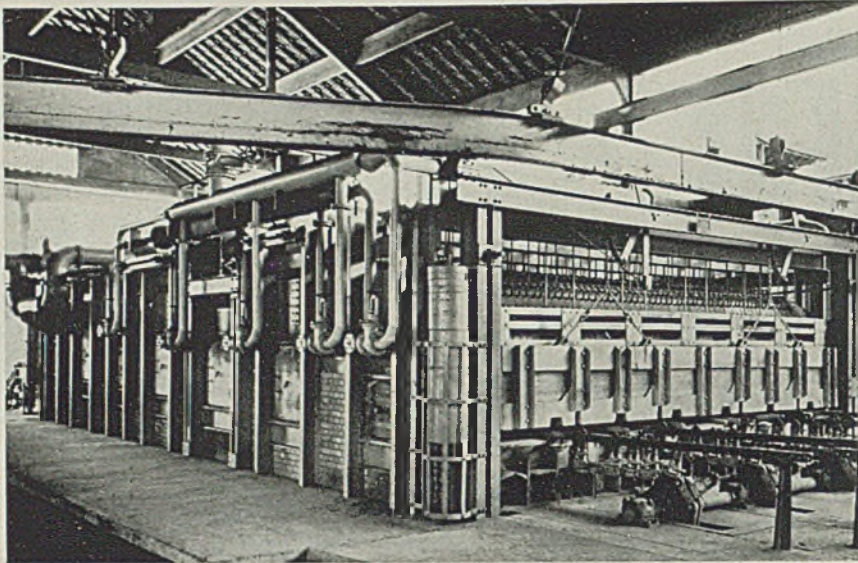
Both grades of iron ore are mixed and screened before fed to the blast furnaces. Each ore charge weighs 883 pounds and is followed by 1.3 cubic yard of charcoal. Each stack takes an average of six charges of ore and charcoal hourly. Cold blast supplied by three Ingersoll-Rand air compressors is passed through a Liesen heater consisting of a number of nickel-chrome tubes provided with fins. Part of the gas from the blast furnace is burnt in the Liesen heater to maintain a hot blast temperature ranging from 1100 to 1300 degrees Fahr. The temperature is controlled and automatically regulated by pyrometers.

Gas from the blast furnaces after being properly cleaned by a scrubber and drying system is used in the plant. The largest part of it is burnt under two Bailly-Mathot boilers giving superheated steam at 170 pounds which is fed to a Thiriau compound steam engine coupled to a 460 kilovolt-ampere alternator which furnishes the power for the whole plant as well as light for the employees' houses.

Alternating current produced is 3-phase, 50-cycle and 400 volts. Part of this energy is transformed into direct current for use on the centrifugating machine. The electric system is in duplicate and permits throwing in a second alternator should the first one fail in service. The plant is equipped with three Babcock & Wilcox steam boilers; these are fired with gas or wood and supply steam to operate the air compressors.

In the pipemaking shops, the most modern centrifugal processes using rotating chills are employed. In these, two 7-ton cupolas serve five centrifugal pipemaking machines, one machine be-

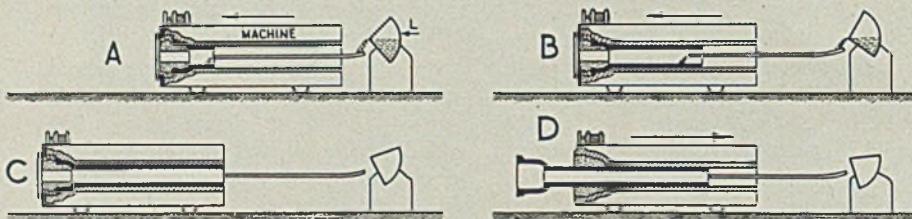




Left—Conveyor-type furnace for annealing centrifugal cast pipe. The furnace is fired with blast furnace gas

Sketch I. (Left)—Various steps involved in manufacture of centrifugal cast pipe

Above—Chart showing production of pig iron in metric tons for five-year period



ing held in reserve as a spare unit.

Pig iron is melted in the cupola and poured into the ladle, L, Sketch I-A, in sufficient quantity to make one pipe. The ladle is tilted in such a way as to keep a constant flow of metal pouring in the feeder, which has a slight slant. The mold is impelled by a rotating as well as a longitudinal translating motion; the metal falls inside the mold helicoidally. The two motions, rotating and translating, are regulated in such a way that the metal film suffers no solution of continuity. Centrifugal force gives to the metal, which solidifies quickly, an even thickness as well as a uniform and homogeneous texture. The mold is made of steel and is water cooled. The various stages entailed in the making of the pipe are shown in Sketch I.

Metal from the ladle L, flows into the feeder, and rotating mold and fills the bell. As soon as the bell is filled, the machine is set in motion and moves away from the ladle with the mold rotating. See Sketch I-B. When the pipe is completed the ladle, L, returns to its starting position. See Sketch I-C. To strip the pipe from the machine, it suffices to hold up the bell while the machine goes back to its starting position. See Sketch I-D.

The outside skin of the cast pipes is tempered by its contact with the cold surface of the chill, and it is necessary to alleviate this temper which imparts

fragility to the pipes and renders any subsequent machining difficult. Consequently, the pipes are annealed for a period of one hour at a temperature of about 1475 degrees Fahr. The annealing furnace is fired with gas from the blast furnace. Different phases of this thermal treatment are controlled by automatic regulating pyrometers. After being annealed each pipe is cleaned and examined to ascertain if it is free from defects that could render it improper for use or decrease its mechanical resistance. Each pipe is then tested under a water pressure of 210 pounds per square inch for half a minute by a specially designed hydraulic press. Pipes that show the least sign of leakage are scrapped if the defect affects a large area but if the defect is located at one end, the pipe is cut off and the sound part salvaged. The pipes are afterwards tar coated in a tank heated to 270 degrees Fahr. by a steam coil.

The Gorceix plant makes every class of pipe actually in use in South America, such as standard universal LA-A-B, Obras Sanitarias de la Nacion (Argentine) (National Sanitary Works), Stanton's sizes of gas pipe, cylindrical pipe with Gibault's ring, flange and threaded paper and small pipe ("Metallit") for sanitary installations.

Pipe manufacturers starting with 4-inch diameter pipe have adopted 19 feet 9 inches as the most convenient length for laying in the ground. Dia-

meters range from 2 to about 24 inches though the maximum size is seldom reached in South America for city water pipe installations.

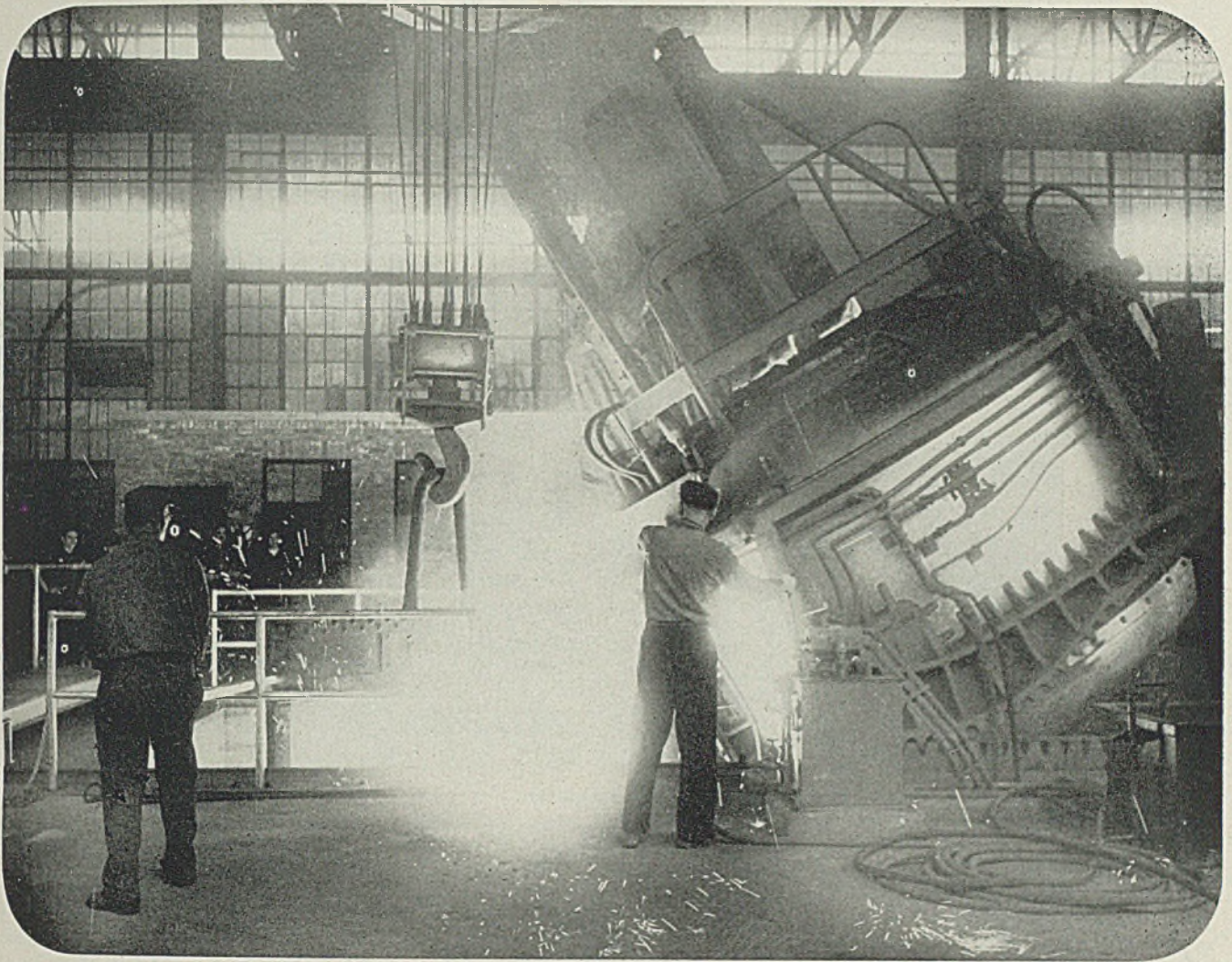
Two of the four centrifugating machines are producing pipe 19 feet 9 inches long and from 3 to 24 inches diameter. The two other machines are making pipe 9 feet 10½ inches long ranging from 2 to 4 inches diameter.

The plant also includes a foundry for casting special pipe fittings. Its output as yet small will be increased in 1943 when a new completely machine equipped foundry will be put in operation.

Insofar as the production of pig iron in Brazil is concerned, the Companhia Ferro Brasileiro stands second only to the Companhia Siderurgica Belgo Mineira. Output reached the peak of 39,282 metric tons (38,660 tons) in 1941; the accompanying chart shows the country's trend of pig iron production since 1937. Part of the pig iron made by the company is used for the manufacture of its centrifugated cast-iron pipe and accessories, the balance being sold either in Brazil or abroad.

Total production of pipe in 1941 reached 14,665 metric tons (14,433 tons) which represents 260 miles of pipe. The monthly output is actually 1500 metric tons (1476 tons) but the eventual output may reach 2000 metric tons (1968 tons).

An average of 1000 men are employed (Please turn to Page 83)



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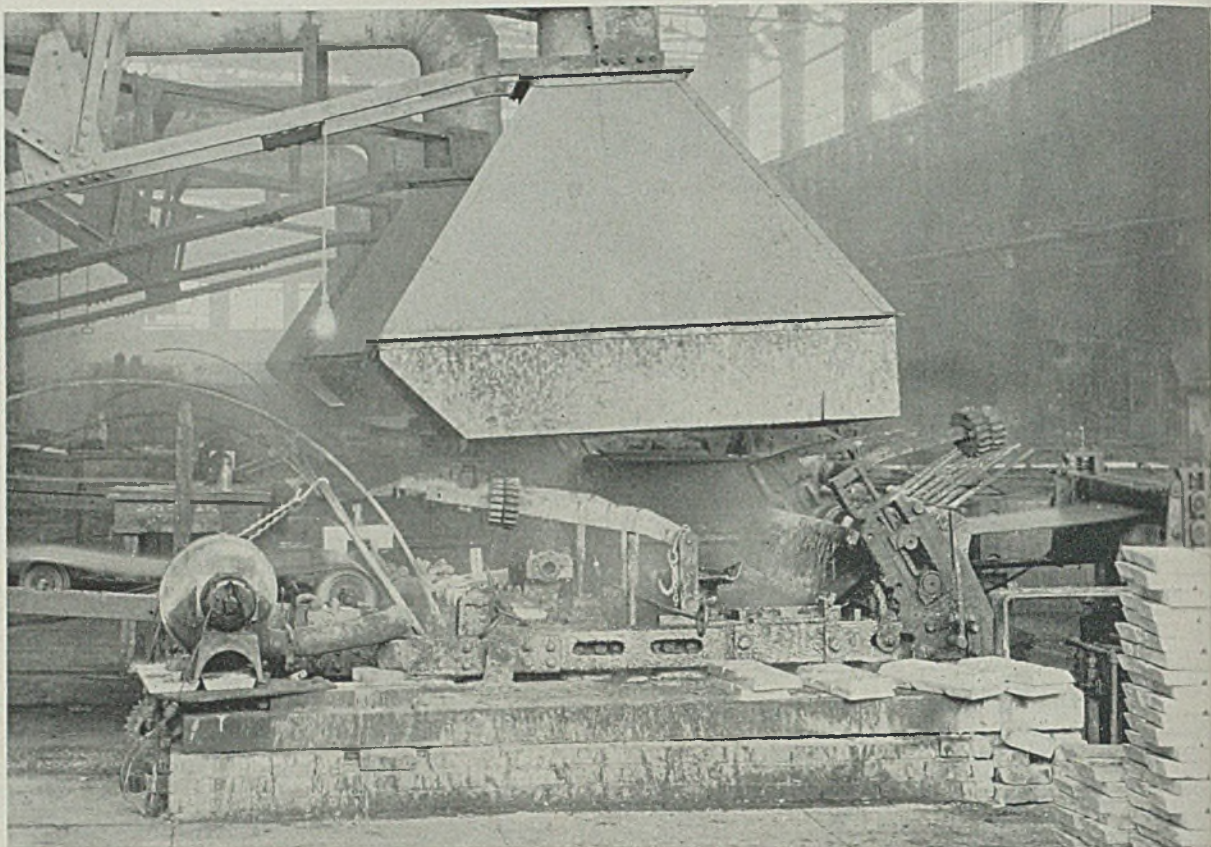
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Rolls

FOR SHEET GALVANIZING

THIS DISCUSSION on rolls used in sheet galvanizing will try to give the galvanizing industry some new ideas which may help to solve some of the troubles developed in service.

Two things are immediately apparent. First, a thorough search through the literature on this subject does not reveal an extensive study of this phase of sheet galvanizing; and second, the facts and conditions surrounding this subject are so vast and involve a technical knowledge and practical experience on so many other related subjects that it is extremely difficult to offer a technical discussion on the subject. This limited discussion is offered for what it is worth.

Rollmaking a Separate Industry: According to C. B. Francis (1), the manufacture of rolls is a separate industry for few users of rolls are skilled in the art of rollmaking. When the work the rolls have to do is considered, together with their effect upon the product of

By WALLACE G. IMHOFF
President
Wallace G. Imhoff Co.
Vineland, N. J.

the mill, the importance of good rolls is better appreciated. Most rolls are castings, some are forged, yet they must all be ductile to withstand the shock produced as the piece enters them; strong to resist sufficiently the great pressure applied to their ends; and uniformly hard to give them good wearing qualities so that they may not develop surface defects which would leave their marks on every surface rolled on them and cause the material to be rejected. To secure these qualities, it is evident that the rolls must be sound throughout, and that the best of materials and the greatest of skill are required in their manufacture.

These materials are of four classes: namely, plain cast irons, alloyed cast

irons, carbon steels and alloyed steels. From these materials, several different types of rolls are produced, which are used for various purposes.

Forged Steel Rolls: How little any one person can know about anything is well illustrated in just laying a foundation to open this discussion on the subject of rolls used in sheet galvanizing. To find our way to galvanizing rolls a brief moment will be taken to look into the kinds of rolls and their uses based upon the materials and methods of manufacture. Rolls are classed as follows:

—Sand cast iron rolls, commonly called sand rolls.

—Chilled cast iron rolls, commonly called chilled rolls. The chill may be mild, medium, or hard.

—Alloyed cast iron rolls are of two types—the alloyed grain roll and the alloyed chilled roll.

—Steel rolls can be cast or forged and are also of two classes as to composition:

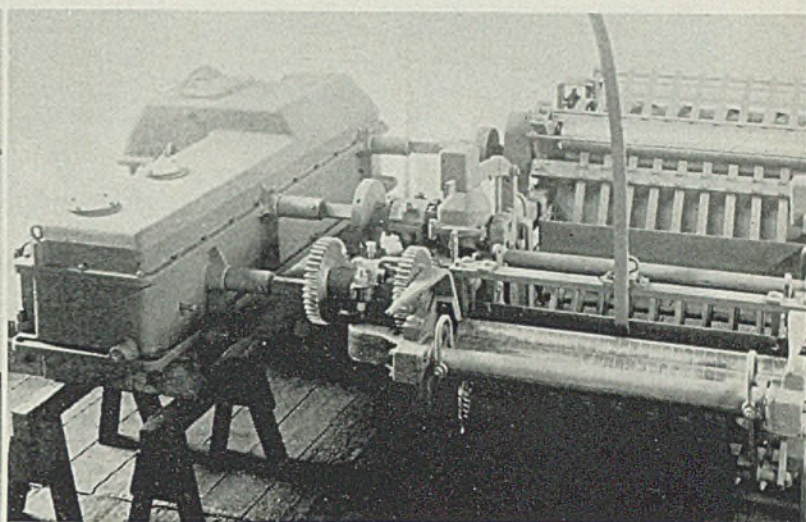
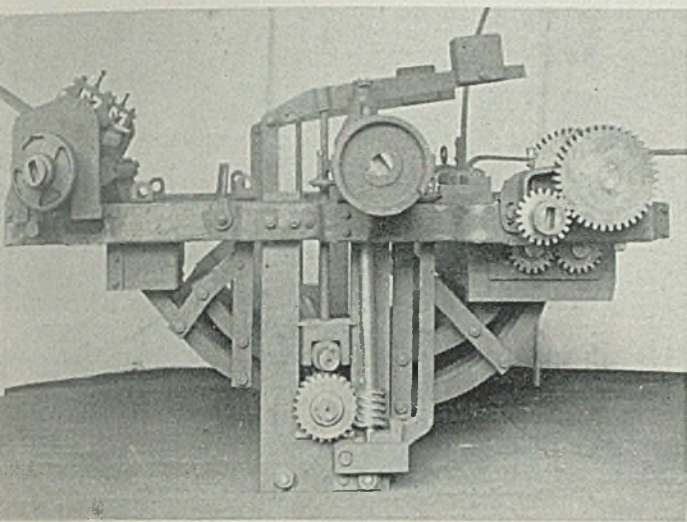


Fig. 1. (Opposite page)—Sheet galvanizing machine in operation in the sheet galvanizing pot. United Engineering & Foundry Co. photos

Fig. 2. (Directly above)—Side view of sheet galvanizing machine itself as it appears when removed from galvanizing pot. Note various roll drives, entrance and exit guides, etc.

Fig. 3. (Right)—End view of sheet galvanizing machine and its drive mechanism at the left. Various guides are much in evidence. Note grooves on exit rolls in foreground

namely, carbon steel and alloyed steel.

—Composite rolls are the latest types devised. They consist of one kind of metal, usually a very hard iron alloy, forming the outer surface of the roll; and another kind, very strong and tough, such as steel, or a soft iron, making up the central parts of the body, necks and wobblers.

Chemical Composition: Galvanizing rolls made by one company are carbon steel of the approximate chemical analysis: 0.45 per cent carbon, 0.65 manganese, 0.040 maximum phosphorus, 0.040 maximum sulphur, 0.05 silicon.

Other analyses of roll steel are:

—Armed ingot iron.

—Mild steel, analyzing 0.20 to 0.30 per cent carbon, 0.50 to 0.80 manganese, 0.025 maximum phosphorus, 0.030 maximum sulphur, 0.05 maximum silicon.

—Medium carbon steel, analyzing 0.40 to 0.50 per cent carbon, 0.50 to 0.80 manganese, 0.025 maximum phosphorus, 0.030 maximum sulphur, 0.05 maximum silicon.

Heat Treatment and Hardness: After forging, the rolls are normalized and annealed so as to show a hardness of 27 to 32 scleroscope. The heat treatment of rolls for galvanizing may be:

—Normalize.

—Normalize and temper.

—Quench and temper.

Roll Service: The galvanizing machine and the general outline of sheet galvanizing practice has been described in detail by a number of recognized authorities (2, 3, 4, 5, 6). This discussion only will refer to the hot-dip galvanizing

practice and equipment as a means of further clarifying the details submitted on the rolls and their service. One early reference (6) states the "rolls are made of hammered forgings and turned". Also, "the rolls have a hammered wrought iron pinion on the end of one and two wrought iron pinions at the other end, and are driven by another wrought iron cog wheel."

In an extremely fine paper on sheet galvanizing (7), Nelson E. Cook states, "Galvanizing rolls have probably caused more troubles to the galvanizer than any other part of the machine." He discusses the relation that the rolls play in the correct application of the zinc coating to the sheet, and also calls attention to the correct mechanical operation of the driven rolls in a galvanizing machine.

Roll speed (8), double-bottom rolls (9), iron content of the galvanizing bath (10), synchronization (11), zinc-iron alloys and stirring up dross (12) and many other factors and conditions (13, 14, 15) all must be carefully studied when concentrating on galvanizing roll service.

A broad viewpoint and background help to understand and overcome the more definite problems that occur with the rolls themselves. It is these outside influences and conditions that in many cases are directly responsible for the roll troubles.

Galvanizing Equipment: Before discussing some of the conditions developed by roll service, it is of practical importance to describe briefly the galvanizing machine proper. Figs. 1, 2 and

3 show a sheet galvanizing machine installed and in operation in a galvanizing pot, a side view of the galvanizing machine out of the pot, and a sheet galvanizing machine and drive respectively. The rolls and their operation are best described by the company that makes the machine (16).

Feed Rolls: The feed rolls are arranged close to the flux box at an angle of 30 to 45 degrees from vertical, in a housing supported on the main frame. Both the top and bottom rolls are driven. The top roll is driven from the bottom roll through a set of spur gears, and the bottom roll is connected to the main drive through a friction clutch so the rolls can be stopped without stopping the motor that is driving them. This feature is a distinct advantage in case a sheet becomes clogged in the machine. The feed rolls are made of steel.

The pressure required between the rolls depends on the resistance of the sheets to bending in the guides before and after entering and should be only enough to keep the sheets from slipping in the rolls. The pressure is usually regulated by means of a spring at each end over the top roll bearings, with set screw adjustment. Some operators, however, prefer a counterweight arrangement for regulating the pressure.

Flux Box and Fluxing: Before the sheets pass into the zinc bath, they must be covered with flux in order that they will take the coating properly.

The flux box is made of special steel and is located at one end of the pot. It is supported from the main frame in such a manner that it can easily and quickly be lifted out when necessary. Guides are usually provided to carry the sheets through the flux and into the guides for the bottom rolls. However, some operators insist on eliminating guides, as far as possible, because they are in the way when removing dirty flux and because they obstruct the operator's view of the sheets passing through the machine. Therefore most guides to the flux box

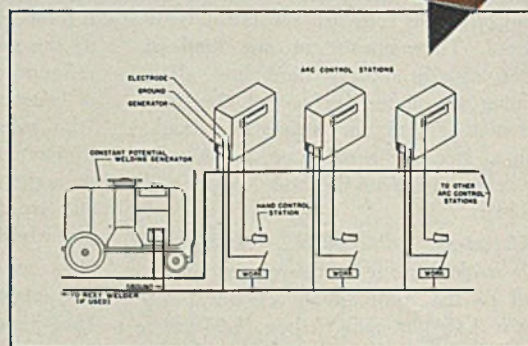
More Arcs FROM

with the new Wilson "Honey Bee" Arc Control Station



GREATER welding output from every machine, improved arc control, and better welds on thin gauge metal — these are some of the advantages offered by the new Wilson "Honey Bee". Several welding operations can be performed simultaneously from one constant potential arc welding generator — up to the full capacity of the generator. For example, two 150 ampere or four 75 ampere Wilson "Honey Bees" can be connected to any 300 ampere constant potential arc welding generator. Most conventional drooping voltage generators can be converted easily to constant potential. A quick-change switch may be mounted on every Wilson "Hornet" arc welding generator for quickly changing its characteristics from drooping to constant potential or vice versa.

Wilson "Honey Bee" stations are connected to



the generator in parallel. The number of stations used (within the capacity of the generator) determines the number of welding operations that can be performed at the same time. Each operator can control his own welding current from maximum to minimum without breaking the arc or affecting the performance of any other station working from the same generator.

WILSON WELDER AND METALS

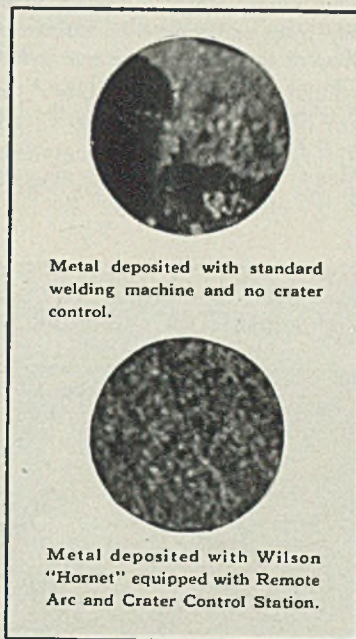
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Improved Weld Deposits with Remote Crater Control

To prevent weld defects that result from the abruptly broken arc, the Wilson "Honey Bee" is equipped with a control switch which permits gradual reduction of the current. For example, when welding, the operator can reduce the current from the value at which it was set by pressing a button on the control switch which he holds in his hand. He can hold this button down until the current has been reduced from, (for in-

stance), 65 to 25 amperes. He can maintain it at 25 amperes until the arc is extinguished, or he can control the crater by allowing the current to fall to zero. In either case when he releases the control button, the setting automatically goes back to the original figure. The photomicrographs at right show clearly how Wilson Crater Control improves the quality of weld deposits.



Metal deposited with standard welding machine and no crater control.

Metal deposited with Wilson "Hornet" equipped with Remote Arc and Crater Control Station.

Control Mechanism

Controls are fully automatic and are operated by the remote control push button. For convenience this control may be combined with the electrode holder to save time for the operator. The mechanism in the unit is motor-operated, driving a saddle type sliding contactor,

which adjusts a resistor having a range of either 0 to 75 amp. or 0 to 150 amp., depending on the size of "Honey Bee" used. This motor is operated by two directional contactors, bridged by condensers to eliminate sparking or sticking of contactors.

Ratings and Dimensions

Wilson "Honey Bee" Arc Control Stations are made in two sizes: 0 to 75 amperes and 0 to 150 amperes.

Continuous current rating at any setting on an open circuit of 80 volts, constant potential.

	Height	Length	Width	Weight
75 amperes	20"	24 1/4"	11 1/4"	125 lbs.
150 amperes	20"	29 1/4"	13 1/4"	160 lbs.

For further information, call your nearest Air Reduction office

CO., INC.

WASHED COAT ELECTRODE AVAILABLE ON LOW PRIORITIES

Wilson No. 18 Washed Coat electrode is an all-purpose electrode for general welding on low carbon and mild steel. It is made in 5 sizes — 3/32", 1/8", 5/32", 3/16" and 1/4", with a tensile strength of 45,000 to 60,000 p.s.i. as welded, and elongation in 2" of 7% to 10%. The surface coating materially improves arc stability and operating characteristics over those of bare electrodes.



are arranged so they can easily be removed.

As previously stated, the sheets enter the flux in a damp or wet condition. The reason is that flux will adhere to dry steel and prevent proper galvanizing, but when the sheets are damp or slightly wet, the flux functions perfectly.

Sal ammoniac or zinc ammonium chloride flux is used. Tallow or bran and glycerine, sometimes sawdust and glycerine, are used as agents for frothing up the flux. These agents decompose slowly and give off gases which bubble up through the molten sal ammoniac, making the froth.

The steam resulting from the dampness of the sheets causes the flux to appear to boil; the intensity of the boiling action depending largely on the amount of moisture on the sheets. The boiling action causes a certain amount of the froth and flux to be thrown over the top of the box into the pot and onto the frame and furnace coping. A head of 6 to 8 inches of flux, above the liquid zinc, is kept in the flux box.

About 8 to 10 pounds of sal ammoniac is required per ton of steel. This,

with the tallow or bran and glycerine should be added a little at a time, depending on the rate of feed and condition of the steel.

Guides To and From the Bottom Rolls: Operators have different ideas as to what is the best section for the guide to and from the bottom rolls. Some want rectangular bars arranged vertically and some rectangular bars flat. Others claim an advantage for guides made of round bars. In any case, the guides are supported on the frame of the machine entirely out of the bath and are so arranged that they can be lifted out without taking the machine out of the pot. This provision will usually permit removal of a clogged sheet without lifting out the machine.

Submerged or Lower Rolls: The submerged rolls with their drives are the result of much experimenting and long experience and were probably the hardest problems to solve successfully in the whole machine. Their purpose is to carry the sheets through the bath. The rolls are solid forgings of special steel about 8 inches in diameter when new. Forged steel renewable protector sleeves or bushings are provided for the

necks so the bearings may be maintained at approximately their normal size, the zinc acting on the outer surface of the bushing instead of on the roll neck.

The surface of the rolls must be kept smooth and true. Thus it is necessary to remachine the surface of the rolls occasionally, taking off about $\frac{1}{8}$ -inch in diameter. With continuous operations under good conditions, rolls are usually remachined about every 8 months. The rolls can be used until they are reduced to about 6 inches in diameter.

Some operators prefer to use bottom rolls of reduced diameters as exit rolls rather than continue to use them as long as they can as bottom rolls.

While the action of the rolls in the bath circulates the metal constantly, in a measure preventing the dross from solidifying, the rolls still must be placed high enough to allow a considerable accumulation of dross at the bottom of the pot without carrying it to the sheets. This means the bottom roll must be not less than 1 inch above the dross line.

A worm drive has been found most satisfactory for the bottom roll as it causes the least agitation of the bath. Too, the flow set-up is mostly in a horizontal plane. As a consequence, there is little resulting disturbance and little flow of molten zinc to the surface. This is important, for the less the flow of the bath in the pot, the fewer are the number of different particles of molten zinc brought in contact with the air, with the result that less zinc ash is formed.

On account of the action of the molten zinc, roll drive gears are subject to considerable wear. In order to maintain as smooth and regular a motion as possible, a wedge adjustment is provided for keeping the worm and gear properly in mesh until worn out. This is usually accessible from the top of the machine.

The top roll is driven from the bottom roll through a set of spur gears.

The pressure required between the rolls is governed by the gage of sheets being galvanized and should be just sufficient to keep the sheets from slipping between the rolls. The pressure is regulated by counterweight levers acting through rods on the top roll bearings.

The bevel gears for driving the worm are entirely enclosed in an oil-tight cast-iron case which is carried in trunnions to keep it in line with the worm as adjustment is made. The case is arranged so the teeth of the gears are continuously lubricated by the vertical gear dipping in oil.

Exit Rolls: The purpose of the exit

ELECTRIC RANGE AND IRON "GO TO WAR"



A HEATER from an electric range and a thermostat from an electric iron go into these new heating "guns" for exploding rivets in hard-to-reach parts of planes, now being manufactured by Westinghouse's Electric Appliance Division. Shaped like a submachine gun, these tools shown at the final production stage shoot heat into a special DuPont rivet containing a small explosive charge. The heat sets off the charge within 2 to 6 seconds thus capping the rivet that holds together the metal parts

Industrial Truck Care Pays You Dividends

A. E. DOROD

ASSISTANT CHIEF ENGINEER, BAKER INDUSTRIAL TRUCK DIVISION, THE BAKER-RAULANG CO.



BAKER HELPS VITAL WAR PLANTS TO "KEEP 'EM RUNNING"

"The investment in regular inspection and lubrication of your industrial trucks is one of the best you can make." This statement from an article appearing in recent trade publications, written by a Baker engineer, is more true today than ever before. The unprecedented increase in industrial production and the huge amount of handling required in the movement of war materials, have created demands for power trucks which are taxing the productive capacities of truck manufacturers. Thus, with new equipment difficult to get, truck maintenance is extremely important, for trucks now in service must be kept running at top efficiency . . . So that the essential points of truck maintenance may be made available to everyone concerned with their operation, reprints of this article are offered in bulletin form.

Do You Know

That many possible causes of excessive wear or loss of power are not apparent in ordinary running but can be determined only by inspection?

Do You Know

That over-lubrication can often be as harmful as under-lubrication?

Do You Know

That it is desirable to blow the dust and dirt off the truck daily before oiling?

Do You Know

That overloading a truck is helping the Axis by breaking down irreplaceable equipment?

Do You Know

That service brakes should be tested for stopping with the heaviest load to be carried, and parking brakes for holding maximum load on steepest incline truck must negotiate?

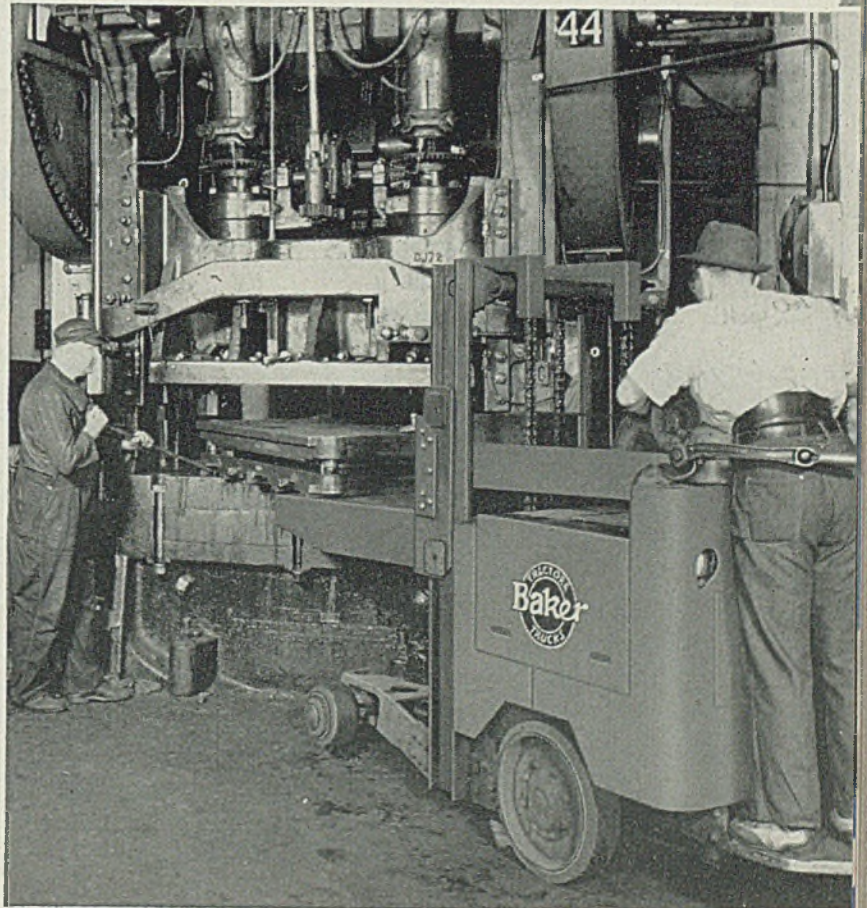
These are a few of many points covered in the Baker bulletin "Industrial Truck Care." Write for your copy or copies today.

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rolls is to remove excess metal, control the weight of coating and make the coating even. Generally, they are similar to the submerged rolls, being solid forgings of special steel with necks protected by renewable sleeves or bushings. The surfaces are provided with spiral grooves to carry the zinc along the rolls and assist in making the coating uniform. Like the submerged rolls, these rolls must be remachined occasionally to keep their surfaces smooth and true. They are usually about 8 inches in diameter when new and can be used until they are reduced to about 6 inches in diameter.

These rolls are carried in open-top housings of special steel attached to the main frame above the bath. Filler blocks are provided, faced with supplementary bearing plates to take the wear from the necks. These plates have to be renewed frequently. As the amount of zinc used per ton of steel depends, in a measure on the pressure between the rolls, the means of adjusting the pressure is important. The heavier the gage, the greater the pressure required. The adjustment is usually obtained by counterweighted levers acting on the roll necks, a renewable wearing plate being provided on the lever where the pressure is applied.

Satisfactory operation requires that the motion of the exit rolls be smooth and regular, free from all jerks. Both rolls are positively driven by being con-

nected through a pair of spur gears at one end. One of the rolls is connected to the drive through a spur gear of ample proportion and arranged so it can be adjusted easily and quickly to take care of wear on the teeth. The drive is also arranged so that by removing two nuts it can be swung out of position when the rolls are to be removed.

As the wear on the exit rolls may not be the same as on the submerged or bottom rolls, it is necessary to be able to change the relative speeds of the two sets of rolls in order to prevent crowding or pulling the sheets. Additional speed adjustment is, therefore, provided in the main drive for this purpose.

The relation of the surface level of the zinc bath to the rolls is important. The primary reason for varying the relationship between the surface level of the zinc and the center of the rolls is to control the weight of coating. New operators frequently are not familiar with the simple means at their command which permits them to control the thickness of the coating on the sheets. The surface level may vary from the center of the rolls to a little above the bottom of the rolls — i.e., at the lowest level the bottom of the rolls is still submerged. For the heaviest gage sheets, the bath level is usually kept highest, and lowest for light-gage sheets. If allowed to drop too low, dirt

(oxide), flux, etc., are more likely to collect on and be rolled into the coating.

An easily removable separating plate of special steel is provided to keep flux and oxide away from the rolls and to confine clean zinc around them. Clean galvanized sheet cannot be produced without this plate.

Purpose of Groove in Exit Rolls: The explanation of the groove in the exit rolls is given by Burns and Schuh (5) as follows: "In coating sheets by machinery, the thickness of the coating can be regulated, at least approximately, by setting the exit rolls with respect to the surface of the zinc bath. By slightly changing the relative position of the rolls and bath surface (often by adding more zinc to the bath), it is possible to increase the amount of zinc in the V-groove between the two rolls, resulting in a thicker coating, other operating conditions remaining the same.

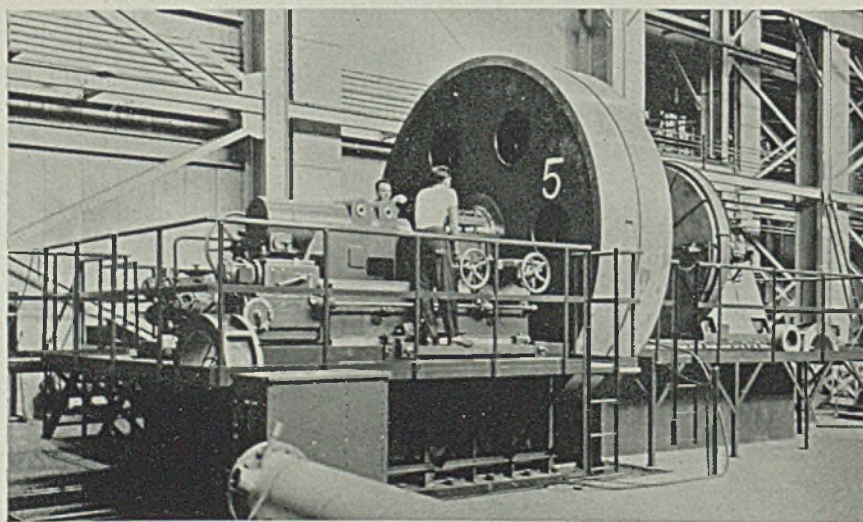
"Thickness of the coating varies somewhat from sheet to sheet. In fact, it may vary rather widely on different portions of the same sheet. A variation of 17.5 per cent (0.35-ounce per square foot in a nominal coating of 2 ounces per square foot) is considered by many manufacturers as good commercial practice, even with present-day equipment."

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(Concluded in Feb. 8 Issue)

UNCONVENTIONAL, BUT IT DOES THE JOB



WHEN MACHINE tool builders were too busy to tackle the task, General Electric built the above 200-inch gap lathe to turn marine reduction gears at one of its New England plants. To get the big lathe in production faster some departures from conventional design practice were made. For example, concrete is used for the base; a simply designed face plate and spindle is employed with a standard small headstock. No large parts were used in the machine to permit subcontracting work. The machine operates over a wide range of speeds

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Division THE BALDWIN LOCOMOTIVE WORKS, Philadelphia, Pa.

TECHNICAL PROGRESS



War Gives Foundries a Chance To Utilize Casting Improvements

BY A. C. DENISON
President
Fulton Foundry & Machine Co. Inc., Cleveland

■ THE PAST year of adjustments in the use of critical metals has given the capable iron foundrymen a long hoped-for opportunity. In recent years he has been putting his business on a scientific basis of controlled and improved metallurgical practice. And, while his product quality and the engineering properties of his iron has come up to new high standards that justified a much broader use, still because of custom he was making only slow progress in getting his better product accepted by engineers and put into the wider use it deserves.

War has given great impetus to this wider acceptance of modern gray irons produced by good foundries. So now we are finding these strong irons being used in ship propellers, high pressure work, heavy duty machinery parts, and many other suitable applications which in recent years engineers generally specified in steel or bronze. The year is notable not so much for new developments as it has been for this broader acceptance and application of these finer gray irons. This is a trend that will grow. It already has been greatly accelerated by the war economy.

New Paints, Glass Fiber Combine to Make Camouflage Netting Highly Effective

BY HOWARD E. WISE
President
Arco Co., Cleveland

■ WITH AMERICA facing the possibility of aerial attack, paint attained the importance of a major tactical instrument of defense during 1942. While even now the complete camouflaging of aircraft and other war plants, defense works and vital storage facilities is limited to isolated locations in our coastal areas. American industry is for the first time alert to the implications of protective concealment.

Following the introduction of infra-red reflecting camouflage paint in dark visual colors in the middle of 1941, the value of paints was recognized by the inclusion of infra-red reflecting requirements in several government specifications pertaining to camouflage paints. When properly used in the art of camouflage, infra-red reflecting paints enable the camoufleur to make camouflage installations that are as effective under infra-red photography as they are visually, so that the problems of protection are now largely confined to the working out of suitable techniques for concealment of ground installations and combat equipment.

Search for a non-combustible garnishing material led to application of glass fiber for camouflage netting. The result is a new and unique camouflage netting in the color

and texture of natural foliage which when photographed from the air under both panchromatic and infra-red photography appears to be the same color as natural foliage. In addition, it does not support combustion.

Because they reflect heat generated by electric light bulbs to a greater degree than do ordinary paints of dark color, these same paints are being used to blackout the seaward side of street lights in certain coastal areas to minimize the possibility of glass breakage.

To meet the needs of special war housing facilities, a new two-coat system for pre-fabricated homes was developed with a special rapid-drying weather-proof shop coat that can be applied on plywood, ordinary lumber or manufactured board without a preliminary sealer.



Special-Purpose Machine Tools Step Up War Production

BY O. W. YOUNG
Executive Assistant General Manager
Buick Motor Division
General Motors Corp., Flint, Mich.

■ THE WAR production program has stepped up in such intensity and volume that it has become necessary to make every machine and tool and every foot of floor space do several times the work formerly required of it. This may be expected to affect the operation of machinery and machine tool builders, who, having produced amazing accomplishments in the early stages of the war program, are fitting their facilities to the changed and expanded requirements.

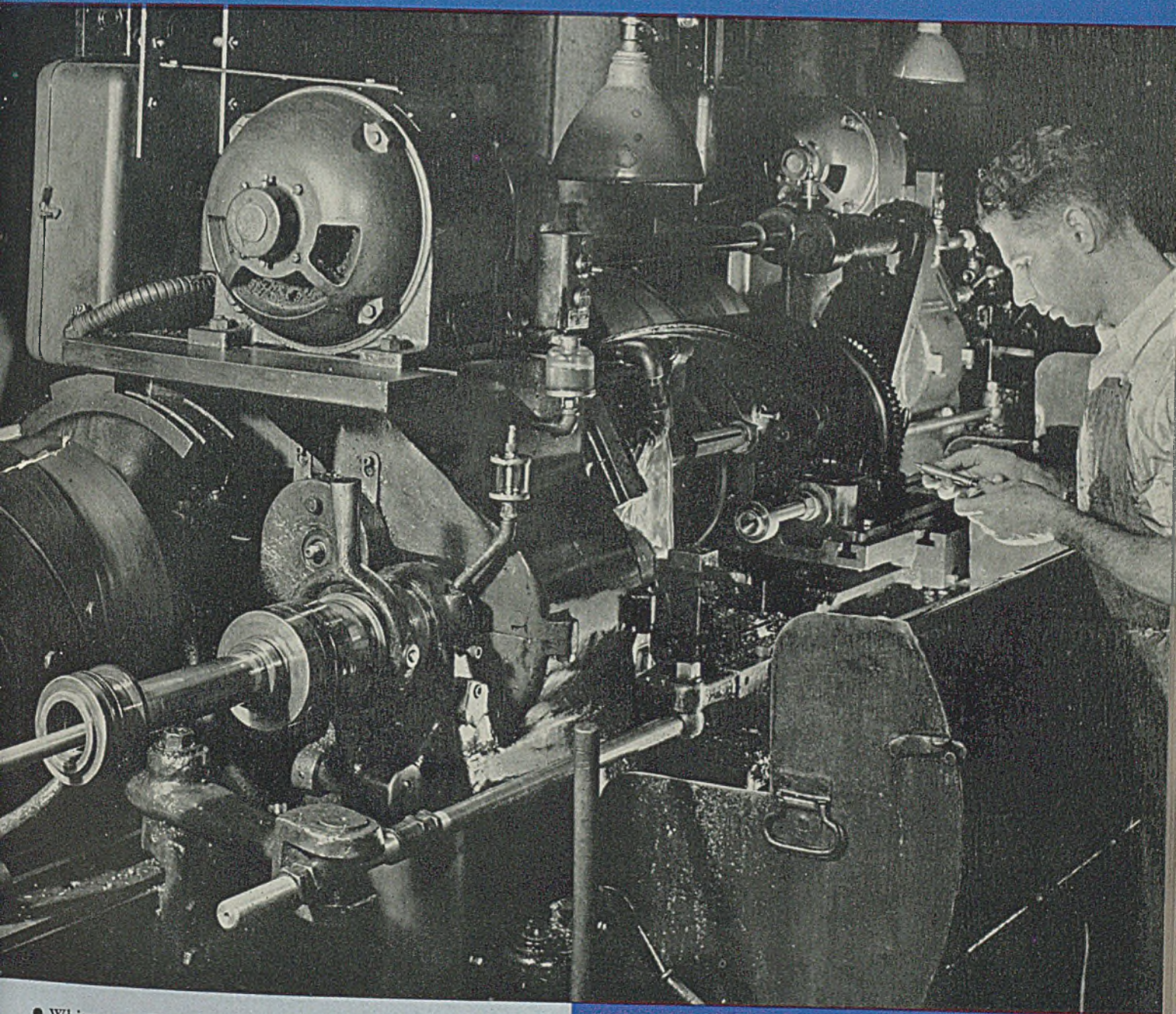
When American industry launched the production of war goods, it was necessary to take what equipment had been developed and to adopt the production methods which had been devised in arsenals or other manufacturing units accustomed to operating on a relatively small volume basis. These methods required wide flexibility in the use of tools and equipment because of limited volume and variety of design.

At the outset, consequently, the demand upon the machine tool industry was for standard tools and equipments. From there, increase in war production, which already has been accomplished manifold and will be greatly accelerated in 1943, has developed the need for special purpose machines to save manpower, floor space and time. A facility originally planned for limited output, in comparison with present needs, now finds it possible to produce several times the volume for which it was designed with relatively small expansion of floor space and personnel.

For instance, the purpose of four special purpose Pratt & Whitney machines in two Buick operations will fully meet substantially increased production requirements and, at the same time, release 16 standard machines for other uses.

Over a period of more than 30 years, the automobile industry with the help of machine tool builders has arrived at near perfection in mass producing methods. In two years of war production, methods are approaching

CLEVELAND *Single Spindle* **AUTOMATICS** SAVE
50% IN COST, RELEASE TWO OTHER MACHINES
IN WHITMAN & BARNES SMALL TOOL PRODUCTION



• Whitman & Barnes avoid "bottle-necks" in small tool production by adopting faster methods of manufacture as soon as they are recognized and proved practical. Production of center reamers and jobber drills was recently speeded up by installation of Model B, Cleveland *Single Spindle* Automatics. Model B is built in sizes from 1 1/16-inch to 2 1/2-inch capacities, and used on such jobs as making shafts of multiple diameters, various types of studs, nipples, tap blanks and pins. Built in short and long lengths up to 18-inch stock feed, cutting tools can be mounted singly or in series for turning one or more diameters of various lengths simultaneously. Ask for descriptive bulletin.

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VITAMINS B2

FOR STEEL

TITANIUM ALLOY MANUFACTURING COMPANY announces the production of two Boron-containing alloys for imparting deep hardenability to steels and for the conservation of other elements less available today than in other years.

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To realize these highly desirable qualities, only a few pounds of "BORTAM" (a complex alloy) are needed per ton of steel. (Note: "Bortam" is restricted to war production applications only.)

An exceedingly economical alloy to use in steel to produce deep hardenability, as well as other superior physical properties, is "CARBORTAM" (a less complex high-carbon alloy containing Boron and the well-known nitrogen stabilizer, Titanium.)

ANALYSIS

"BORTAM"		"CARBORTAM"	
Ti	16-18%	Ti	16-17%
Al	13-15%	Si	2.50-3.00%
Mn	22-24%	C	6.5-7.5%
Si	20-25%	B	1-1.25%
C	Less than 1%		
B	1.5-2.0%		

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a comparable basis, indicating the nature of the demand upon suppliers of machinery and tools during the remaining phases of the war program.

Need for Continued Production Now Overshadows Economics in Refractory Use

BY H. M. KRANER
Bethlehem Steel Co. Inc.
Bethlehem, Pa.

■ THE PRESENT vital need for maximum tonnage in all the metal industries has developed some new concepts of refractory use. Many operators are now more discriminating and are using higher quality refractories in spite of higher resulting costs in order to obtain more nearly uninterrupted service. This procedure tends to reduce repair delay time as well as cut crane and other equipment tie-ups which add to the confusion and bear a share in holding up production. Increased labor rates and difficulties in maintaining servicing organizations also favor the use of better materials if they will decrease required repairs. Thus refractory materials are now being used which normally would not be considered economical.

To be economical, some of these refractories must be improved. One such improvement now underway involves certain magnesite brick developments. The present situation has made it possible and desirable for the

manufacturer to devote time to this vital problem. From a ceramic viewpoint it appears that this is the most important refractory development during the year.

Rammed magnesite bottoms for open hearths, particularly those of high magnesia contents, are gaining in popularity. Rammed bottoms require less time for installation than conventional sintered bottoms although their life and the effect of slightly lower density have not been determined. Statistics relative to "our time" (or tonnage) saved seldom justify new bottom installations in old furnaces at this time. Rammed bottoms, however, appear to be a compromise.

Our present producing rates afford excellent opportunities for studying critically the actual performances of many refractory materials. In some cases it has been found that certain refractories of a class are 10 to 15 per cent more efficient than other brands of the same class, although standard ceramic tests now available do not either differentiate between the brands or explain the better results obtained in service. High production rates make extensive and conclusive service tests possible whereby we shall learn still more about many materials. Thus we will emerge with a broader knowledge of the characteristics and possibilities of materials that under normal conditions would be considered too expensive to be economical. No doubt, many refractory practices which are now developing will be retained.

Hercules Booklet Gives Uses of Dresinate

Uses of Dresinate for extra-action metal cleaning compounds are included in a booklet recently issued by Hercules Powder Co., Wilmington, Del. It also carries comparison tables and photographs of metal surfaces tested.

The product itself is a neutral sodium salt of selected rosins, described as a dry, free-flowing powder, with each particle water-soluble. The booklet explains that Dresinate, in its various types, produces rapid wetting of surfaces, emulsifies oils, greases, and other types of dirt removable with alkaline cleaners, and maintains the soil in suspension to assure a thorough rinsing action.

Ample supplies of the product without present priority restrictions will permit the metal industry to test its applicability under the wartime shortage of chlorinated solvents.

Publication Discusses Hardness of Tin Alloys

Methods of obtaining new and stronger tin-base alloys suitable for use as bearing metals are included in the latest technical publication issued by the Tin Research Institute, Fraser road, Greenford, Middlesex, England. Offered gratis, on request, it includes results of the hardness tests recorded in a paper by W. T. Pell-Walpole, B.Sc., Ph.D.

The effect on hardness, produced by quenching from the highest practicable temperature followed by prolonged tempering at 100 or 140 degrees Cent. was examined for 80 tin-base alloys containing 4 to 14 per cent antimony and 0 to 10 per cent cadmium. It is shown that these alloys can be hardened by heat treatment and maintain a useful degree of improvement for at least 1000 hours at 100 to 140 degrees Cent.

The best alloys in this respect, the paper reveals, are those in the range antimony 9 to 10 per cent, cadmium 1 to 1½ per cent, balance tin. The degree of improvement is indicated by Vickers diamond pyramid hardness tests. Values of 33 to 34 are obtained, compared with values of 26 to 30 in the normal non-heat-treated condition.

Brazilian Pipe Maker

(Concluded from Page 70)

ployed. To house these people it was necessary to establish a town with dwellings for the employes, stores, school, dispensary, slaughter house, etc. — in a word, all that goes to constitute the welfare and comfort of such a community. The streets are wide; some with stone block pavements, others with asphalt but all with sidewalks and curbs. The town has its own water supply, sewer system and electric lights. There is also a field and grand stand for all kind of sports.

In all these undertakings, the management of the company has followed scrupulously the modern precepts of hygiene,

engineering and architecture. Trees also have been planted over the town area.

For the accommodation of the workmen the company owns about 50 dwellings—more are being built. They have electric lights, drinking and running water, sewers and complete sanitary installations. They were erected in chosen spots most of them having gardens.

A primary school for the workmen's children is provided in a large building with play grounds and accommodations for 300 pupils. A stadium has been built for various sports and a grand stand of wood with dressing rooms and other facilities will be built in the future.

A large dining room is operated for the men with an appropriate kitchen, larder and all necessary improvements exceeding even what is required by law. The company intends to organize a technical school with classes for the specialization of the men. This new department, which will be put under the supervision of the company's technicians, will provide a nucleus of technicians and specialists.

Issues Manual on Carbon Steel Sheets

General definitions and manufacturing practices regarding carbon steel sheets are discussed in a steel products manual recently issued by American Iron and Steel Institute, 350 Fifty avenue, New York. Identified as section 11, the manual includes tables, illustrations and other engineering data.

End-Quench Test for Hardenability

and its application

DURING the past year two societies have written up a standardized method for making the end-quench test for hardenability. The Society of Automotive Engineers adopted a standard method the early part of the year, and the American Society for Testing Materials adopted a tentative method shortly thereafter. The methods agree in their essential parts, and perhaps the greatest divergence lies in the method of plotting the results. SAE suggested plotting the results on a modified logarithmic scale whereas ASTM agreed to use linear coordinates.

The method of recording results is, of course, very unimportant except that it is desirable to have a uniform method so that we do not misunderstand one another in examining hardenability curves. ASTM has a printed form on which the curves can be recorded which can be purchased from them for a nominal fee.

Quite a large number of tests have been made by independent workers at laboratories located in many of the larger plants. These tests have shown that it is possible to get good duplication of results with the standardized methods as now developed. Although it has been found that rather wide variations in the test conditions can be tolerated in obtaining good results, it is quite easy to carry out tests as laid down in the standard methods, and it would be well for these who are making hardenability tests to read these over carefully so that a standardized method of making the test will be used and possible errors due to modifications can be avoided.

Perhaps the most likely error to be made would be to obtain a tight scale on the test pieces due to heating in certain atmospheres and because of the presence of this scale, non-uniform cooling would result. It is only necessary to keep the scale off the face which will be in contact with the water and on the sides of the specimen near this surface.

There is one deviation from the standard method that is such a convenience that it is commonly used. This is in the matter of size of test specimen. It will often not be possible to use a 1-inch round specimen when a bar size of 3/4-inch is received, and it may not be convenient to machine a 1 1/2-inch round to 1-inch. Although these odd sizes can be used in routine testing and will be quite satisfactory, they are not to be compared with 1-inch round standard size specimens. In the range from 3/8 to 1 1/4 inches, variations will in most

cases not be very much from the standard bar. There are exceptional cases with certain steels, and so the precaution just voiced of carefully noting that these sizes are not standard should be followed.

In the cases where for convenience no machining is done on the bars, it may be necessary to grind off more than 0.015-inch to get below the decarburized zone. No difficulty or appreciable error will result when this is done even though up to 1/8-inch is removed by grinding, except that tempering may result from the heat generated in grinding if due care is not exercised. This does not apply, of course, to carburized bars.

For some reason the test seems to be very seldom used on steel in the carburized condition. If the steel is to be used in the carburized condition, I have found it worth while to make the test after carburizing the test piece, in

which case the hardenability both of the case and the core can be obtained. This is done by first grinding off 0.0015-inch to measure the hardenability of the case and then removing the case by grinding deeper and obtaining the hardenability of the core. Steels which will give trouble from soft spots or insufficient hardness on the carburized surface may be discovered by this means.

There are two points to consider in interpreting the test which should be mentioned briefly. One is the comparison of steels of various carbon contents. The other is the interpretation of the meaning of the hardenability test.

Comparison of Steels of Various Carbon Contents: In comparing steels of different carbon contents, it should be

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NE (National Emergency) ALLOY STEELS

List is revised as of Dec. 17, 1942

MANGANESE-SILICON-CHROMIUM-NICKEL-MOLYBDENUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE-9415	0.13-0.18	0.80-1.10	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9420	0.18-0.23	0.80-1.10	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9422	0.20-0.25	0.80-1.10	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9430	0.28-0.33	0.90-1.20	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9435	0.33-0.38	0.90-1.20	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9437	0.35-0.40	0.90-1.20	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9440	0.38-0.43	0.90-1.20	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9442	0.40-0.45	1.00-1.30	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9445	0.43-0.48	1.00-1.30	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9450	0.48-0.53	1.20-1.50	0.40-0.60	0.20-0.40	0.20-0.50	0.08-0.15
NE-9537°	0.35-0.40	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE-9540°	0.38-0.43	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE-9542°	0.40-0.45	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25
NE-9550°	0.48-0.53	1.20-1.50	0.40-0.60	0.40-0.60	0.40-0.70	0.15-0.25

MANGANESE-SILICON-CHROMIUM STEELS

	C	Mn	Si	Cr
NE-9630	0.28-0.33	1.20-1.50	0.40-0.60	0.40-0.60
NE-9635	0.33-0.38	1.20-1.50	0.40-0.60	0.40-0.60
NE-9637	0.35-0.40	1.20-1.50	0.40-0.60	0.40-0.60
NE-9640	0.38-0.43	1.20-1.50	0.40-0.60	0.40-0.60
NE-9642	0.40-0.45	1.30-1.60	0.40-0.60	0.40-0.60
NE-9645	0.43-0.48	1.30-1.60	0.40-0.60	0.40-0.60
NE-9650	0.48-0.53	1.30-1.60	0.40-0.60	0.40-0.60

CARBON-CHROMIUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE-52100A	0.95-1.10	0.25-0.45	0.20-0.35	1.30-1.60	0.35 max.	0.08 max.
NE-52100B	0.95-1.10	0.25-0.45	0.20-0.35	0.90-1.15	0.35 max.	0.08 max.
NE-52100C	0.95-1.10	0.25-0.45	0.20-0.35	0.40-0.60	0.35 max.	0.08 max.

* Recommended for large sections only.

One of the most important sources of information on the NE (National Emergency) alloy steels is the end-quench test for hardenability. Thus the accompanying comments made by the originator of this test, at the NE steel panel of the 1942 National Metal Congress are of particular significance.

For information on development of NE steels and their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41 and p. 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 9, p. 96; Dec. 28, p. 27.

For latest revised list of NE steels, see p. 85 of this issue.

For reports of users of NE steels, see issues of Nov. 16, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112; Dec. 14, p. 99; Dec. 21, p. 70; Jan. 11, 1943, p. 60; Jan. 18, p. 66.

borne in mind that the carbon has a double function in hardenability. The one function is actually to increase the hardenability of the steel, and the other function is to increase the hardness of the steel. The effect on the hardenability is relatively small; the effect on the hardness is relatively great.

When we remember that the measure of hardenability by this end-quench test is through the measurement of hardness, the effect of carbon must be carefully considered. A hardness, for instance, of 40 rockwell C using 0.90 per cent carbon steel has an entirely different meaning than that same hardness when we employ 0.12 per cent carbon steel. An entirely different structure is indicated in these two cases.

There is a general tendency to in-

crease the carbon as we decrease the alloy in an attempt to find alternate steels. Steels which have approximately the same hardenability curves but differ in carbon content really do not have the same structures or the same hardenability so they cannot be substituted indiscriminately.

Interpreting the Meaning of Hardenability Test: With most new tests, attempts are made to read more into the results obtained than is justified. The hardenability test is no exception. We should remember that it will tell only what hardness will tell.

It is true that the end-quench hardenability test was developed for the very purpose of testing new steels to determine whether they can be used as substitutes for steels which are of proved

quality. As a first approximation, in my opinion this test is very satisfactory because it eliminates the necessity for making up parts and hardening these parts, then determining whether or not the hardness in the parts at the surface, at the center and through the hardness traverse is satisfactory. A great deal of time and effort is saved in using the test in this manner.

The first step of making a substitution or finding alternate steels is to ascertain the hardenability of the two steels. If their hardenabilities are similar, the possibility of a substitution is indicated.

I have no data nor have I seen any data which would indicate that two steels with the same hardenability will have the same tendency to flake, the same machinability or the same resistance to wear, or this same resistance to impact, or even the same resistance to fatigue. It seems to me that they should have the same tendency to distort, although this is far from established.

We do know that steels with the same hardness will have the same approximate tensile strength and should therefore have the same resistance to fatigue, but these relationships are very approximate and it is much better not to take too much for granted.

COMPOSITIONS given are subject to check analysis and apply to sections less than 10 x 10 inches. Modifications in the NE steel compositions made necessary by unexpectedly greater amounts of nickel content in scrap now available were approved in Washington Dec. 17, 1942, by representatives of the War Production Board, the Technical Committee on Alloy Steel of American Iron & Steel Institute and by representatives of the Iron & Steel Division of

the Society of Automotive Engineers.

The average nickel content of scrap has been steadily increasing, due partly to the influx of new nickel-containing steel scrap generated as a result of our ever-increasing production of war materials and partly to the conservation measures employed by steel mills. Consequently, many steel mills find it virtually impossible to hold the nickel content of some of the NE steels below 0.60 per cent as originally specified for

many of the NE grades. There is not available sufficient carbon steel scrap low in phosphorus and sulphur content to dilute the high-nickel scrap, and it is commercially impracticable to reclaim the nickel for any other use or in any other manner.

This condition prevented production in many mills of the NE-9400 series steels, which have a specification limit of 0.20 to 0.40 per cent nickel and resulted in "off-analysis" heats in the NE-8600 and 8700 series.

The high nickel content of the scrap in recent weeks has often prevented alloy steel producers from bringing heats of NE steels within the specified compositions, resulting in last minute switches of heats already in process to steels of higher specified nickel content, thereby complicating manufacturing procedures and delivery problems.

That situation has frequently resulted in the use of greater quantities of virgin nickel, and sometimes of other elements such as chromium or molybdenum as well, than would have been necessary if the original intent had been to charge nickel scrap to produce the high-nickel steels.

To alleviate those conditions and to make more efficient use of the alloying elements derived from scrap, the accompanying revised list of NE steels has been approved.

CARBON-MANGANESE STEELS

	C	Mn	Si
NE-1330	0.28-0.33	1.60-1.90	0.20-0.35
NE-1335	0.33-0.38	1.60-1.90	0.20-0.35
NE-1340	0.38-0.43	1.60-1.90	0.20-0.35
NE-1345	0.43-0.48	1.60-1.90	0.20-0.35
NE-1350	0.48-0.53	1.60-1.90	0.20-0.35

MANGANESE-MOLYBDENUM STEELS

	C	Mn	Si	Mo
NE-8020	0.18-0.23	1.00-1.30	0.20-0.35	0.10-0.20
NE-8442*	0.40-0.45	1.30-1.60	0.20-0.35	0.30-0.40

NICKEL-CHROMIUM-MOLYBDENUM STEELS

	C	Mn	Si	Cr	Ni	Mo
NE-8613	0.12-0.17	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8615	0.13-0.18	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8617	0.15-0.20	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8620	0.18-0.23	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8630	0.28-0.33	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8635	0.33-0.38	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8637	0.35-0.40	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8640	0.38-0.43	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8642	0.40-0.45	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8645	0.43-0.48	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8650	0.48-0.53	0.75-1.00	0.20-0.35	0.40-0.60	0.40-0.70	0.15-0.25
NE-8720	0.18-0.23	0.70-0.90	0.20-0.35	0.40-0.60	0.40-0.70	0.20-0.30

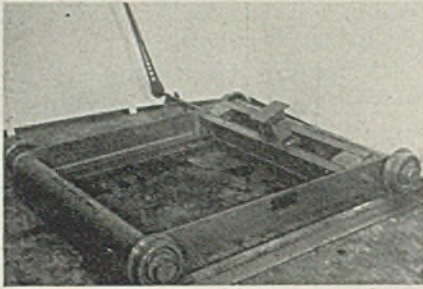
SILICON-MANGANESE AND SILICON-MANGANESE-CHROMIUM STEELS

	C	Mn	Si	Cr
NE-9255	0.50-0.60	0.70-0.95	1.80-2.20	.....
NE-9260	0.55-0.65	0.75-1.00	1.80-2.20	.....
NE-9262	0.55-0.65	0.75-1.00	1.80-2.20	0.20-0.40

INDUSTRIAL EQUIPMENT

Locomotive Dolly

Whiting Corp., Harvey, Ill., announces a new 4-wheel dolly equipped with an elevating arrangement for removing a mounted pair of wheels and

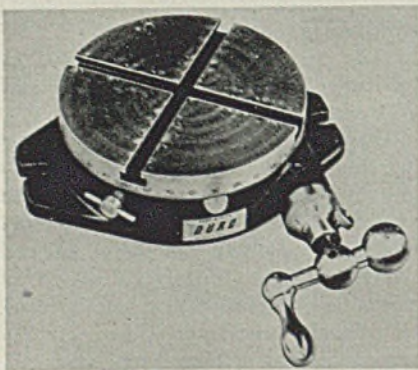


motor from diesel-electric locomotives. Its elevating mechanism is built with an adjustable tilting plate and is operated by a ratchet wrench, which may be located on either side. The plate is used to tilt the nose of the motor during wheeling or unwheeling operations.

Rotary Table

Duro Mfg. Co., 800 East Sixty-first street, Los Angeles, is introducing a new 6-inch rotary table which features worm gear ratio of 60:1, versatile enough for tool making, layout, inspection and production. Each turn of its crank gives a 6-degree rotation.

An eccentric adjustment between the worm and gear of the table is instrumental in eliminating backlash. Easy reading is assured by a beveled dial cut and graduated to tenths of a degree. Two T slots cross at 90 degrees, forming four



quadrants. Also a T lock screw is provided for fixing the position of the table. The table is of heavy semisteel construction. Its height is 2½ inches and weight is 14½ pounds.

Acid-Resisting Stamp

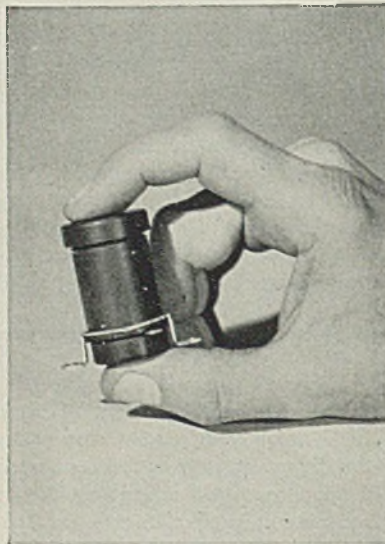
Jas. H. Matthews & Co., 3942 Forbes street, Pittsburgh, announces a new S-22 etching stamp reported to be three to four times better for use with acid. The

material used for the stamp represents many months research and laboratory work. It is said to be unaffected by acid etching inks.

Dust-Tight Relay

General Electric Co., Schenectady, N. Y., announces a new dust-tight relay for aircraft applications requiring high current-carrying capacity without sacrifice of compactness and light weight. It is a solenoid-operated device with the normally-open contacts rated at 10 amperes direct current.

Contacts will make or break 30 amperes at altitudes up to 40,000 feet. The coil, contacts, and plunger are enclosed in a dust-tight housing, and the unit is



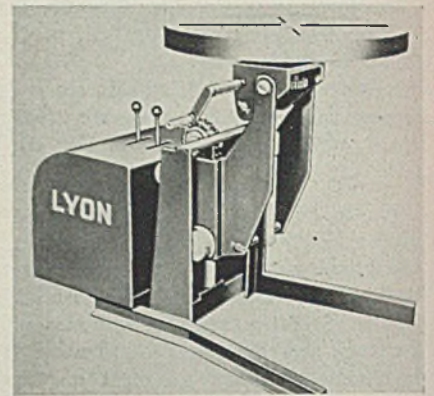
corrosion-proof, meeting 200-hour spray tests. The relay can be furnished in a single-pole, single-circuit form with normally-open and one normally-closed contact. The operating coil can be furnished for either 12 or 24-volt direct-current operation. The relay can be mounted in any position on a metal or non-metallic base.

Welding Positioner

Lyon-Raymond Corp. Greene, N. Y., is offering a hydraulic elevating welding positioner which features a hydraulic tilting and elevating table powered by a motor-driven hydraulic pump that enables the unit to revolve in any position mechanically by worm gear arrangement.

The positioner is self-locking at any point within its revolution due to the worm and worm gear. Its table is easily removed by taking out four cap screws so that welding fixtures can be attached to the same top plate to which the table is attached. Round table measures 30 inches in diameter and it is designed

with T-slots for 5/8-inch bolts. It tilts from horizontal to vertical 90 degrees. Its lowered height to top of table in



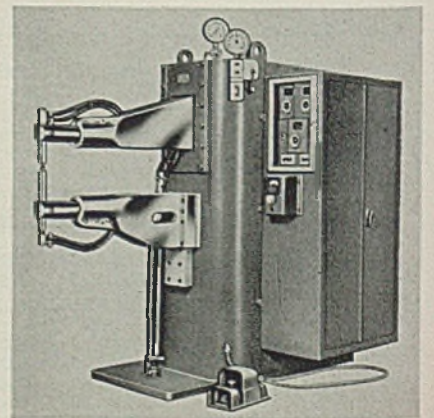
horizontal position is 28 inches and elevated height is 40 inches. Its lowered height to center of table with table in vertical position is 22 inches, and elevated height—34 inches.

The table also may be revolved by hand crank which operates worm and worm gear 360 degrees in any position. Capacity of the positioner is 2000 pounds.

Resistance Welder

Sciaky Bros., 4915 West Sixty-seventh street, Chicago, is offering a new rocker arm resistance welder for spotwelding aluminum and its alloys. It embodies such features as stored energy with preheating and variable pressure with recompression, besides several others. These include adjustable electrode tips which may be at most angles without impairing proper welding position.

All gages and dials of the welder are visible to the operator and are set on the



frame of the machine. The welding process incorporated in the welder compensates for the natural expansion that takes place when the metal is in molten state during the welding process.

Metal is preheated during welding



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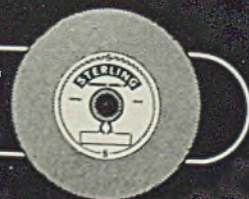
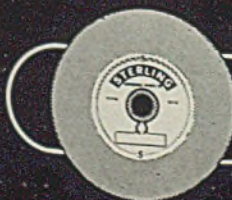
TWO victories must be gained - one by men on the battlefields, and one by men on the production front. Wherever materials for war are being made, Sterling Weld Grinding Wheels are doing a lot to speed up deliveries.

These wheels, whose grain, bond, structure, size and shape have been predetermined for the particular job to be done, speed up your metal removal to a surprising degree.

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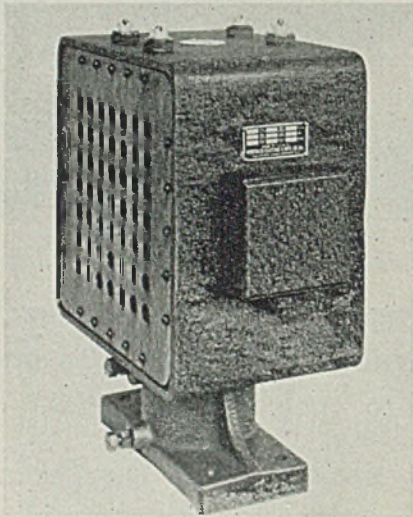
INDUSTRIAL EQUIPMENT

process to overcome high thermo conductivity, slowing down the cooling process and providing an added protection of a "forging" pressure which in itself precludes the possibility of shrinking the metal after the weld. The machine provides the same weld settings as those embodied in the standard type Sciaky welders.

Operator of one machine, it is said, can readily operate the other with exactly the same training, since the welding charts are applicable to both. The machine supplies a total pressure of 3000 pounds between the electrode tips from a supply line of 90 pounds using normal throat depth of 34 inches. Welding stroke is ½-inch and retraction stroke 3½ inches. For special work the unit can accommodate special face plate at 45 degrees with the vertical face plate.

Heavy-Duty Solenoid

Hercules Electric & Mfg. Co. Inc., Brooklyn, N. Y., announces a new type 3-phase heavy-duty solenoid capable of 160 pounds pull per 2-inch stroke. Its



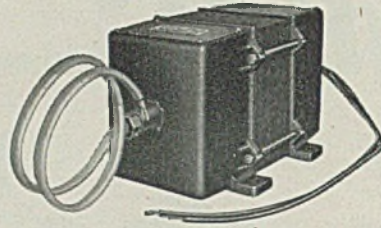
intermittent use affords 200 pounds pull for the same stroke. The unit is said to work instantly with and without air shock absorbers.

Isolating Transformer

Acme Electric & Mfg. Co., Cuba, N. Y., announces a T-4173 isolating transformer designed to eliminate interference that affects testing of equipment whose performance depends upon accuracy. It is capable of handling an over-load of 50 per cent or a total load of 3 kilovolt amperes.

The transformer makes use of a secondary completely enclosed in a copper

shield. Secondary terminal connections are provided by means of a lead-shielded cable, the sheath of which is integrally joined to the copper enclosing shield



of the secondary winding.

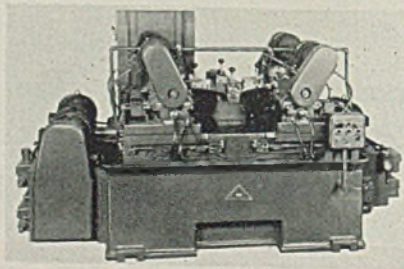
Regulation of the transformer is 1 per cent at 1 kilovolt ampere. The lighting in the shielded test-room, the use of soldering irons, instruments and various types of test equipment all may be operated from the shielded secondary of the isolating transformer without causing objectionable voltage drop, it is said.

Horizontal Machine

Snyder Tool Engineering Co., 3400 East Lafayette blvd., Detroit, announces a single-end horizontal machine for drilling and reaming a hole in the exact center of a boss on an aircraft part.

This operation is accomplished with the use of two special fixtures. The first fixture, foreground, is used for drilling the sidewalls of the fork-like flange. Equalizing clamps balance the stock to bring the drill hole in exact center of boss. After being drilled, this flange is welded to a tubular member and the outside diameter of the tubular member is used for locating the assembly in the second fixture, shown on the machine.

The second fixture is equipped with a pivoted 2-hole bushing plate—one set of bushings for core drilling the holes on this assembly and the second set of bushings for line reaming. Work cycle



is as follows: A bank of flanges is drilled, using the first fixture which is then replaced by the second fixture. Flanges are welded to the tubular member, placed in the second fixture and core drilled and line reamed. A quick-change tool chuck permits fast ex-

changing of drill, core drill and reamer.

Also embodied on the machine, is a quick-speed change for the spindle so various tools can be driven at their proper surface speed. Overall spindle speed is changed through the use of pick-off gears. The head and its drive unit are mounted in guide bars. The base of the machine is welded steel construction and contains the coolant tank.

Handling Unit

Factory Service Co., 4615 North Twenty-first street, Milwaukee, announces a handling unit that can be quickly and effectively moved in restricted space with a hand jimmy or by power lift truck, crane, tractor or conveyor. It consists of a superstructure mounted on a trans-



port chassis.

The superstructure is a skeleton rack, designed to accommodate standard shop boxes and trays. In cases where the product must be handled carefully, special wooden trays or boxes can be substituted. Boxes and trays can be taken out of the rack for use at machine, bench or assembly line or the operator can place the entire unit beside him.

Milling Machine

Lombard Governor Corp., Ashland, Mass., announces a new heavy duty 30 HV universal milling machine, so designed that it can be converted from horizontal to vertical spindle type in a few moments. A rigid extension head carrying a vertical spindle permits this conversion. The head, which is bolted to the face of the vertical column when in use, is hinged to the right side of the column so that it can be swung into position or out of the way easily and quickly, no heavy lifting being involved.

When this vertical head is applied, the arbor support is removed and the overarm bars "telescope" back into the

Graver Welded Construction

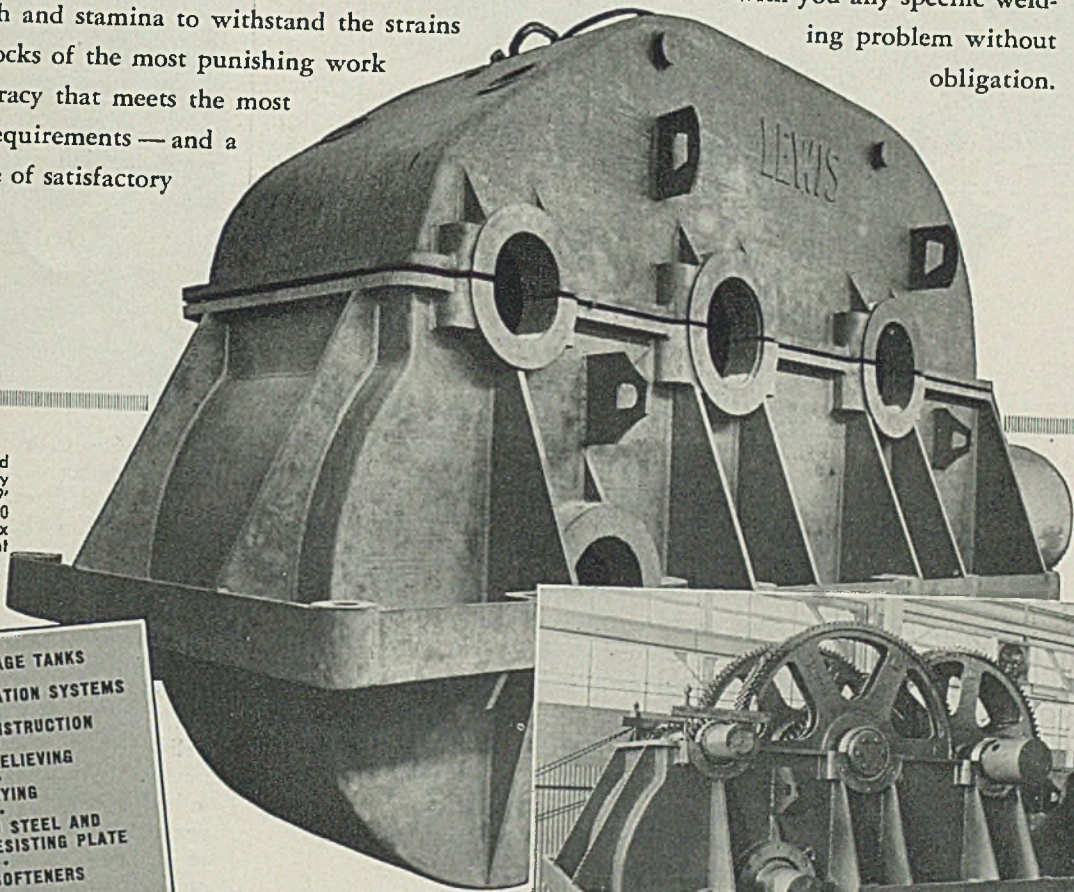
GEARED TO THE TEMPO OF TODAY'S INDUSTRIAL PROGRESS

This war has taught all of us many things. Industry has found, for one thing, that tanks and planes and ships can be built better — and faster — by welding. And it's found that the same thing applies to the manufacture of much of the machinery and equipment used in turning out these and other supplies and munitions for our fighting forces.

Graver Welded Construction provides the strength and stamina to withstand the strains and shocks of the most punishing work — accuracy that meets the most rigid requirements — and a lifetime of satisfactory service.

In one of the most modern and best equipped plants, Graver's expert welders are producing equipment, widely varied as to types and sizes, for hundreds of the country's largest industries. They're meeting rigid specifications — and they're showing remarkable savings, too.

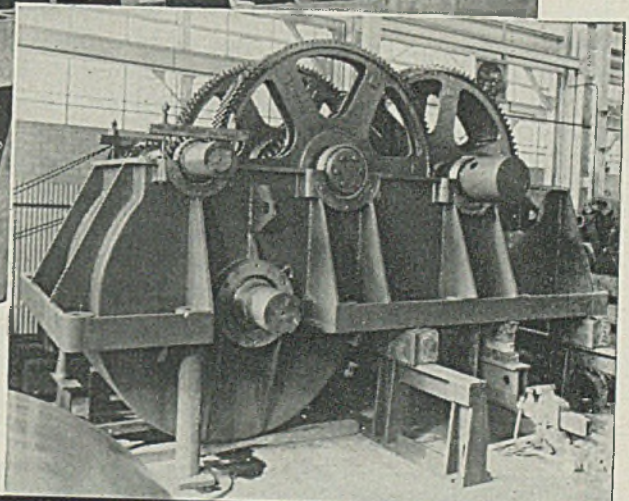
The facilities of the Graver Welding Division are at your service and we will gladly discuss with you any specific welding problem without obligation.



Mill Drive Case and Cover Welded by Graver. Case, 20' x 9' x 8'8". Weight 46,500 lbs. Cover, 17'6" x 6'7" x 5'. Weight 14,650 lbs.

- STEEL STORAGE TANKS
- VAPOR CONSERVATION SYSTEMS
- WELDED CONSTRUCTION
- STRESS RELIEVING
- X-RAYING
- FABRICATED STEEL AND CORROSION-RESISTING PLATE
- WATER SOFTENERS
- FILTRATION SYSTEMS
- CLARIFIERS
- SEWAGE EQUIPMENT

Showing case with gears in place. Designed and machined by Lewis Foundry and Machine, Division of Blaw-Knox Company.



GRAVER

GRAVER TANK & MFG. CO., INC.

NEW YORK
CATASAUQUA, PA.

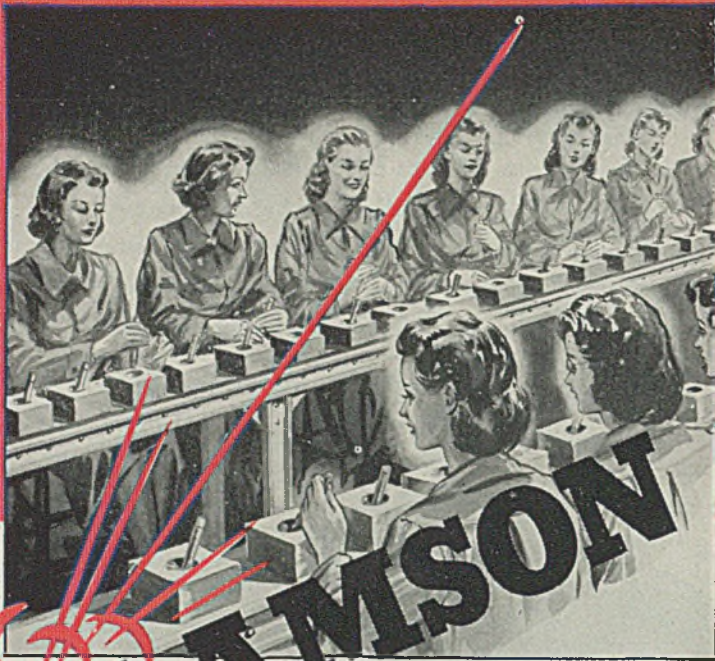
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CABLE ADDRESS — GRATANK

CHICAGO
TULSA

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January 25, 1943

Here's **HIGH-VELOCITY
OUTPUT FOR YOU!**



... JUMPED
SHELL-FUSE PRODUCTION
2½ TIMES
with a Carousel Conveyor!

All it took was a trial installation of one Conveyor in the Assembly Department of an Ordnance plant, and production per day was stepped up 2½ times—with the same number of operators! So outstandingly successful was this trial unit that eleven other conveyors were installed. And to top it—the savings effected by each Conveyor returns its purchase price every two months!

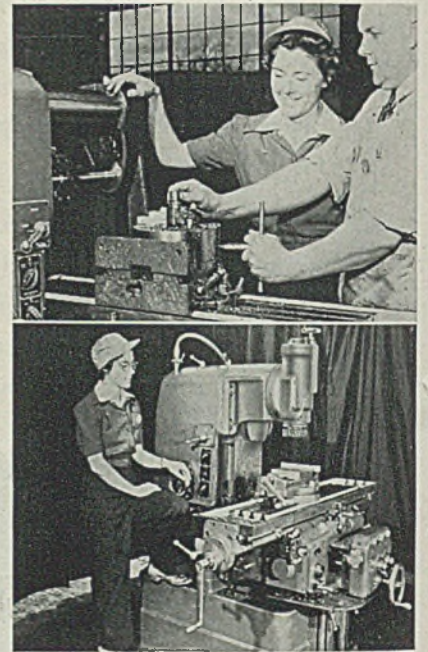
Simple, efficient movement of material is vital to your production, too. Whether it's on assembly lines or to and from warehouses and shops—a Lamson Conveyor can contribute great savings in time and man-power. Let us study your materials handling problem, and if there's room for improvement let Lamson Conveyors give you top efficiency!

LAMSON CORPORATION

Makers of CONVEYORS and PNEUMATIC DISPATCH TUBES
SYRACUSE, N. Y.

column. Power for the vertical spindle is taken from the horizontal spindle through a tapered shank which is pulled back into the taper in the horizontal spindle by a draw bolt. The vertical spindle quill has 360 degrees of angular adjustment in a plane vertical to the long axis of the bed, and 4 inches of power or hand feed lengthwise of the spindle.

When set up as a horizontal spindle machine, the miller utilizes two large diameter overarms of round bar type. These are supported by three bearings in the column and are tied to the knee by an overarm support. Inasmuch as



the knee also is tied to the base by still another outboard support, the cutter arbor is held in exact rigid relation to machine and work. This permits high speeds and heavy speeds without chatter on production work.

One-piece table of the miller is heavily ribbed, and features a 12x13-inch working surface. It is finished all the way around, and has three T-slots and deep coolant return troughs and wells. It has 6-direction power rapid traverse, with 100 inches per minute in both longitudinal directions, 50 inches per minute on cross travel and 15 inches of horizontal power feed and 10 inches of cross power feed. Skip stop operation is provided for in the automatic table cycle, as well as automatic starting and stopping of spindle rotation and coolant flow. Convenient dial controls regulate spindle speed ranges—which are from 30 to 1900, or from 45 to 2850 revolutions per minute. Eighteen quick-range feed ranges giving 40:1 ratio are available in geometrical progression. These ranges are: From ¼ to 15 inches; ½ to 20 inches; ¾ to 30 inches; and 1 inch to 40 inches per

FOR SALE

USED STEEL MILL MACHINERY AND EQUIPMENT

250 TON HOT METAL MIXER
12" DIAMETER BLAST FURNACE BELL 45°
FOUR (4) BLOOMING MILL STACKS
NO. 3460 DIXIE NON-CLOG CRUSHER
PUNCH & SHEAR (LONG & ALSTATTER)
RECIPROCATING PUMP (LAIDLAW-DUNN GORDON
COMPOUND DUPLEX)
SOUTHWARK BLOWING ENGINE (VERTICAL STEEPLE
CROSS COMPOUND CONDENSING)
EVAPORATOR AND PUMP (GRISCOM-RUSSELL)
OPEN FEED WATER HEATER (GRISCOM-RUSSELL)
VACUUM PUMP (INGERSOLL-RAND)
NO. 9 CONTRAFLO DEAERATING HEATER
OIL HYDRAULIC UP-CUT BLOOM SHEAR
BAR TWISTER MACHINE
WESTINGHOUSE STEAM DRIVEN AIR COMPRESSOR
TYPE Z-1 TERRY STEAM TURBINE
TROY 4-1/2" x 5" VERTICAL, THROTTLING,
SELF-OILING ENGINE

MOTORS

Included in our list of used equipment are 25 AC and DC motors put out by leading manufacturers of the country and ranging in size up to 75-horsepower.

CONTROL EQUIPMENT

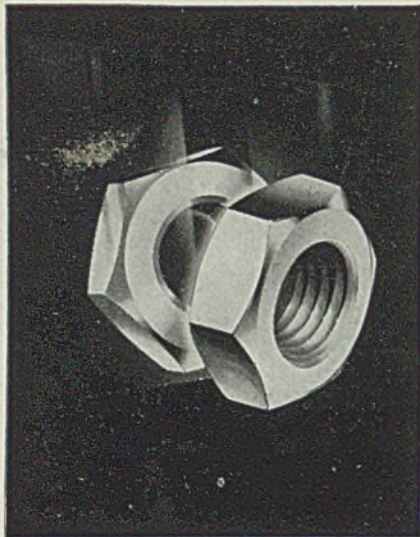
A quantity of steel mill control equipment, mostly General Electric and Westinghouse are also available for immediate shipment.

INTERNATIONAL HARVESTER COMPANY
WISCONSIN STEEL DIVISION

180 NORTH MICHIGAN AVE.

CHICAGO, ILLINOIS

PHONE: ANDOVER 4200



IT PAYS TO USE THESE "Double Chamfered" Nuts by Central!

★ No "try—turnover—and try again" when assembling war products with Double Chamfered Nuts by Central.

Both Sides Are "Tops" . . .

Both sides being identical—there's no fumbling. Assembly line workers pick them up *right side up* every time for **BIG SAVINGS** on assembly costs.

Chamfering the Central way—in addition to embossing the metal to proper shape and thickness—increases its density and hardness, while the finished products are free from surface irregularities. Such nuts can be (and are) more accurately tapped with clean, sharp threads that provide maximum thread engagement. They start easy—spin on—**STAY TIGHT**.

Regular quantities of Double Chamfered Machine Screw Nuts carried in stock in steel and brass. Also available in other suitable metals.

Used for Assembly of:

Aviation Components — Marine Controls — Communications Devices & Components — Ordnance Products. Stocks Include Many A N Items.

Write for new circular "S" today

CENTRAL
SCREW COMPANY
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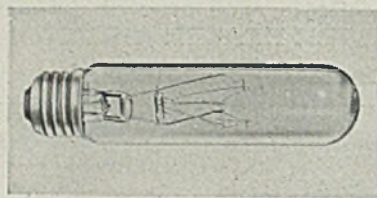
minute.

Safety interlock insures against possibility of dangerous whirling of table cranks when power feed is applied, and safety torque clutch prevents overloading of power rapid traverse and power feed and mechanism. Vital gears are hardened and ground, spindles are heat treated, hardened and ground, and liberal use is made of anti-friction bearings.

Controls of all functions of the machine are simplified so women operators readily can understand them—thus operating the miller safely, easily and effectively after relatively brief training. This machine is offered either as a universal (convertible) horizontal and vertical model here described, or as single purpose machines either of horizontal or vertical type.

Spatterproof Lamp

Radiant Lamp Corp., 260 Sherman avenue, Newark, N. J., is offering a new type spatterproof lamp for welding and rough industrial service. It is of a special glass that resists penetration of hot metal particles, and is built to withstand severe handling. By reducing replacements, it not only saves money but increases the worker's production. The lamps take a T10 bulb with medium



screw base. Sizes offered include 50, 75, 100 and 150 watts.

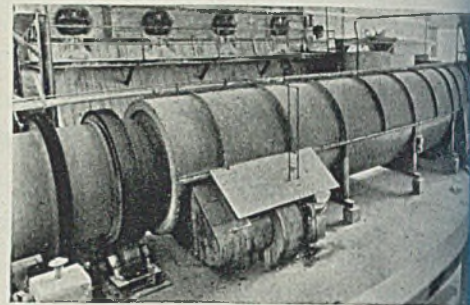
A new 200-watt lamp which is guaranteed not to crack due to climatic conditions, even when used outdoors in an open fixture, also was recently added to the company's line of weatherproof lamps for general lighting service. The complete range is now from 200 to 2000 watts inclusive.

Rotary Dryer

L. R. Christie, 17C East Forty-second street, New York, recently introduced a new rotary dryer which eliminates the need for independent dust collectors. It is of a type known as an indirect dryer, in which the furnace gases do not come in direct contact with materials to be dried.

Unit consists of a metal drum divided into compartments, to give increased heating surface, enclosed in an insulated steel casing that utilizes the entire surface of the outer shell for additional heating surface. It also may be used

as a rotary retort and distilled gases recovered, or drying done in an inert atmosphere. All openings are closed against infiltration of air, but by patent-



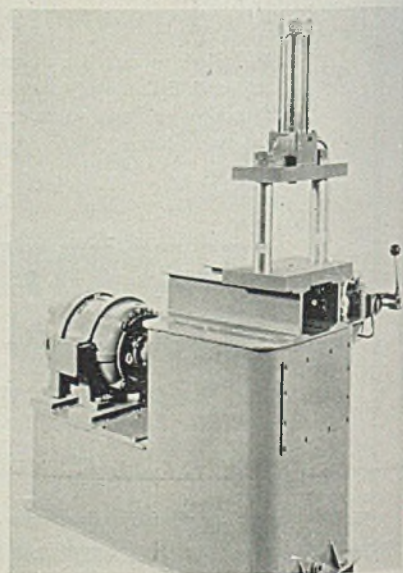
ed construction, the operation of charging and discharging are continuous. Due to the total absence of draft, in, over, and around the "charge" the dryer handles materials of -300 mesh without appreciable dust loss, it is said. Any nature of fuel or heating medium can be used.

Hydraulic Press

Hydraulic Machinery Inc., Detroit, announces a new hydraulic arbor press for inserting bushings etc. It is rated at 6 tons with an 8-inch maximum stroke—20 inches of daylight and an opening of 20 inches from left to right.

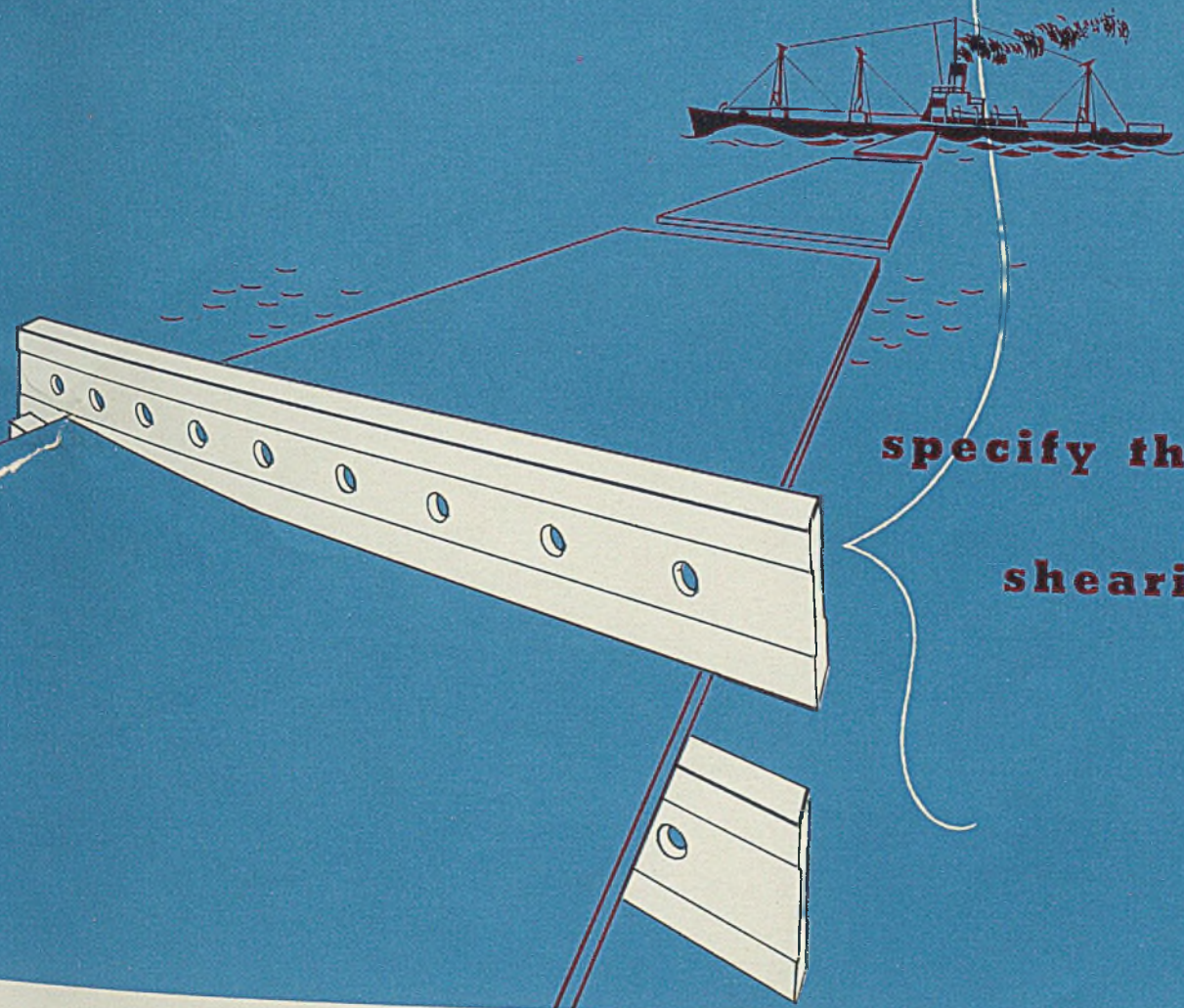
The power unit and the press are en-unit—the former, reinforced on the top by two I-beams, acting as the base for the assembly. Control centers are at a level-operated valve. These determine the direction and the speed of the movement.

Arbor press and power unit combined occupy only a 27 x 42-inch floor space. Motor is directly connected, and operates at 1200 revolutions per minute. It is equipped with a manually operated 4-way valve that is self centering. A Vickers pump is included as standard equipment.



STEEL

First thing to remember when you order shear knives



**specify the
shearing job**

First thing to remember when you order shear knives is to specify their use. It's usually false economy to use a knife to cut a thickness or a steel for which it was not designed.

Second thing to keep in mind is delivery. Heppenstall facilities are extensive and we make

our own E.I.S. Steel. We can deliver faster at a lower rating.

Third thing to keep in mind is quality. As the world's oldest and largest manufacturer of solid tool steel shear knives, Heppenstall is able to offer greater precision in manufacture.

Heppenstall

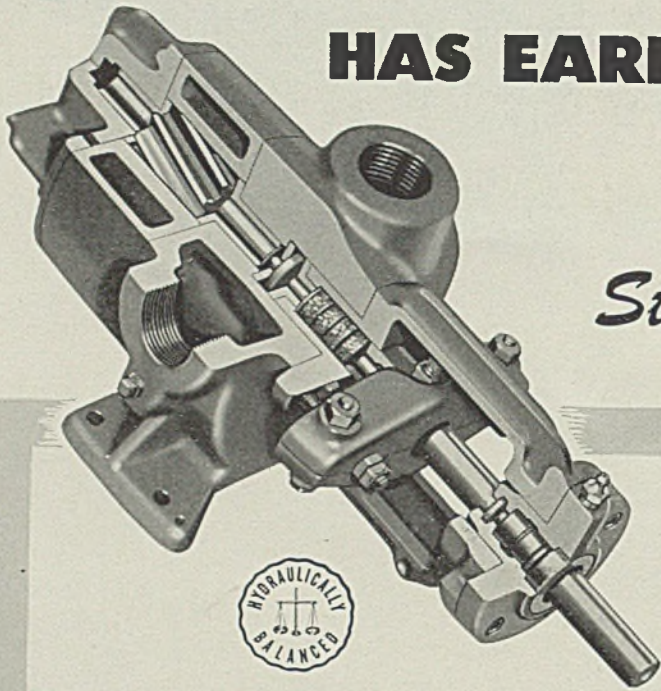
PITTSBURGH • DETROIT • BRIDGEPORT
EDDYSTONE



Forging Fine Steels for Fifty-Three Years

WHY THE ROPER PUMPING PRINCIPLE HAS EARNED TOP RANKING

for
Steel Mill Installations



ONLY 2 MOVING PARTS

The Roper Principle is the simplest ever designed. It employs only two moving parts . . . equal size pumping gears . . . operating in a case with just enough clearance so that there is no perceptible wear on either case or gears.

Roper Hydraulically Balanced Pumps, quiet and smooth in operation, definitely last longer because of their simplicity and because internal pressure is equalized at all points. The pumping gears actually float in operation, as they are entirely separate from the drive shaft and are connected by a smooth, sliding joint which absorbs all shock and thrust from power end.

Another good feature of Roper design is that all internal parts such as gears and bearings can be inspected without disturbing piping or power. Type of gears optional . . . Spiral Gears for applications requiring high efficiency and practically silent operation at high speed . . . Spur Gears for high volumetric efficiency at maximum pressure. Automatically lubricated Bearings . . . Built-In Relief Valve . . . Rigid one-piece Backplate carries the load of all pipe connections and protects working parts from stress and strain.

Roper Pumps are built to last a long time . . . and they do!

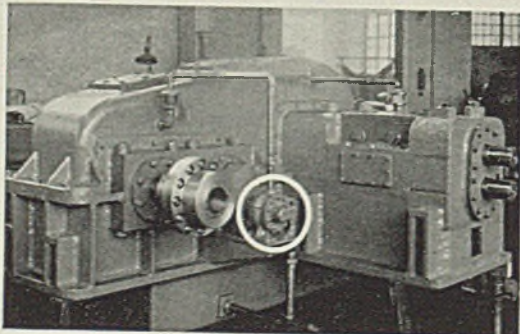
**DETERMINE YOUR PUMPING
REQUIREMENTS QUICKLY AND
EASILY WITH THIS VALUABLE**

Book of Facts

A book filled with factual information . . . listing liquids that can be pumped, how to determine the proper size of pump, friction of water in pipes, how to compute suction lift, how to compute discharge head, horsepower required, size and speed of pulleys or gears, and many more time-saving tables and charts.

Ask for Book No. 948

COMBINATION DRIVE AND PINION
STAND INSTALLATION



ROPER

Rotary Pumps

DEPENDABLE SINCE 1857

GEO. D. ROPER CORP.
ROCKFORD, ILLINOIS

PITTSBURGH OFFICE
207-209 BLVD. OF THE ALLIES

"You Can Rely on Roper"

Steel Buying Lighter as Allotments Match Output

Excess buying restrained by PRP. . . Deliveries show some improvement. . . Freight car orders released. . . Scrap prices adjusted. . . Iron ore consumption at peak

DEMAND

Buying is slower.

PRODUCTION

Steady at 99 per cent.

PRICES

Scrap schedule amended.

STEEL buying is on a reduced scale compared with a year ago, as much as ten per cent under January, 1942, in some instances. This is attributed to reductions in allocations under Production Requirements Plan and preliminary action looking to shift to the Controlled Materials Plan.

Closer control by War Production Board is restraining excess buying and bringing a better balance between steel production and consumption. Easing in demand is not uniform in all products but reduction of allotments in some directions tends to equalize pressure by diversion of semifinished steel to most needed materials.

Numerous consumers are preparing their Controlled Materials Plan applications for second quarter. It appears that some have been particularly forehanded and a few already have submitted their numbers to sellers. These include some prime contractors with work for the Navy. It is believed likely that numbers related to airplane work will come through first, as some features of CMP have been used in that industry for some time.

In steel bars the situation has improved somewhat, attributed to better supply of semifinished steel, in part due to smaller lend-lease requirements. Alloy bars are in no better position but some shift is observed from electric furnace to open-hearth alloys, which may ease the situation somewhat. Cold-drawn bar producers are unable to obtain sufficient material to meet their orders and substitution of bessemer steel for this purpose is slow. Accumulation of directives on cold-finished and alloy bars has caused delivery delay on old orders and schedules have been broken considerably.

While sheet consumption continues heavy, demand has receded and in some cases mills are able to make inroads on order backlogs. Considerable tonnage has been canceled as PRP allocations failed to cover consumer requests and as a result deliveries have improved. Hot-rolled sheets can be promised by some producers in five weeks or less and occasionally such shipment can be promised on ratings down to AA-3 and AA-4. In cold-rolled sheets some mills offer delivery by the middle of March, others having nothing earlier than April. Galvanized sheet deliveries range from seven to eleven weeks.

Orders have been released on about 10,900 domestic freight cars, part of the 20,000 allocated for first half con-

struction, about 4600 to railroad shops and 6300 to commercial builders. Most of these were placed on order several months ago and later frozen by the War Production Board. Compared with the 100,000 cars deemed necessary by the carriers to give efficient service this is a small release. The remaining 9100 of the first half allotment are expected to be released shortly.

Numerous changes have been made in the schedule of scrap prices. The most important is a reduction of \$1 per ton on machine turnings and mixed borings and turnings, an effort to move grades not particularly desired by the industry. The differential on unprepared scrap has been increased from \$2.50 to \$3.50 to stimulate preparation before shipment to consumers. Cut electric furnace grades have been advanced 50 cents per ton and cut automobile steel scrap has been reduced \$1 per ton. A number of definitions have been amended to cover changes in specifications. No. 1 machinery cast is no longer a listed grade and cupola cast specification has been widened to include this.

Under stress of steel demand for every ton possible, operations last week were maintained unchanged at 99 per cent. Chicago advanced ½-point to 102½ per cent and Buffalo 2½ points to 93 per cent. Cincinnati receded 2 points to 95 per cent. Production was unchanged in the other nine districts, Cleveland, 91; St. Louis, 93; eastern Pennsylvania, 96; New England, 95; Pittsburgh, 97½; Wheeling, 80; Birmingham, 95; Detroit, 93; Youngstown, 97.

Lake Superior iron ore consumption in December set a new all-time record at 7,540,841 gross tons, exceeding the prior records set in November with 7,227,497 tons and October with 7,370,595 tons. Total ore consumed in 1942 was far above any earlier year, with 83,714,451 tons, compared with 74,570,871 tons in 1941. Stocks at furnaces and lower lake docks Jan. 1 totaled 47,424,421 tons, compared with 40,456,893 tons at the same date last year. Active blast furnaces in the United States Jan. 1 numbered 175, against 172 a month earlier.

Composite steel and iron prices are unchanged at levels prevailing for several months, finished steel composite at \$56.73, semifinished steel at \$36, steelmaking pig iron at \$23.05 and steelmaking scrap at \$19.17.

COMPOSITE MARKET AVERAGES

	Jan. 23	Jan. 16	Jan. 9	One Month Ago Dec., 1942	Three Months Ago Oct., 1942	One Year Ago Jan., 1942	Five Years Ago Jan., 1938
Finished Steel	\$56.73	\$56.73	\$56.73	\$56.73	\$56.73	\$56.73	\$62.18
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.92
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	14.10

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. 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. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Jan. 23,	Dec.	Oct.	Jan.	Pig Iron	Jan. 23,	Dec.	Oct.	Jan.
	1943	1942	1942	1942		1943	1942	1942	1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c	Bessemer, del. Pittsburgh	\$25.19	\$25.19	\$25.19	\$25.19
Steel bars, Chicago	2.15	2.15	2.15	2.15	Basic, Valley	23.50	23.50	23.50	23.50
Steel bars, Philadelphia	2.49	2.49	2.49	2.47	Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.34
Shapes, Pittsburgh	2.10	2.10	2.10	2.10	No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
Shapes, Philadelphia	2.22	2.22	2.22	2.22	No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Shapes, Chicago	2.10	2.10	2.10	2.10	Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Plates, Pittsburgh	2.10	2.10	2.10	2.10	Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.00
Plates, Philadelphia	2.15	2.15	2.15	2.15	No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.215
Plates, Chicago	2.10	2.10	2.10	2.10	Malleable, Valley	24.00	24.00	24.00	24.00
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10	Malleable, Chicago	24.00	24.00	24.00	24.00
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05	Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.34
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50	Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10	Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.33
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05					
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50	Scrap				
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60	Heavy melting steel, Pitts.	\$20.00	\$20.00	\$20.00	\$20.00
Tin plate, per base box, Pittsburgh	\$5.00	\$5.00	\$5.00	\$5.00	Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55	Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
					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	\$6.00	\$6.00	\$6.00	\$6.20
					Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
					Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

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 and Feb. 4, 1942. 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. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

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.)
Alloy Steel Ingots: Pittsburgh base, uncropped, \$45.00.
Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$34.00; Detroit, del. \$36.25; Duluth (bil.) \$36.00.
 (Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under leasehold during first quarter 1942 at \$37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs \$41 gross ton at established basing points.)
Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$40.00; Detroit, del. \$42.25; Duluth, \$42.00.
 (Andrews Steel Co. may quote carbon forging billets \$50 gross ton at established basing points.)
Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., \$52.00; 12-18 in., \$54.00; 18 in. and over, \$56.00.
Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, \$54.00.
Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$34.00.
 (Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at \$39 gross ton, f.o.b. mill.)
Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., \$1.90.
Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5-9/32 in., inclusive, per 100 lbs., \$2.00.
 Do., over 9/32-47/64-in., incl., \$2.15. Worcester add \$0.10 Galveston, \$0.27. Pacific Coast \$0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c, (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.)
Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced on its 8-inch mill.)
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., 2.82c.
 (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)	0.55
		(20-30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	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., 2.65c; Detroit 2.70.
Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.
Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Roll Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)
Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.

(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.

(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)
Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.
Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.
Electrical Sheets, No. 24:

	Pittsburgh	Pacific	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; 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. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; 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.
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.

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. \$16.00; 30-lb. \$17.25; 40-lb. \$19.50.

Plates
Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c. (Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes
Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c. (Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails
Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add \$2 for Worcester):
Bright basic, Bessemer wire 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Wire Products to the Trade:
Standard and cement-coated wire nails, polished and staples, 100-lb. keg \$2.55
Annealed fence wire, 100 lb. 3.05
Galvanized fence wire, 100 lb. 3.40
Woven fence, 12 1/2 gage and lighter, per base column67
Do., 11 gage and heavier70
Barbed wire, 80-rod spool, col.70
Twisted barbless wire, col.70
Single loop bale ties, col.59
Fence posts, carloads, col.69
Cut nails, Pittsburgh, carloads \$3.85

Pipe, Tubes
Welded Pipe: Base price in carloads 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		Steel		Iron	
In.	Blk. Galv.	In.	Blk. Galv.	In.	Blk. Galv.
1/2	56	3/8	24	3/4	31 1/2
3/4	59	40 1/2	30	10	34
1	63 1/2	51	1-1 1/4	34	16
1 1/4	66 1/2	56	1 1/2	38	18 1/2
1-3	68 1/2	57 1/2	2	37 1/2	18

Lap Weld			
Steel		Iron	
In.	Blk. Galv.	In.	Blk. Galv.
2	61	1 1/4	23
2 1/2	64	1 1/2	28 1/2
3 1/2	66	2	30 1/2
4	65	2 1/2	31 1/2
5	64 1/2	3	32 1/2
6	64 1/2	3 1/2	32 1/2
7	65	4	33 1/2
8	64 1/2	4 1/2	34 1/2
9	64 1/2	5	35 1/2
10	64 1/2	5 1/2	36 1/2
11	63 1/2	6	37 1/2
12	63 1/2	6 1/2	38 1/2

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	Seamless		Lap Weld	
	Hot	Cold	Steel	Iron
1"	\$ 7.82	\$ 9.01	.....	.....
1 1/4"	13	9.26	.....	.....
1 1/2"	13	10.23	\$ 9.72	\$23.71
1 3/4"	13	11.64	11.06	22.93
2"	13	13.04	12.38	19.35
2 1/4"	13	14.54	13.79	21.63
2 1/2"	12	16.01	15.16	.....
2 3/4"	12	17.54	16.58	26.57
3"	12	18.59	17.54	29.00
3 1/2"	11	24.63	23.15	31.38
4"	10	30.54	28.66	39.81
4 1/2"	10	37.35	43.04	49.90
5"	9	46.87	54.01	44.25
6"	7	71.96	82.93	68.14

Rails, Supplies
Standard rails, over 60-lb., f.o.b. mill, gross ton, \$40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, \$40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, \$28-\$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels
Tool Steels: Pittsburgh, Bethlehem, Syracuse, 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.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base.
18.00	4	1		per lb.
1.5	4	1	8.5	67.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels
Base, Cents per lb.—f.o.b. Pittsburgh
CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R.	C. R.
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	28.50	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
311	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
*317	50.00	54.00	58.00	50.00	58.00
†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
442	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
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*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. †††Free machining. †††Includes annealing and pickling.

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.

Extras 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. **Emergency basing point** is the basing point at or near the place of production or origin.

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.

Bolts, Nuts
F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine	
1/2 x 6 and smaller	65 1/2 off
Do., 3/8 and 5/8 x 6-in. and shorter	63 1/2 off
Do., 3/8 to 1 x 6-in. and shorter	61 off
1 1/2 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	U.S.S.	S.A.E.
Semifinished hex, 1/2-inch and less	62	64
1/2-1-inch	59	60
1 1/2-1 1/2-inch	57	58
1 1/2 and larger	56	.....

Hexagon Cap Screws	
Upset 1-in., smaller	64 off
Milled 1-in., smaller	68 off
Square Head Set Screws	
Upset, 1-in., smaller	71 off
Headless, 3/4-in., larger	60 off
No. 10, smaller	70 off

Piling
Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
1/2-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

Metallurgical Coke
Price Per Net Ton

Beehive Ovens	
Connellsville, furnace	\$6.00
Connellsville, foundry	7.00-7.50
Connellsville prem. fdry.	7.25-7.60
New River, foundry	8.00-8.25
Wise county, foundry	7.50
Wise county, furnace	6.50

By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	112.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge \$6.50, effective Aug. 12, 1942. †\$12.75 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	\$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry			
	Basic	Bessemer	Malleable	
Bethlehem, Pa., base	\$25.00	\$26.00	\$25.50	
Newark, N. J., del.	26.62	27.62	27.12	
Brooklyn, N. Y., del.	27.63		28.15	
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	120.38	119.00		
Baltimore, del.	25.67			
Boston, del.	25.12			
Chicago, del.	124.47			
Cincinnati, del.	24.30	22.92		
Cleveland, del.	24.12	23.24		
Newark, N. J., del.	26.24			
Philadelphia, del.	25.51	25.01		
St. Louis, del.	124.12	23.24		
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53		26.53	26.03
Syracuse, del.	26.08		27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38		27.38	26.88
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.76	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00		24.50
Hamilton, O., base	24.00	23.50		24.00
Cincinnati, del.	24.68	24.68		25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
†Pittsburgh, del.				
No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00			
Sharpville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50		
Baltimore, del.	26.05			
Steeltown, Pa., base		24.50		25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39		26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. †For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery
 6.00-6.50 per cent (base) . . . \$29.50
 6.51-7.00 . . . \$30.50 9.01- 9.50 . . . \$35.50
 7.01-7.50 . . . 31.50 9.51-10.00 . . . 36.50
 7.51-8.00 . . . 32.50 10.01-10.50 . . . 37.50
 8.01-8.50 . . . 33.50 10.51-11.00 . . . 38.50
 8.51-9.00 . . . 34.50 11.01-11.50 . . . 39.50
 F.o.b. Jackson county, O., per gross ton, Buffalo base prices are \$1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon
 Prices same as for high silicon silvery iron, plus \$1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron
 Northern
 Lake Superior Furn. \$28.00
 Chicago, del. 31.54

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

Gray Forgs
 Neville Island, Pa. \$23.50
 Valley, base 23.50

Low Phosphorus
 Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., \$29.50 base; \$30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: 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%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

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: Pittsburgh Coke & Iron Co. (Sharpville, Pa. furnace only) and 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, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by \$2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick
 Super Quality
 Pa., Mo., Ky. \$64.60
 First Quality
 Pa., Ill., Md., Mo., Ky. 51.30
 Alabama, Georgia 51.30
 New Jersey 56.00
 Ohio 43.00

Second Quality
 Pa., Ill., Md., Mo., Ky. 46.55
 Alabama, Georgia 38.00
 New Jersey 49.00
 Ohio 36.80

Malleable Bang Brick
 All bases \$59.85

Silica Brick
 Pennsylvania \$51.30
 Joliet, E. Chicago 58.90
 Birmingham, Ala. 51.30

Ladle Brick
 (Pa., O., W. Va., Mo.)
 Dry press \$31.00
 Wire cut 29.00

Magnesite
 Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk 22.00
 net ton, bags 26.60

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

Fluorspar

Washed gravel, f.o.b. Ill. Ky., net ton, carloads, all rail \$25.00-28.00
 Do., barge 25.00-28.00
 No. 2 lump 25.00-28.00
 (Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, \$135; Del. Pittsburgh \$140.65; f.o.b. Southern furnaces \$135; Add \$6 per gross ton for packed carloads \$10 for ton, \$13.50 for less-ton and \$18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. \$36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. \$2.25; less-ton lots \$2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less lbs.
2% C . . .	19.50c	20.25c	20.75c	21.00c
1% C . . .	20.50c	21.25c	21.75c	22.00c
0.20% C .	21.50c	22.25c	22.75c	23.00c
0.10% C .	22.50c	23.25c	23.75c	24.00c

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybde Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. \$2.80; 100-200 lb. lots \$2.75; under 100-lb. lots \$3.00.

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.

Ferrophosphorus: 23-26%, based on 24% 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 Mt. Pleasant, Tenn.; contract price \$75. spot \$80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	\$ 74.50	\$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.
Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton \$74.50; packed \$80.50; ton lots \$84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; \$5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton \$135; ton lots \$147.50. Spot \$5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, \$1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity \$2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained

titanium; ton lots \$1.23; less-ton lots \$1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots \$1.35; less-ton lots \$1.40. 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 destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon \$142.50; 3-5% carbon \$157.50.

Ferrovandium: 35-40%, 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.

Vanadium Pentoxide: Technical grade, 88-92 per cent V₂O₅; contracts, any quantity, \$1.10 per pound V₂O₅ contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton \$102.50; packed \$107.50; ton lots \$108; less-ton lots \$112.50. Spot \$3 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsilfer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Hot rolled bars	Structural shapes			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	AISI hot bars 2300 series	AISI hot bars 3100 series
		Plates	Floor plates										
Boston	3.98 ¹	3.85 ¹	3.85 ¹	5.66 ¹	3.71 ¹	4.06 ¹	5.06 ¹	5.11 ¹²	4.68 ¹²	4.13 ²¹	3.46	7.75 ²³	6.05 ²³
New York	3.84 ¹	3.75 ¹	3.76 ¹	5.56 ¹	3.58 ¹	3.96 ¹	3.96 ¹	5.00 ¹²	4.60 ¹	4.09 ²¹	3.51	7.60 ²³	5.90 ²³
Philadelphia	3.85 ¹	3.55 ¹	3.55 ¹	5.25 ¹	3.55 ¹	3.95 ¹	4.45 ¹	4.90 ¹²	4.63 ¹²	4.06 ²¹	3.31	7.56 ²³	5.86 ²³
Baltimore (city)	3.85 ¹	3.70 ¹	3.70 ¹	5.25 ¹	3.50 ¹	4.00 ¹	4.35 ¹	5.05 ¹⁷	5.00 ²⁰	4.04 ²¹			
Baltimore (country)	3.85 ¹	3.70 ¹	3.45 ¹	5.25 ¹	3.25 ¹	4.00 ¹	4.35 ¹	4.75 ¹⁷	5.00 ²⁰	4.04 ²¹			
Washington, D. C.	3.95 ¹	3.80 ¹	3.80 ¹	5.35 ¹	3.60 ¹	4.10 ¹	4.45 ¹	5.15 ¹⁷	5.10 ²⁰	4.03 ²¹			
Norfolk, Va.	4.00 ¹	4.05 ¹	4.05 ¹	5.45 ¹	3.85 ¹	4.10 ¹	4.10 ¹	5.40 ¹⁷	4.50 ²⁴	4.15 ²¹			
Bethlehem, Pa.°	3.45 ¹												
Claymont, Del.°			3.45 ¹										
Coatesville, Pa.°			3.45 ¹										
Buffalo (city)	3.35 ¹	3.40 ¹	3.62 ¹	5.25 ¹	3.25 ¹	3.82 ¹	3.82 ¹	4.75 ¹⁵	4.30 ¹⁰	3.75 ²¹	3.52	7.35 ²³	5.65 ²³
Buffalo (country)	3.25 ¹	3.30 ¹	3.62 ¹	5.25 ¹	3.15 ¹	3.82 ¹	3.82 ¹	4.65 ¹⁵	4.20 ¹⁰	3.65 ²¹			
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 ¹⁵	4.00 ²⁴	3.65 ²¹		7.45 ²³	5.75 ²³
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 ¹⁵	4.00 ²⁴	3.65 ²¹			
Cleveland (city)	3.25 ¹	3.58 ¹	3.40 ¹	5.18 ¹	3.35 ¹	3.50 ¹	3.50 ¹	4.62 ¹⁵	4.05 ²⁴	3.75 ²¹	3.20	7.55 ²³	5.85 ²³
Cleveland (country)	3.25 ¹	3.58 ¹	3.30 ¹	5.18 ¹	3.25 ¹	3.50 ¹	3.50 ¹	4.62 ¹⁵	4.05 ²⁴	3.75 ²¹			
Detroit	3.43 ¹	3.65 ¹	3.60 ¹	5.27 ¹	3.43 ¹	3.43 ¹	3.68 ¹	4.84 ¹⁵	4.30 ²⁴	3.80 ²¹	3.40	7.67 ²³	5.97 ²³
Omaha (city)	4.10 ¹	4.15 ¹	4.15 ¹	5.75 ¹	3.85 ¹	4.20 ¹	4.20 ¹	5.52 ¹⁰	4.77 ²⁴	4.42 ²¹			
Omaha (country)	4.00 ¹	4.05 ¹	4.05 ¹	5.65 ¹	3.75 ¹	4.10 ¹	4.10 ¹	5.52 ¹⁰	4.77 ²⁴	4.42 ²¹			
Cincinnati	3.60 ¹	3.68 ¹	3.65 ¹	5.28 ¹	3.42 ¹	3.67 ¹	3.67 ¹	4.92 ¹⁰	4.37 ²⁴	4.00 ²¹	3.45	7.69 ²³	5.99 ²³
Youngstown, O.°								4.40 ¹⁵					
Middletown, O.°								4.40 ¹⁵					
Chicago (city)	3.50 ¹	3.55 ¹	3.55 ¹	5.15 ¹	3.25 ¹	3.60 ¹	3.60 ¹	4.85 ¹⁰	4.10 ²⁴	3.75 ²¹	3.50	7.35 ²³	5.65 ²³
Chicago (country)	3.40 ¹	3.45 ¹	3.45 ¹	5.05 ¹	3.15 ¹	3.50 ¹	3.50 ¹	4.75 ¹⁰	4.00 ²⁴	3.65 ²¹			
Milwaukee	3.63 ¹	3.68 ¹	3.68 ¹	5.28 ¹	3.38 ¹	3.73 ¹	3.73 ¹	4.98 ¹⁰	4.23 ²⁴	3.88 ²¹	3.54	7.33 ²³	5.88 ²³
St. Paul	3.75 ¹	3.80 ¹	3.80 ¹	5.40 ¹	3.50 ¹	3.85 ¹	3.85 ¹	5.00 ²	4.35 ¹	4.34 ²¹	3.83	7.70 ²³	6.00 ²³
St. Louis	3.64 ¹	3.69 ¹	3.69 ¹	5.29 ¹	3.39 ¹	3.74 ¹	3.74 ¹	4.99 ¹⁰	4.24 ²⁴	4.02 ²¹	3.61	7.72 ²³	6.02 ²³
Indianapolis (city)	3.60 ¹	3.70 ¹	3.70 ¹	5.30 ¹	3.45 ¹	3.75 ¹	3.75 ¹	5.01 ¹⁰	4.25 ²⁴	3.97 ²¹			
Indianapolis (country)	3.35 ¹	3.45 ¹	3.40 ¹	5.05 ¹	3.20 ¹	3.50 ¹	3.50 ¹	5.01 ¹⁰	4.00 ²⁴	3.97 ²¹			
Memphis, Tenn.	3.90 ¹	3.95 ¹	3.95 ¹	5.71 ¹	3.85 ¹	4.10 ¹	4.10 ¹	5.25 ¹¹	4.66 ²⁴	4.31 ²¹			
Birmingham (city)	3.50 ¹	3.55 ¹	3.55 ¹	5.83 ¹	3.45 ¹	3.70 ¹	3.70 ¹	4.75 ¹⁰	4.78 ²⁴	4.43 ²¹			
Birmingham (country)	3.40 ¹	3.45 ¹	3.45 ¹	5.83 ¹	3.35 ¹	3.60 ¹	3.60 ¹	4.75 ¹⁰	4.78 ²⁴	4.43 ²¹			
New Orleans (city)	4.10 ¹	3.90 ¹	3.90 ¹	5.85 ¹	3.95 ¹	4.20 ¹	4.20 ¹	5.25 ²⁰	4.95 ¹⁰	4.60 ²¹	5.00		
New Orleans (country)	4.00 ¹	3.80 ¹	3.80 ¹	5.75 ¹	3.85 ¹	4.10 ¹	4.10 ¹	5.15 ²⁰	4.95 ¹⁰	4.60 ²¹			
Houston, Tex.	3.75 ¹	4.25 ¹	4.25 ¹	5.50 ¹	3.75 ¹	4.30 ¹	4.30 ¹	5.25 ¹⁰	5.43 ¹⁰	4.50 ²¹			
Los Angeles	4.35 ¹	4.60 ¹	4.90 ¹	7.15 ¹	4.95 ¹	4.90 ¹	6.70 ¹	5.95 ¹⁰	7.15 ¹⁵	5.70 ²¹		9.55 ²³	8.55 ²³
San Francisco (city)	3.95 ¹	4.35 ¹	4.65 ¹	6.35 ¹	4.55 ¹	4.50 ¹	4.50 ¹	6.60 ¹⁰	7.55 ¹⁵	5.55 ²¹		9.80 ²³	8.80 ²³
San Francisco (country)	3.85 ¹	4.25 ¹	4.55 ¹	6.25 ¹	4.45 ¹	4.40 ¹	4.40 ¹	6.50 ¹⁰	7.45 ¹⁵	5.45 ²¹			
Tacoma	4.20 ¹	4.45 ¹	4.75 ¹	6.50 ¹	4.65 ¹	4.25 ¹	5.45 ¹	5.70 ¹⁵	6.63 ¹⁵	5.75 ²¹			
Seattle (city)	4.20 ¹	4.45 ¹	4.75 ¹	6.50 ¹	4.65 ¹	4.95 ¹	5.45 ¹	5.70 ¹⁵	6.63 ¹⁵	5.75 ²¹			8.00 ¹

*Basing point cities against which warehouses equalized freight as of April 16, 1941, and which must now be used in calculating lowest combination prices.
 NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendment No. 10 to Revised Price Schedule No. 49.

BASE QUANTITIES

¹—400 to 1999 pounds; ²—400 to 14,999 pounds; ³—any quantity; ⁴—300 to 1999 pounds; ⁵—400 to 3999 pounds; ⁶—300 to 1999 pounds; ⁷—1500 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, any quantity is base.

Ores	Foreign Ore	Chrome Ore	
Lake Superior Iron Ore	Cents per unit, c.i.f. Atlantic ports	(Equivalent OPA schedules):	48% no ratio 31.00
Gross ton, 51 1/2%	Manganiferous ore, 45-55% Fe, 6-10% Mang.	Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.	South African (Transvaal) 27.40
Lower Lake Ports	N. African low phos.		45% no ratio 28.30
Old range bessemer \$4.75	Spanish, No. African basic, 50 to 60%		48% no ratio 31.00
Mesabi nonbessemer 4.45	Brazil Iron ore, 68-69% f.o.b. Rio de Janeiro. 7.50-8.00c	(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)	50% no ratio 32.80
High phosphorus 4.35		Indian and African	Brazilian—nominal
Mesabi bessemer 4.80		48% 2.8:1 41.00	44% 2.5:1 lump 33.65
Old range nonbessemer 4.60		48% 3:1 43.50	48% 3:1 lump 43.50
Eastern Local Ore			Rhodesian
Cents, unit, del. E. Pa.			45% no ratio 28.30
Foundry and basic 56-63%, contract 13.00	Tungsten Ore		48% no ratio 31.00
	Chinese wolframite, per short ton unit, duty paid \$24.00		48% 3:1 lump 43.50
			Domestic (f.o.b. Columbus, Mont.) 48% 3:1 43.50
			less \$7 freight allowance

NATIONAL EMERGENCY STEELS (Hot Rolled)

Designation	Chemical Composition Limits, Per Cent						Basic open-hearth		Electric furnace		Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)
	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Bars	Bars	Billets	Billets	
							per 100 lb.	per 100 lb.	per G T	per G T	
NE 1830	28-33	1.60-1.90	.20-.35				\$.10	\$.95	\$19.00	\$19.00	Brazilian, 48% 73.8c
NE 8020	18-23	1.00-1.30	.20-.35			.10-.20	.45	9.00	28.00	28.00	Brazilian, 46% 71.8c
NE 8442	40-45	1.30-1.60	.20-.35				.90	18.00	1.40	28.00	Caucasian, 51% 75.3c
NE 8613	12-17	.70-.90	.20-.35	.40-.60		.15-.25	.75	15.00	1.25	25.00	Caucasian, 50% 74.8c
NE 8720	13-18	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00	Chilean, 48% 73.8c
NE 9255	50-60	.75-1.00	1.80-2.20				.40	8.00			Indian, 50% 74.8c
NE 9262	55-65	.75-1.00	1.80-2.20	.20-.40			.65	13.00			Indian, 48% 73.8c
NE 9415	13-18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00	South African, 48% 73.8c
NE 9442	40-45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00	South African, 46% 71.8c
NE 9537	35-40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00	(Duty Free)
NE 9630	28-33	1.20-1.50	.40-.60	.40-.60			.80	16.00	1.30	26.00	Cuban, 51% 86.5c
NE 9642	40-45	1.30-1.60	.40-.60	.40-.60			.85	17.00	1.35	27.00	Cuban, 48% 85.0c
											Cuban, 45% 82.0c
											Philippine, 50% 85.0c
											Domestic, 48%, f.o.b. mines 96.0c

January 25, 1943

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES

Location	Description	Low Phos. Grades		Bar		Alloy-Free		First Cut
		Blillet, Bloom, Forge Crops	Crops and smaller; Punchings, Plate	Heavy Structural, Plate and less	1 ft. and less	1 ft. and less	Low Phos. & Sulfur Turnings		Heavy Axle & Forge Turnings
Fittsburg, Mo.	OPEN HEARTH GRADES	\$20.00	\$15.00	\$16.00	\$17.00	\$17.00	\$18.00	\$21.00
Fittsburg, Mo.	Mixed Bor., Turn., Machine Turnings	18.75	14.75	14.75	15.75	15.75	16.75	19.75
Fittsburg, Mo.	Bethlehem	18.25	14.25	14.25	15.25	15.25	16.25	19.25
Fittsburg, Mo.	Buffalo	19.25	15.25	15.25	16.25	16.25	17.25	20.25
Fittsburg, Mo.	Cleveland	19.50	15.50	15.50	16.50	16.50	17.50	20.50
Fittsburg, Mo.	Detroit	17.85	13.85	13.85	14.85	14.85	15.85	18.85
Fittsburg, Mo.	Toledo	12.85	8.85	8.85	9.85	9.85	10.85	13.85
Fittsburg, Mo.	Chicago	18.75	14.75	14.75	15.75	15.75	16.75	19.75
Fittsburg, Mo.	Kokomo	18.25	14.25	14.25	15.25	15.25	16.25	19.25
Fittsburg, Mo.	Duluth	18.00	14.00	14.00	15.00	15.00	16.00	19.00
Fittsburg, Mo.	St. Louis	17.50	13.50	13.50	14.50	14.50	15.50	18.50
Birmingham, Ala.	Heavy Melting Steel	17.00	13.00	13.00	14.00	14.00	15.00	18.00
Birmingham, Ala.	Los Angeles	16.50	12.50	12.50	13.50	13.50	14.50	17.50
Birmingham, Ala.	Seattle	14.50	9.50	9.50	10.50	10.50	11.50	14.50

RAILROAD SCRAP

Location	Description	Scrap Rails		18 in. and under
		3 ft. and under	2 ft. and under	
Pittsburgh, Pa.	Heavy Melting Steel	\$21.00	\$22.00	\$24.50
Pittsburgh, Pa.	Wheeling	19.75	20.75	\$24.50
Pittsburgh, Pa.	Sharon	20.50	21.50	\$24.50
Pittsburgh, Pa.	Youngstown	20.25	21.25	\$24.50
Pittsburgh, Pa.	Wilkes-Barre	20.00	21.00	\$24.50
Pittsburgh, Pa.	Scraps	19.00	20.00	\$24.50
Pittsburgh, Pa.	Point	17.00	18.00	\$24.50
Pittsburgh, Pa.	St. Louis	18.50	19.50	\$24.50
Pittsburgh, Pa.	Birmingham	18.00	19.00	\$24.50
Pittsburgh, Pa.	Los Angeles	18.00	19.00	\$24.50
Pittsburgh, Pa.	Seattle	15.50	16.50	\$24.50

CAST IRON SCRAP OTHER THAN RAILROAD

Location	Description	Group A			Group B			Group C		
		150 lbs. & Under	100 lbs. & Under	50 lbs. & Under	150 lbs. & Under	100 lbs. & Under	50 lbs. & Under	150 lbs. & Under	100 lbs. & Under	50 lbs. & Under
Los Angeles	No. 1 Cupola Cast	\$18.00	\$19.00	\$20.00	\$19.00	\$20.00	\$21.00	\$20.00	\$21.00	\$22.00
Los Angeles	No. 1 Machinery Cast	18.00	19.00	20.00	19.00	20.00	21.00	20.00	21.00	22.00
Los Angeles	Clean Auto Cast	18.00	19.00	20.00	18.00	19.00	20.00	18.00	19.00	20.00
Los Angeles	Stove Plate	17.00	18.00	19.00	17.00	18.00	19.00	17.00	18.00	19.00
Los Angeles	Unstripped Motor Blocks	15.50	16.50	17.50	15.50	16.50	17.50	15.50	16.50	17.50
Los Angeles	Heavy Breakable Cast	15.50	16.50	17.50	15.50	16.50	17.50	15.50	16.50	17.50
Los Angeles	Changing Box Size Cast	17.00	18.00	19.00	17.00	18.00	19.00	17.00	18.00	19.00
Los Angeles	Miscellaneous Malleable	20.00	21.00	22.00	20.00	21.00	22.00	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico. Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida. Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo. Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 bushing, 3 bundles under No. 1 per cent oil, \$1 under, No. 2, 1.5 per cent oil, \$2 under heavy melting steel, No. 1 melting steel under No. 1 heavy melting steel, \$2.50 over, No. 2 bushing, \$2.50 under No. 1 heavy melting steel. A basing point includes the switching district. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Monaca, Munhall, Pa. Cincinnati basing point includes the switching districts of Newport, Ky.; St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill.; San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif. Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer. Commissions: No commission is payable except by a consumer to a broker for services rendered. The commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice. Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel, in such cases, maximum shipping point price are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, \$1 at Great Lakes ports, \$1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, \$6.65 per ton. Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum \$1.00 per ton. Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than \$1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than \$1, if most economical transportation is used. Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are \$3.50 less; material from which Nos. 1, 2 and 3 bundles made is \$4 less than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry scrap be used as the corresponding grades of prepared scrap. Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Missouri, Washington, Louisiana, Utah. Delivered price may exceed by not more than \$5 the price at the nearest basing point. Consumer # plant, provided sworn details furnished OPA. Permission required to exceed by more than \$5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip . . .

Sheet & Strip Prices, Page 96

While consumption is still heavy, sheet demand is tapering, with orders spotty and mill deliveries improving. On hot-rolled sheets some mills can make shipments in five weeks or less and in some instances this applies on ratings down to AA-3 and AA-4. Some producers who now can not make five-weeks delivery promise on anything under AA-2, expect definite easing, one asserting the present trend indicates he may be able to make fairly good delivery before first quarter is over on ratings down to A-1-a.

Cold-rolled sheet schedules are perhaps a shade easier, with some mills offering delivery by the middle of March, or earlier in some instances, depending on ratings. Some other producers can promise little before early April. Further diversion of strip capacity to plate is a factor in sustaining cold-rolled sheet schedules and in some instances even extending them. Galvanized sheet promises vary from seven to ten or eleven weeks.

With building construction down sharply warehouses are the principal buyers in some districts. Even some of the larger sheet consumers who normally buy in carlots are turning more to warehouses, not only because of quicker delivery but because of the greater diversity of their requirements under war-time operations. It is difficult to keep in stock the various types and sizes of steel they are called on to use at present, the situation being much more difficult than in normal times.

Shipyards are also large sheet consumers as present designs call for diversified sheet products and building of small light craft is greater than is usually recognized. Radar and electronic control equipment takes a substantial sheet tonnage, particularly in hot-rolled pickled, cold-rolled and electrical sheets. Incendiary bomb and bomb crate requirements are also fairly large. Barrel and drum stock demand is off.

One of the largest contracts ever placed for ash and garbage cans has been closed, several hundred thousand units, Cincinnati Galvanizing Co. being awarded part at \$331,206.40 and Reeves Steel & Mfg. Co., Dover, O., \$204,893.10.

Plates . . .

Plate Prices, Page 97

Shipyards continue the largest users of steel plates, with structural fabricators next largest in many districts and warehouses probably third in volume of receipts. Shipyards use results from greatly increased operations by larger builders and expanded activity at many small yards, including several that have been started in the past year or have expanded facilities. This is particularly true on both the Atlantic and Pacific coasts.

That fabricating shops are taking more plates than warehouses, in spite of decline in building, indicates their success in developing ship assemblies and other subcontract work of importance in the war effort.

Another factor in this situation is that jobbers have been able to build stocks to better proportions. Odd sizes from overruns taken by warehouses in fourth quarter are not as active now. Shops engaged in flame cutting continue to work

Part of the Fleet's Fighting Efficiency . . .



KEYSTONE

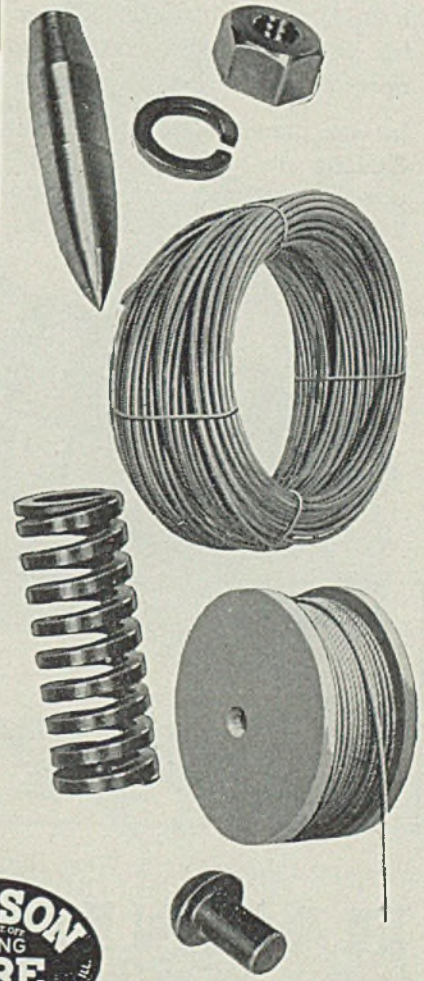
Wire

Just a few of thousands of wire mill products for war uses.

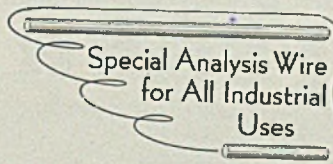
Every time the U. S. fleet engages the enemy, thousands of wire mill products play their essential supporting roles. In ammunition, guns, communications and ship construction, wire helps complete the fighting efficiency of every ship. Air forces and land forces, too, continually "draft" huge tonnages of wire mill production.

"First call" reasons are these why Keystone, along with the country's other leading wire mills, is turning out its highest maximum tonnage.

And on this industrial march to Victory, vastly significant developments in wire performance are being made. After Victory, these developments should streamline production for an INTENSIFIED civilian demand.



KEYSTONE STEEL & WIRE CO.
PEORIA, ILLINOIS





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Going To War!

—TO HELP SOLVE MAN-POWER PROBLEMS

SALLY doesn't have a man's strength. But give her—or any woman—a P&H Zip-Lift and watch her keep materials moving—anything—on assembly lines, shipping platforms, in store rooms, machine shops, everywhere. Pushing a button is all it takes to lift and move a load with a Zip-Lift—the fully-safe, all-electric wire rope hoist. It's easy to operate without special training.

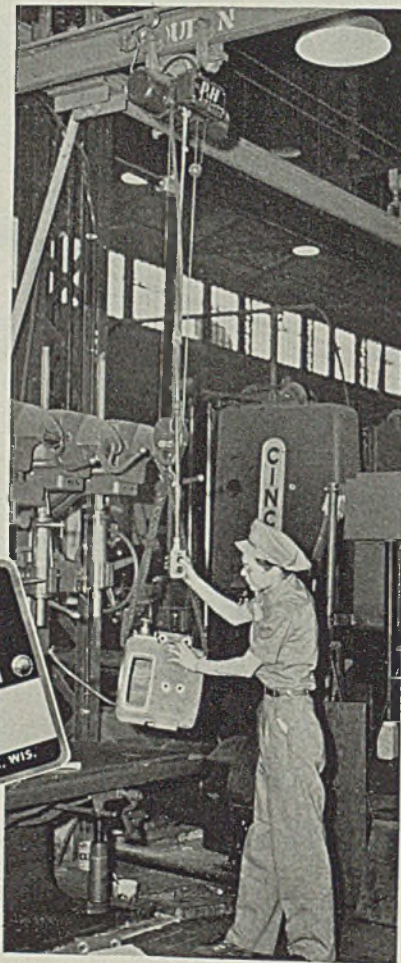
In war plants of all types, P&H Zip-Lifts are today solving man-power problems—speeding delivery of products to battlefronts.



Capacities:
250, 500,
1,000, and
2,000 lbs.



The new star in our Army-Navy "E," awarded for continuous production achievements, also signifies P&H's renewed pledge of future effort.



Zip-Lifts have complete magnetic push-button control for lifting, lowering or travel. Interchangeable mountings permit immediate change for bolt, hook, or trolley service.

General Offices: 4411 West National Avenue, Milwaukee, Wisconsin

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off good volume, most of it commanding high ratings. Larger plate inventories are made up mainly of strip mill universal output. Sheared material and wider plates are tight, about balancing heavy demand. Ratio of so-called delinquent tonnage each month is relatively greater for sheared plates.

Bars . . .

Bar Prices, Page 96

Some easing in supply of bars in larger diameters has resulted from better supply of semifinished steel and pressure is somewhat less. The situation in alloy bars is still tight but additional changes are being made in specifications from electric furnace to open-hearth alloys, expected to ease pressure on electric furnace operators.

Accumulation of directives for cold-finished and alloy steel bars is extending deliveries of some newly placed tonnage. To some extent the number of directives tends to weaken procedure as to shipment and schedules. In some instances hot-rolled alloys and small carbon rounds and flats are slightly easier but demand for cold-finished and alloys is maintaining pressure on producers. Specifications tend to increase each month against old contracts and efforts to place new tonnage with definite assurance of delivery are hampered.

Reduction in the number of NE steels is urged in some directions and production of the 9400 series is handicapped by high alloys in scrap: some consumers are specifying more of the 8600 series.

Where possible, slightly more bessemer bars, especially in small rod sizes, are being specified. Bessemer deliveries are better than most open-hearth grades but distributors complain they could dispose of more sizes were they available.

Demand for tool steel continues heavy, most being sold by distributors in relatively small lots and mills are maintaining jobber inventories in satisfactory balance as a rule. Forging shops continue among leading consumers of alloys.

Pipe . . .

Pipe Prices, Page 97

Cast iron pipe foundries which have not obtained other lines of war work are tapering production as military demand for cantonments and other construction has declined and industrial building is smaller. Municipal maintenance can be covered on priorities as low as A-10 but there is not much of this business at this season. Soil and pressure pipe producers are concerned over the outlook.

Some leading interests have obtained war business outside their regular lines and are in good position, but this is not the rule. Stove and heater manufacturers are running on restricted schedule as releases of these products have not been sufficient for full operation.

Office of Price Administration has reminded jobbers, dealers and distributors of steel and iron pipe in twelve western states that there are two kinds of freight allowance that may be included in their maximum prices, but that one may be marked up and the other may not. As provided in revised schedule No. 49 freight from mill basing point to buyer's location is included in maximum prices and is subject to a percentage markup. The schedule also provides that for specified pipe shipped from jobber

stocks in eleven states and two locations in the twelfth state any charge actually paid in excess of 30 cents per hundred pounds to equalize freight may be added to the price. However, charges in excess of 30 cents should not be marked up but added to the price separately.

Rails, Cars . . .

Track Material Prices, Page 97

Reliable information is that Washington has released orders for about 10,900 freight cars for the account of domestic carriers, against the first-half program of 20,000 cars. Of this number 4600 units, probably all that are scheduled to be built by them, have been released to railroad shops, the remainder, about 6300, going to commercial car builders.

Most of this equipment was placed months ago, later frozen by WPB. Of the remaining 9100 of the 20,000 car program fully half were ordered last year and then held back. It is believed these remaining cars will be released.

This small number of cars is only a fraction of the 100,000 units asked by the railroads and hope is held that a large number may be released for construction in last half.

Railroads would prefer all-steel cars to the composite types now proposed as substitutes and some definitely believe savings in steel would not compensate for loss of carrying capacity and shorter life of the composite cars.

Repair work in railroad shops is heavy under stress of present traffic load and most roads are reconditioning many used parts formerly scrapped and substituting wherever possible.

While 480,000 tons of rails for domestic carriers was originally approved by Washington for rolling in the current quarter, some trade interests believe that schedules for the first two months will be on a lighter basis and that recent heavy export tonnage may preclude complete rolling of the domestic program, though it is too early to be certain.

Meanwhile, according to some plate producers, railroads are being given a larger tonnage of both sheared and strip plate in February for maintenance and repairs. Others report little variation. Some applications for a fairly substantial tonnage of plates for export cars were not approved by Washington.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 97


A continuing effort is being made to have reinforcing bars shifted from group 2 to group 3 by the Conservation Division of the War Production Board. Thus far no action has been taken, although various members of the industry have recommended that it be done and it is understood officials of the steel section are in accord.

The new list of critical materials will be issued Feb. 1 by the Conservation Division and every effort is being made to have this product shifted before publication of the new list. Transfer to Group 3 would automatically permit its use in many applications now prohibited.

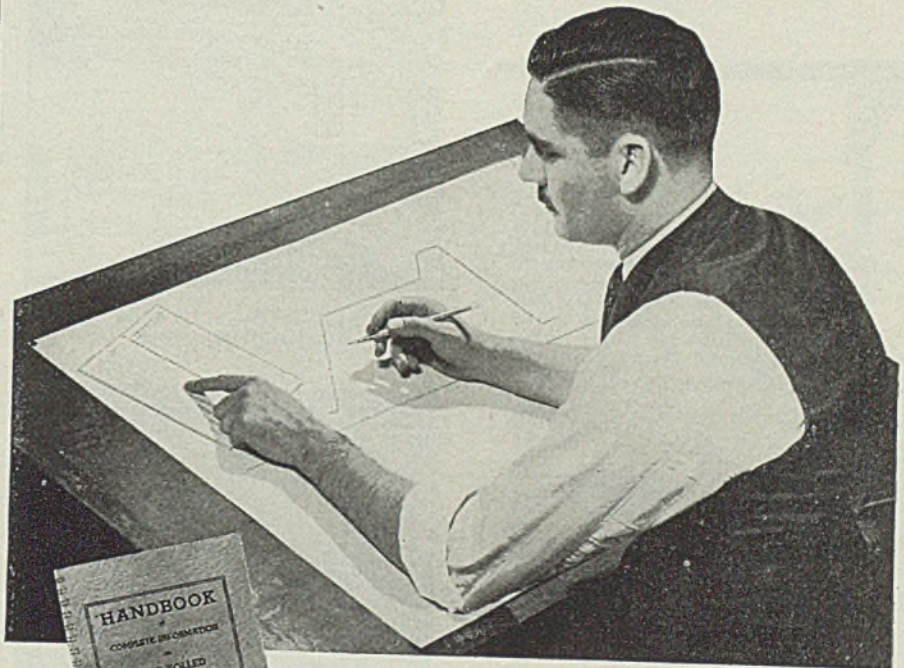
The reason for the recommendations is that an ample quantity of rerolling rails is available, as well as substantial tonnage of off-heat billets, which are usable only for production of reinforcing steel.

OPA has defined conditions govern-

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 Steel which is applicable to the product, steel to meet fast production requirements, materials to conserve vital metals, goods which are most likely available . . . these are a few of the staggering problems confronting product designers, purchasing departments, and production managers. The red Thomastrip Handbook gives valuable information that has led to the solution of many of these problems. It gives facts in words, pictures, and figures regarding electro-coated and bright finish uncoated cold rolled Thomastrip. Write for your copy.

THE THOMAS STEEL CO. — WARREN, OHIO



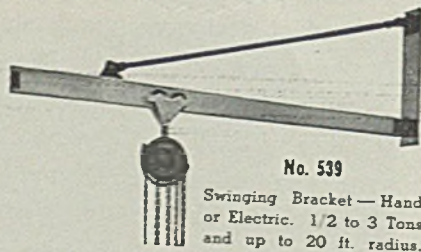
Thomas Strip

BRIGHT FINISH NOT COATED SOLDER COATED ELECTRO COATED WITH NICKEL, ZINC, COPPER, BRASS

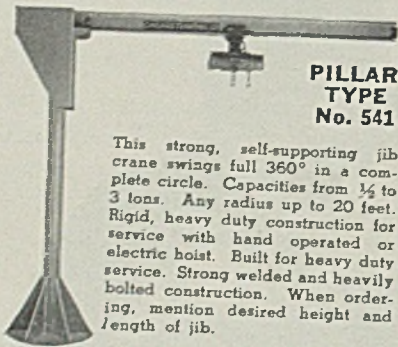
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

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Speed War Production with
JIB CRANES
FASTER SAFER HANDLING AT LESS COST!

★ Make a quick survey of present handling operations in your plant, and you'll be quick to locate any slow production gaps. Consider then how these Jib Mounted Cranes (hand or electrically operated) will span those "in-between" spots and help you meet and even beat your war delivery schedules.

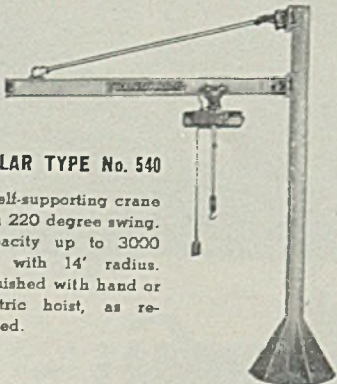


No. 539
 Swinging Bracket — Hand or Electric. 1/2 to 3 Tons and up to 20 ft. radius.



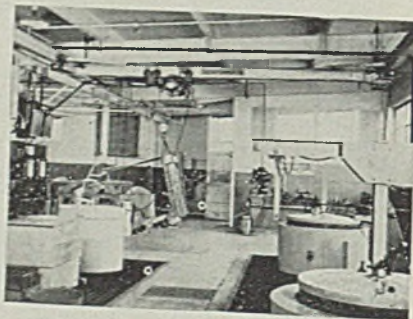
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This strong, self-supporting jib crane swings full 360° in a complete circle. Capacities from 1/4 to 3 tons. Any radius up to 20 feet. Rigid, heavy duty construction for service with hand operated or electric hoist. Built for heavy duty service. Strong welded and heavily bolted construction. When ordering, mention desired height and length of jib.

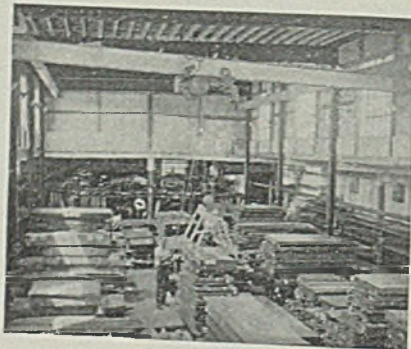


PILLAR TYPE No. 540

A self-supporting crane with 220 degree swing. Capacity up to 3000 lbs. with 14' radius. Furnished with hand or electric hoist, as required.



Chicago Tramrail Overhead Crane operating in Heat-Treating Room.



View of Chicago Tramrail Overhead Crane Installed in Large Steel Warehouse.

WRITE TODAY — Without obligation we will send circular showing new line of Jib Cranes and heavy duty handling units.

CHICAGO TRAMRAIL COMPANY

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ing application of ceiling prices to lump-sum and average price bids and contracts for furnishing fabricated steel bars for concrete reinforcing. The provisions do not change the effect of schedule 159 but define conditions in greater detail.

Pig Iron . . .

Pig Iron Prices, Page 98

Decline in foundry melt is noted in some districts, jobbing foundries producing machine tool castings being especially affected. This is due in part to the fact that these foundries in various instances have run temporarily ahead of tool builders' requirements. Additionally, it appears that some tool builders have less work to do and that in some instances government cancellations have caused revision of castings schedules.

However, most machine tool manufacturers still have substantial backlogs. Some have large foundry facilities of their own which go a long way toward meeting their needs.

Pipe foundries also are tapering operations as military construction, cantonments, air bases and the like, is lessened. Industrial construction has contracted also, restricting demand for soil pressure pipe.

A fair supply of pig iron can be obtained on ratings as low as A-10.

Basic pig iron produced at Provo, Utah, is expected to be priced at \$21.50 per ton, 50 cents under the base now applying on No. 2 foundry. A large tonnage of basic will be supplied from that center when all five blast furnaces are in production. Two furnaces now are in blast and three more will go on at intervals from now to September. A new base for the Kaiser stack in southern California and the one at Daingerfield, Tex., will be established.

Scrap . . .

Scrap Prices, Page 100

Quality of steel and iron scrap has improved somewhat on the average as supplies are larger, though it still is below normal pre-war standards. Much has been learned about using these grades to make good steel, melting practice being adapted to the grade of material available. This may have some

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types

(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80c
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

Mixed Scrap

(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum . . . . .	.30
Millings, turnings, each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum . . . . .	.70

effect on practice in post-war days and cheaper grades may have a better position than in the past because of lower price.

Increased production of alloy-bearing scrap is become troublesome to buyers and closer checks on alloy content are necessary to avoid trouble. This is particularly true in borings and turnings and segregation has been found difficult where various alloys are machined on the same equipment.

Scrap offerings by railroads are much below what had been considered normal, a larger proportion of what formerly was regarded as obsolete being salvaged and reused in place of new material, now difficult to obtain. A leading eastern railroad in 1938 offered about 13,000 tons monthly, increased to 20,500 tons in 1939 and 24,500 tons in 1940. Limitation orders in 1941 cut this average to less than 20,000 tons in first half and 8000 tons in last half. In 1942 the average was slightly over 4500 tons per month. This is characteristic of the railroad situation and indicates the extent to which old material is being reused for repairs.

In the St. Louis area bad weather has further cut into scrap preparation and with steel production continued at a high rate some scrap has been taken from stock piles. Increased demand is encountered for blast furnace grades attributed to blowing in of the second rebuilt stack at Granite City, owned by the Granite City Pig Iron Co., which has capacity of 1000 tons per day.

Buffalo dealers still are swamped by output of machine shop turnings and see little aid from the recent OPA action in cutting the price \$1 per ton. Several plants engaged on war work produce a carload every day.

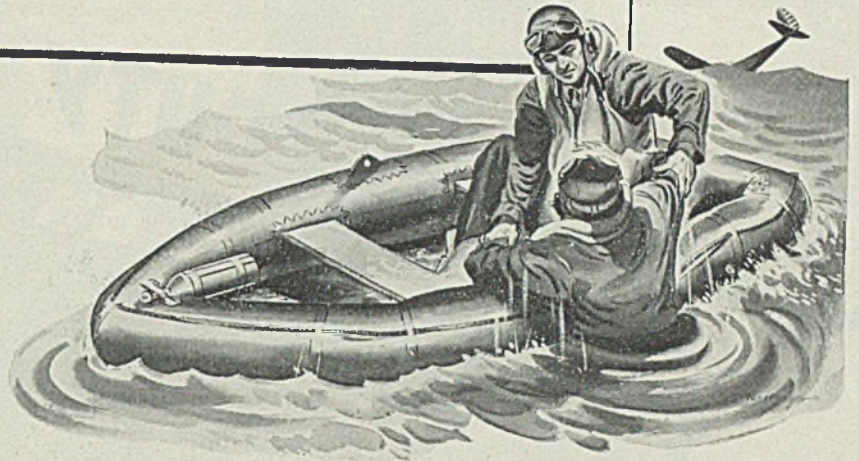
At Cincinnati melters are being supplied sufficient for needs, though weather has hampered preparations. A drive by the American Legion to increase the number of jalopies made available to automobile wreckers is having some effect but is retarded by the cold.

OPA Advances Turnings, Borings To Move Surplus

Maximum prices on machine turnings and mixed borings and turnings have been decreased \$1 per ton and shoveling turnings have been advanced \$1 per ton, effective Jan. 22, by OPA. This is an effort to force preparation of these grades, which have been a burden on the market. The changes are included in amendment No. 10 to price schedule No. 4.

The amendment, in addition to the changes noted above, eliminates charges for crushing machine shop and shoveling turnings. Machine shop turnings are defined as "clean steel or wrought iron turnings (including high-sulphur shell turnings) free of cast or malleable iron borings, nonferrous metals in a free state, scale or excessive oil." Shoveling turnings are defined as "clean short steel or wrought iron turnings (including high-sulphur shell turnings), drillings or screw cuttings." In addition to changes in prices and specifications, the specifications for baled machine shop turnings have been amended to permit inclusion of not over 25 per cent by weight of black sheet scrap for binding or wrapping. Several upward adjustments have been

When fliers take to boats they use a deep-drawn cylinder



This cylinder is only one of many and varied Hackney deep-drawn shapes now in active war service. Not only does deep drawing assure an improved product, but it also effects considerable savings in material, man-hours and equipment.

Fliers forced down at sea use a deep-drawn cylinder to inflate rubberized boats which keep them afloat until rescued. The inflation is accomplished by compressed carbon dioxide stored in the deep-drawn lightweight cylinders.

Here, as in countless other war products, the Hackney deep-drawn process has met the requirements necessary to produce the unit to aviation specifications and meet war urgencies. In common with other parts used by aircraft, this cylinder must be light in weight. Hitherto, it was necessary to machine the cylinder

down to specifications. Time is saved. Material is conserved—and considerable lathe equipment and needed machinists are released for other work.

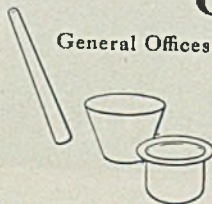
The Hackney deep-drawn process assures uniform side-wall thickness. Electrically controlled heat-treating provides additional strength.

Perhaps your product can use the time- and material-saving advantages of the Hackney Deep-Drawn Process. Hackney engineers have had extensive experience in meeting war requirements for concerns in many industries. They are ready to help you. Write today for full details.

Pressed Steel Tank Company

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Milwaukee, Wisconsin

DEEP-DRAWN
SHAPES AND SHELLS



made in differential between unprepared and prepared grades, increasing it from \$2.50 to \$3.50 on heavy melting steel but making no change in the \$4 differential between No. 1, No. 2 and No. 3 bundles and the unprepared material from which they may be made. The increase was made to cover increased cost of preparation.

Short-cut electric furnace grades have been advanced 50 cents per ton on cut structural and plate scrap and \$1 per ton on cut automobile steel scrap. In the latter grade the three-foot length has been dropped. This scrap has been designated as foundry scrap.

The differential between clean auto

cast and unstripped motor blocks has been increased from 50 cents to \$2.50 per gross ton, accomplished by reducing the maximum price of unstripped blocks \$2 per ton.

No. 1 machinery cast has been eliminated as a listed grade but specifications of No. 1 cupola cast have been altered to permit inclusion of material normally sold as machinery cast.

Warehouse . . .

Warehouse Prices, Page 99

Improved deliveries of steel to warehouses were confined mostly to lighter

hot-rolled products; cold-finished, alloys and heavier hot carbon bars are as tight as ever. A few jobbers getting these in slightly better volume are exceptions. While demand has slackened for some hot-rolled carbon steels, notably structurals and black sheets, inquiry for alloys and cold-drawn material is heavy and most shipments are moving promptly into consumption, adding little to warehouse inventories.

Lists offered by the Steel Recovery Sections, WPB, covering frozen and surplus stocks, include substantial tonnages of structurals and cold strip, but for the most part are composed of odds and ends in bars.

Metallurgical Coke . . .

Coke Prices, Page 97

Kelden Coal & Coke Co., Pittsburgh, has bought 1400 acres of coal land near Greensburg, Pa., and plans to build operations to a maximum of 3000 tons per day. This is a new bituminous project.

Equipment . . .

New York — Revised war production programs often influence machine tool deliveries, changing equipment required for entire plants. For most part revisions center on tooling of new units for production of aircraft or parts. Several plants under construction for one purpose are being converted to other production, requiring an entire change in equipment. New plants with equipment changes affected by conversion, some still under construction, include General Steel Castings Co., Scullin Steel Co., Continental Roll & Steel Foundry Co., and Symington - Gould Corp. Procedure following with a new plant being constructed by Symington-Gould Corp., Rochester, N. Y. is illustrative and typical.

Late last year a study of the Symington-Gould plant for the ordnance department indicated its production of tank armor castings would not be needed in the revised 1943 production program and an order was sent to the Symington-Gould Corp. and to the Defense Plant Corp. ordering a suspension of activities. It was determined that the Air Corps could use the released facilities and the plant became a part of the Air Corps production network. In view of time required to make necessary financial and contractual changes, it was determined to lift the suspension order on construction and the Ordnance Department went ahead with its own construction contract, although the completed plant was to become an Air Corps facility.

Iron Ore . . .

Iron Ore Prices, Page 99

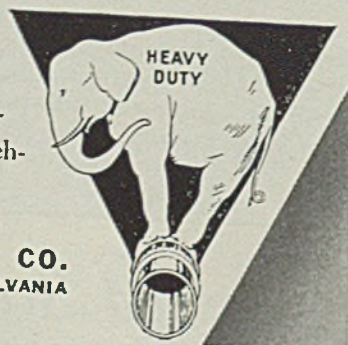
Consumption of Lake Superior iron ore in December by furnaces in the United States totaled 7,540,841 gross tons, compared with 7,227,497 tons in November and with 6,863,450 tons in December, 1941. Canadian furnaces in December smelted 218,525 tons, making a total of 7,759,366 tons, according to statistics of the Lake Superior Iron Ore Association.

For the entire year, 1942, furnaces in the United States consumed 83,714,451 tons and Canadian furnaces 2,511,018 tons, for a total of 86,225,460 tons. The

**WHEN IT'S HEAVY DUTY
RIDE THE LOAD ON
AMERICANS!**



In continuous, 24-hour-a-day use made necessary by war production, heavy duty equipment will stand the gaff only if the bearings function flawlessly. AMERICAN SUPER HEAVY DUTY Roller Bearings are built with the vital extra capacity to take it. They will keep your heaviest equipment producing for war with minimum downtime. Consult our engineers for full technical facts.



**AMERICAN ROLLER BEARING CO.
PITTSBURGH PENNSYLVANIA**

Pacific Coast Office: Edward D. Maltby Co.
1718 S. Flower St., Los Angeles, California

**AMERICAN
Heavy-Duty ROLLER BEARINGS**

latter figure compares with 76,335,682 tons in 1941

Ore on hand at furnaces Jan. 1 totaled 39,277,113 tons in the United States and 1,326,437 at Canadian furnaces. Ore on Lake Erie docks in the United States at that date was 6,820,871 tons, total stocks being 47,424,421 tons. This compares with 53,703,458 tons a month earlier and 40,456,893 a year earlier.

Blast furnaces in production Jan. 1 numbered 175 in the United States and nine in Canada, compared with 172 and nine a month earlier and 169 and seven a year earlier. Idle furnaces in the United States Jan. 1 numbered seven against ten a month before and 12 a year before. Canada had no idle furnaces.

Semifinished . . .

Semifinished Prices, Page 96

To ease the situation in bars additional semifinished steel has been diverted to bar mills the past few months, resulting in some shortage for other uses. Pressure is growing for rounds for seamless tubing and in some cases supply of billets has been unsatisfactory. Negotiations have been going on between the industry and WPB and it is believed an adjustment may be expected soon.

Most consumers of wire rods report inventories are adequate. Non-integrated pipe mills have been fairly well supplied with skelp and lighter demand for export has eased the situation on slabs and forging billets. Practically all forgings producers now are well supplied with semifinished.

Steel in Europe . . .

London—(By Radio)—Higher coke prices are expected in Great Britain as a result of a slight increase in coal prices, but this is not believed sufficient to have effect on the rate of steel production. Larger output of some steel products is required for war purposes.

Magnesium Alloy Steel Prices Are Revised

Specific maximum dollars and cents prices for magnesium scrap and remelt magnesium ingot have been established by Office of Price Administration in a regulation designed to supplement a recent WPB order requiring segregation of such scrap.

Prices of these materials have previously been fixed by general maximum price regulation at the highest price charged by the seller during March, 1942, but this is deemed by OPA no longer adequate as a basis. Magnesium scrap heretofore sold has seldom been segregated as to alloy and has been contaminated to a considerable extent by other metals. Ingots from unsegregated scrap has been far below specifications of commercial alloys and unsuitable for direct use.

Prices of March, 1942, are unsuitable as in that month magnesium scrap was unsegregated and only one low-grade type of remelt ingot was produced. The new regulation is based on prices prevailing in October, 1941, and March, 1942, but modifies and adapts those prices so as to supplement the WPB segregation program.

January 25, 1943

PAGE for Wire



Yes

It's "PAGE FOR WIRE" for America at war—just as it will again be "PAGE FOR WIRE" for peace-time production.

Currently PAGE mills are at capacity for the needs of the armed forces—and for industries on war production.

HOW ABOUT PEACE?

How about peace? PAGE considers that, too—but no wishful thinking is permitted to interfere with the one job today; which is to win this war.

In war and peace, wire is the business of PAGE.

- General Wire** Spring wire, Bond wire, Telephone wire, etc.
- Shaped Wire** Half-round, triangle, hexagon, octagon, keystone, channel, etc., in diameters up to 3/8", end section areas to .250 sq. inches.
- Stainless Steel Wire** Shaped as above and round.
- Welding Wire** Stainless Steel in a range of analyses and diameters from which it is easy to choose the electrode of correct size and that will provide a deposit equal to the Stainless being welded. Also electrodes for welding all other steels—all electrodes being handled by local PAGE Distributors.

TODAY steel for any purpose is hard to get. And mills are jammed. So we continue to suggest buying wire carefully and using it carefully. If under these all-out war conditions you are planning things that must wait for production on peace, you will find us more than able and willing to help work with you on any of the jobs that call for the use of wire.

PAGE WIRE

PAGE STEEL AND WIRE DIVISION

Monessen, Pa., Atlanta, Chicago, New York, Pittsburgh, San Francisco

In Business for Your Safety



AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT • CONNECTICUT

Pacific Coast . . .

Seattle—The reinforcing market is flat, with backlogs out of the way and no new business developing. Rolling mills are operating to capacity on merchant bar tonnage for which there is a steady demand, most orders on AA-1 priorities. Heavy ship construction accounts for this movement, mills having sufficient business to carry through first quarter. Fabricating shops, having completed the heavy schedules of 1942, are now again in the market, although some are still fully engaged in army and navy work. Plate shops and small machine plants are all well booked, mainly on subcontracts from shipyards. This phase is promising under the program of doubling

the 1942 output of deep sea tonnage this year.

Cast iron pipe agencies report business slow, due to priorities. Many housing projects are under construction but scarcity of cast iron pipe has caused the use of substitutes in many instances. Municipal requirements are extensive but cities as a rule have postponed improvements until after the war. Some small lots are moving out of stock but no projects of major importance have developed.

The warehouse situation is improving and new regulations have materially eased deliveries. The movement from mills is easier but jobbers have little opportunity to rebuild stocks as materials go to the job almost as quickly as they

are received. All items continue in strong demand.

The new preference rate of AA-2X for logging and sawmill equipment is giving relief to the lumber industry, which is confining its replacements to maintenance and repairs in the face of a heavy operating schedule. The recent regulations will particularly assist small mills and logging companies.

Pacific Northwest public works awards in 1942 established a new high, although totals were not released. It is known to exceed 1941 with \$215,902,098, which in turn was a 100 per cent increase over 1940.

Announcement from Washington states that Defense Plant Corp. has authorized \$700,000 for increased plant facilities for the Columbia Steel Castings Co., Portland, Oreg.

Tacoma has called bids Jan. 28 for fabricating surge tanks and welded steel pipe tunnel, shaft liners and penstocks LaGrande powerhouse, Nisqually project. Tonnages are unstated. Pacific Car & Foundry Co., Seattle, has taken 150 tons shapes involved in the same job.

Seattle has obtained priorities which will permit completion of the Spokane street viaduct, designed to relieve traffic congestion to the shipyard area. For this purpose 845 tons of structurals and 750 tons of reinforcing have been released.

Washington state will receive bids Jan. 27 at Olympia for sale of 3720 tons of steel salvaged from the Narrows bridge. Seattle has reached an agreement with War Materials Inc. for removal of 18,000 tons of street car rails. Under this contract the city will remove 2500 tons for which it will receive \$46.50 per gross ton and assume the cost of repaving. The remainder of 7500 tons will be taken up by the corporation in payment for which it will recondition the affected thoroughfares.

Following the visit to the Bandon, Oreg., area of Earl K. Nixon, WPB technician, it is reported that a sponge iron plant will be established, using the Brassert process, the ore to come from plants already in operation. Proposed Brassert plant would have capacity of 1000 tons daily. In the same area more than one million tons of magnetite have been blocked out and drilling has also revealed presence of chromite or chromite oxide, ilmanite and zircon. Car load samples of iron ore from Sac Scappoose, Oreg., have been forwarded to Cascade Locks, Oreg., and to Utah where Bureau of Mines will test and analyze it. Grand Coulee generators developed 900% more power in 1942 than in 1941. 92% of the output being absorbed by war industries. Four new generators will be installed this year and production is expected to double that of last year.

Aside from housing projects, U. S. engineers are handling the major contracts in this area, several major awards having been made this month for buildings and facilities, while others are under negotiation. American Steel & Wire Co. will furnish fences and gates at a project in Benton county, Oreg.

Canada . . .

Toronto, Ont.—Facing the possibility of serious shortage of iron and steel for urgent war production, as the result of closing of steel mills at Sydney, N. S. and Sault Ste. Marie, Ont., which has cut off upwards of 65 per cent of Canada's steel output and more than 54 per



Fusing Bauxite to produce Lionite

ABRASIVE grains are essential materials. They must be conserved as a vital war necessity. But with the demand for higher and higher production, conservation is sometimes sacrificed for speed.

Many manufacturers find, however, that by using NB Lionite for their polishing wheels they get from 25% to 100% more production per wheel. They not only conserve vital material but increase production as well.

NB Lionite is an ideal abrasive to use with cements. Its polyhedral shaped grains with their tough, sharp, cutting points are free from non-productive flats and slivers. They cut fast and wear down slowly.

Aircraft engines, propellers, ordnance material, range finders and innumerable other war supplies are getting to the battle fronts faster because of NB Lionite. Our entire capacity is devoted to producing abrasives for war industries and we welcome the opportunity of increasing the production of those companies not now using NB Lionite. Send us your inquiry.

GENERAL ABRASIVE CO., INC.
NIAGARA FALLS, NEW YORK U. S. A.



Nonferrous Metal Prices

Copper				Straits Tin,	
Electro,	Lake,	del.	Castings,	New York	Futures
Jan.	Conn.	Midwest	refinery	Spot	
1-21	12.00	12.12½	11.75	52.00	52.00

F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper

Sheets		
Yellow brass (high)		19.48
Copper, hot rolled		20.87
Lead, cut to jobbers		9.75
Zinc, l.c.l.		13.15

Tubes		
High yellow brass		22.23
Seamless copper		21.37

Rods		
High yellow brass		15.01
Copper, hot rolled		17.37

Anodes		
Copper, untrimmed		18.12

Wire		
Yellow brass (high)		19.73

OLD METALS

*Dealers' Buying Prices
(In cents per pound, carlots)*

Copper		
No. 1 heavy		9.25-10.00
Light		7.25- 8.00

Brass		
No. 1 composition		8.50- 9.00

Lead	Lead	Zinc	Alumi-	Anti-	Nickel
N. Y.	East	St. L.	num	mony	Cath-
	St. L.	St. L.	99%	Amer.	odes
6.50	6.35	8.25	15.00	14.50	35.00
Yellow brass castings					5.50- 6.00
Auto radiators					6.12½-6.62½
Red brass, borings & turnings					8.00- 8.50
Zinc					
Old					4.75- 5.00
New clippings					6.00- 6.50
Aluminum					
Clippings					9.75-10.25
Cast					8.75- 9.25
Pistons					8.50- 8.75
Sheet					8.75- 9.25
Lead					
Heavy					4.75- 5.25

Mixed babbitt	5.35- 5.50
Electrotype shells	5.00- 5.50
Stereotype, Linotype	6.00- 6.75

Tin and Alloys

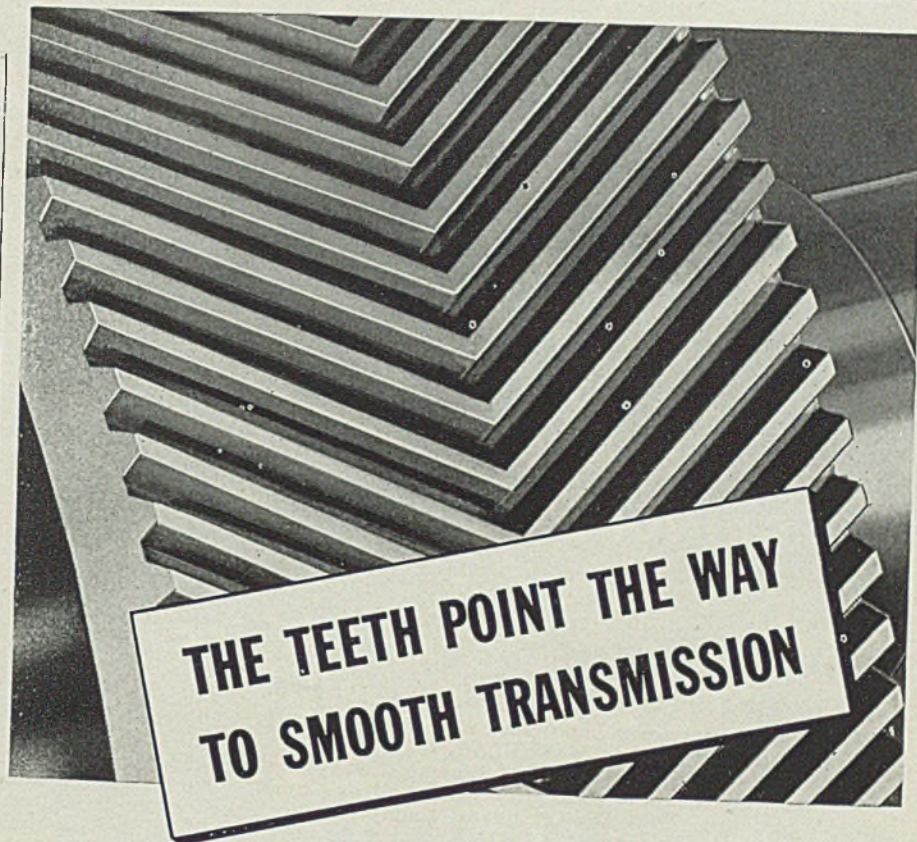
Block tin pipe	44.00-46.00
No. 1 pewter	32.00-36.00
Solder joints	7.75- 8.50

SECONDARY METALS

Brass ingot, 85-5-5, l.c.l.	12.50
Standard No. 12 aluminum	14.50

MAGNESIUM

(12 pound rod, 4 in. diam.)		
99.8% ingot, carlots		22.50
100 lb. to carlots		24.50
Extruded sticks, ¼ to 2 lb.		
Carlots		32.00
100 lb. to carlots		34.00



cent of pig iron production, a flood of new orders has poured into the market. While some war plants have enough steel on hand to take care of requirements for as much as six weeks others already are awaiting delivery of fresh stocks. The demand that developed in the past week was for a widely diversified list of finished and semifinished steel, and much of the business was directed to producers that have not been affected by the strikes. If an immediate settlement of the labor troubles is reached, there still will be a loss of approximately 100,000 tons of steel, as it will take several days after resumption before mills again can reach full production.

Large orders for sheets appeared in the past few days, with a couple of orders ranging above 500 tons, while orders for lots up to 100 tons were numerous. Supplies of galvanized and black sheets still are being made available in small quantities for essential civilian needs.

Demand for merchant bars has taken a sharp upswing and numerous orders came from users who now are beginning to run low on inventory. High carbon and alloy bars continued strongly favored, with most buying directly associated with the war effort. Interest in soft steel bars is steady and some good orders have appeared since the first of the year.

Interest in merchant pig iron has increased sharply while actual deliveries have started to taper. With Algoma Steel Corp. off production, the brunt of demand for foundry and malleable iron has fallen upon Canadian Furnace Co., the only entirely merchant furnace operator in Canada. It is estimated that stock piles of pig iron at all furnaces do not exceed 40,000 tons. Current consumption of foundry and malleable iron is approximately 7000 tons weekly, indicating production is less than half actual needs.

Scrap iron and steel receipts again were brought almost to a standstill as the result of snow throughout Ontario, which added to transportation problems.

... — where speeds are high, where smooth operation is required and where quietness is a factor, Horsburgh & Scott Herringbone Gears are ideal. Sykes type, continuous, double helical teeth give increased bearing surface and greater resistance to wear. They meet the most exacting requirements and provide the smoothest known means of transmitting power between parallel shafts.

Send note on Company Letterhead for 488-Page Catalog 41

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

Workers' Transportation

(Concluded from Page 17)

service he expects to use in getting to and from work when his tires are worn out or the auto is no longer available.

e—The final items of information requested in the survey form showed the volume of cross-traveling by requiring the worker to give the name of any of the company's plants which might be nearer his home. In addition, the questionnaire asked whether the employe would be willing to transfer to the nearer plant to do similar work if transportation to his present job becomes serious.

When the questionnaires had been completed they were ready to be machine tabulated. The results of the sorting and tabulating were recorded on the summary sheets. For each plant, a separate summary sheet was prepared for each method of transportation, by zones. Theoretically it was possible to have 594 of these sheets for each plant—the number of zones (99) multiplied by the number of methods of transportation (6)—but the actual number was only a portion of the maximum; for, obviously, not all methods of transportation were in use from all the zones, nor were there employes in all of the plants liv-

ing in all the county's 99 zones.

The summary sheet for employes of Duquesne works traveling from zone 38 by automobile, presents the following facts: Six men make up the group, four of whom work steady shifts and two of whom work rotating shifts. Five live less than a mile from the street car line, while one lives less than a mile from a bus line. One lives between one and two miles away from the bus, one lives over two miles from the bus, and three live more than two miles from the railroad station. According to the spaces marked 1A, 1B, and 2, five cars are now being used to transport these six workers. Two men ride by themselves, one rides with one other man, and two ride with two other men. These five cars are now carrying ten people. They could carry thirteen more, making a total of twenty-three people for the five cars. Three have indicated that they will be commuting by street car within a year, and four have expressed a willingness to transfer to another plant closer home. Starting times and finishing times are indicated at the bottom of the summary sheet. Of these six men, two start work between 7:00 and 7:29 a.m.; three start between 8 and 8:29; one starts between 8:30 and 8:59. One finishes work between 3 and 3:29 in the afternoon; one between 3:30 and 3:59; one between 4 and 4:29; and three between 5 and 5:29.

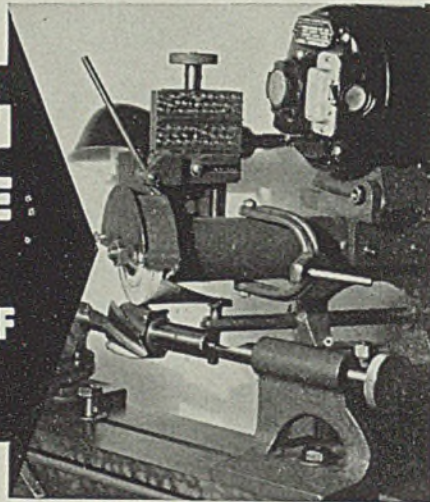
In summarizing the pattern of travel in each of the 99 zones relative to all the plants and the Pittsburgh general offices of the company, the transportation work sheet was used. In filling out this form the zone number is placed in the large circle in the center under the large word "Zone." The numbers in the small circles on the arrows converging on the larger circle showed "the critical groups" employes riding to work in automobiles.

Can Increase Public Transport

The transportation work sheet (illustration) shows the travel pattern for zone 56. It will be noted, from the number in the heading for each plant, general office and "Total" sections that two men work at Edgar Thomson Works, one at Homestead Works and 13 at Schoen Steel Wheel Works. Of these 16 men who live in zone 56, one man walks all the way as indicated in line "A" of the section headed "Total." Of the remaining 15 men in zone 56, three are using public carriers—the sum of lines "C," "D," and "E" in this section; and 12 are riding in or driving private cars—line "B." As shown in the summary section in the extreme lower right-hand corner of the transportation work sheet, a potential increase of 400 per cent in the use of public carrier transportation is possible.

When the 99 work sheets, one from

**LENGTHEN
TOOL LIFE:
WITH
CIRCULAR RELIEF
GRINDING!**



ONE MACHINE and ONE OPERATION Does The Whole Grinding Job!

Today it is of paramount importance to save both tools and time. CIRCULAR RELIEF GRINDING can make your tools last longer, and simplify your grinding operations, too. This new grinding method requires but ONE MACHINE and ONE OPERATION. By following the contour of the tool, no precious metal is needlessly cut away. Result: Fewer grindings needed, time is saved and tools last longer. Send for circular and get the whole story. You'll be glad you did!

Here's Why Tools Last Longer When CIRCULAR RELIEF GROUND:



Note from diagram how CIRCULAR RELIEF GRINDING follows curve of tool, grinds right up to cutting edge and does not cut away valuable metal supporting the cutting edge.



CLEVELAND
TOOL ENGINEERING COMPANY
9114 DETROIT AVE. • CLEVELAND, OHIO

each zone, had been completed and assembled the survey was complete. The information contained in the four forms used provides information which, with data furnished by other companies and groups, will provide a definition of the transportation problem in Allegheny county and a basis of facts for a realistic approach to its solution. From this information, presenting a silhouette of the internal transportation problem within Carnegie-Illinois units, the Office of Defense Transportation can develop an over-all plan for the adjustment of the transportation problem as a whole or phases of it as these appear to be in danger of approaching a critical point.

This type of survey breaks down the pattern of the habitual flow of people within a geographic area into the three constituent elements—space, time and time-space relationships—inherent in any consideration of transportation problems.

The first of the elements in the transportation problem is the item of space. A survey such as the one conducted by the Carnegie-Illinois tends to clarify the elements of space by indicating the amount of passenger room not now being used in private automobiles. The measurement of excess automobile space, combined with a complete inventory of all excessive space in available public carriers, determines the maximum number of persons that can be "hailed" if the use of all available space were 100 per cent efficient.

Future Important Factor

The second element, time, involves both static time, which for the purposes of the transportation problem is a 24-hour cycle and future time. The consideration of static time involves measuring both the time it takes individuals to travel to and from their work and the demand for transportation as it is divided over the 24 hours of the day. As regards future time, the trend of diminishing excess space in public carriers must be determined relative to the full use of automobiles through "swap-ride" arrangements; relative to the decreased use of the automobile through general car and rubber deterioration, or gas or other rationing restrictions; and also relative to the factor—more significant in "war boom" communities—of population changes due to plant expansion on the one hand and plant shutdowns on the other.

The third element, the space-time relationship may be stated as a question: "Is there at any given time in the 24-hour cycle, or at any given time in the future, sufficient space to meet the demand for space at that time?" Effective solutions to phases of the transportation problems as they develop depend, therefore, upon the correlation of such meas-

ured factors in the transportation survey as the location of a worker's home within reasonable or unreasonable distances from utility zones; his travel time to work; the saturation points for space in public conveyances and automobiles; and the unexpended life of workers' cars.

The problem of employes going to and from their job is of vital concern to the efficient operations of industrial plants. If this problem is to be solved before the critical point is reached, surveys of worker groups must first be conducted so that all the elements involved in the transportation pattern may be measured. Such surveys, in order to

effect an answer to the transportation problem of any locality, must be combined and considered as an integral survey. The answer to the problem cannot be effected by any individual company, but rather on a community-wide basis.

For this reason Carnegie-Illinois conducted its transportation surveys so that the results can be utilized by the Office of Defense Transportation. This federal agency and the local branches are charged with the function of maintaining and adjusting present systems of transportation against breakdown and against the threat of hindering war production.



The advertisement features a central illustration of a ram with large, curved horns, standing on a rocky outcrop. The background is a dark, textured surface with a repeating diamond-plate pattern, characteristic of Inland Steel's floor plates. The text is arranged in a clean, professional layout with varying font sizes and weights to emphasize key information.

**Men and Trucks Move
Faster and Safer on
INLAND 4-WAY
FLOOR PLATE**

WRITE FOR BULLETIN

INLAND STEEL CO.
38 S. Dearborn St., Chicago, Ill.
SALES OFFICES
MILWAUKEE DETROIT ST. PAUL ST. LOUIS KANSAS CITY

NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries,
Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Job No. 4093: Throttle arm. Malleable iron. Operations, coil press, broach, horizontal mill, sensitive drill, tapper, Parkerize.

Job No. 4094: Bearing retainer, cold-rolled steel, screw stock. Operations, hand screw machine 1 1/2-inch O.D., centerless grind, zinc plate.

Job No. 4095: Shaft and weight carrier, forging, SAE X1335 D.F. steel optional Ford E steel. Operations, normalize, coil press, heat treat, hand screw machine 3/4-inch collet two operations, vertical mill, external grinder, sensitive drill, surface grinder, micro external grinders.

Job No. 4096: Governor flange, casting, Cast Iron SAE No. 120. Operations, turret lathe 3 1/2-inch O.D., lathe, sensitive drill, tapper, hand mill, paint booth and oven.

Job No. 4097: Throttle body, cast iron No. 120. Operations, turret lathe 5 1/4-inch O.D., lathe, sensitive drill, hand screw machine two operations, internal grinder, tapper, parkerize, paint booth and oven.

Job No. 4098: Governor operating lever, malleable iron. Operations, horizontal mill, sensitive drill three operations, four-spindle sensitive drill with tumble jig, tapper, zinc plate.

Job No. 4099: Governor body, cast iron SAE No. 120. Operations, turret lathe 5-inch O.D., vertical mill, sensitive drill, tapper, hand screw machine two operations, spray booth, hydrostatic tester.

Job No. 4100: Balancing arm, forging steel SAE X1315. Operations, forging, coining press, normalize, four-spindle sensitive drill, zinc plate.

Job No. 4101: Cam foot, SAE 1020 cold-head stock. Operations, hand screw machine 1 1/4 x 3/4-inch O.D., lathe, vertical mill, heat treat, centerless grinder, external grinder, polishing stand.

Job No. 4102: Fork riser, steel SAE X1335. Operations, hand screw machine 1 1/2-inch O.D., lathe with collet, heat treat, internal grinder, lapper, surface polisher.

Job No. 4103: Throttle valve shaft, Carpenter No. 5 stainless steel. Operations, hand screw machine 1 1/2 O.D., sensitive drill, tapper, horizontal mill two operations, vertical mill two operations, heat treat, centerless grinder.

Job No. 4104: Hex head screw. Cold-rolled steel screw stock. Operations, automatic screw machine 3/4-inch hex, burr cutoff end, zinc plate.

Job No. 4105: Hex head screw, cold-rolled steel. Operations, automatic screw machine 3/4-inch hex, burr cutoff end, zinc plate.

Job No. 4106: Cam follower sleeve, cold-rolled steel, SAE No. 1315. Operations, hand screw machine 1 1/2-inch O.D., sensitive drill, heat treat, internal grinder, external grinder, chrome plate.

Job No. 4107: Spring pin, steel, SAE X1335. Operations, hand screw machine 1/4-inch O.D.,

heat treat, centerless grinder, zinc plate.

Job No. 4108: Cam follower pin. Carpenter No. 5 stainless steel. Operations, hand screw machine 3/4-inch O.D., heat treat, centerless grinder.

Job No. 4109: Balancing arm pin. Carpenter No. 5 stainless steel. Operations, hand screw machine 3/4-inch O.D., heat treat, centerless grinder.

Job No. 4110: Spring pin. Steel SAE X1335. Operations, hand screw machine 3/4-inch O.D., heat treat, centerless grinder, zinc plate.

Job No. 4111: Stop pin. Steel, SAE 1112. Operations, hand screw machine 3/4-inch O.D., zinc plate.

Job No. 4301: Slack adjuster worm. Order is for 10,000 pieces with more to follow. Delivery 200 to 400 pieces per day. Cold-drawn NAX-HI-Tens., furnished. Priority AA-1. Operations, hand screw machine 1-inch diameter stock, hand mill, center ends, thread mill, lathe or cut-off, drill 1/4-inch brace.

Job No. 4062: Bushing. Material, SAE 4140, furnished, 6700 pieces. Equipment, hand screw machine 1 1/2-inch O.D., four milling operations, external grinder, heat treat, cadmium plate. Tolerance, plus .00025.

Job No. 4045: Cam, 16,500 pieces. Material, steel, available. Equipment, screw machine 1 1/2-inch O.D., sensitive drill heat treat, centerless grinder. Tolerance, plus .001, minus .000.

Job No. 4046: Plunger, 20,000 pieces. Steel available. Equipment, hand screw machines, mill. Tolerance, plus .000, minus .002.

Minneapolis office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:

S.O. No. 260: Aircraft engine parts, valve taps, studs, piston pins, bushings, etc. Grinding operations on most. Close tolerances. Samples at Minneapolis display room.

S.O. No. 309: Part, tube clamp. Facilities, ten-ton press, die making. Quantities, 58,000 in 14 sizes; repeat orders. Deliveries, 40 per cent Jan. 15, 40 per cent Feb. 1, 20 per cent Feb. 15. Tolerance, .010. Material, chrome moly steel 4130, furnished by subcontractor. AA-1 priority. Samples and drawings at Minneapolis office.

S.O. No. 295: Part: Connector, heater fuel line. Facilities, automatic screw machine, 3/8-inch hex x 3 inches. Operations, drilling, reaming, turning, threading. Quantity and delivery not stated. Tolerance, .002, class 3 threads. Material, 3/8-inch hex stainless steel type 416. Part, fuel mixture outlet fitting. Same facilities, operations, tolerance as above. Material, 3/8-inch stainless steel, type 416. Drawings at Minneapolis office.

S.O. No. 311: Aircraft bolts and pins. Facilities, hand or automatic screw machine to 1 1/4-inch. Quantities, 5000 each of 30 sizes. Delivery, soon. Tolerance, class 3 thread. Material on hand by prime contractor.

S.O. No. 312: Part, hydraulic adaptors. Facili-

ties, hand screw machines to 1 1/2-inch. Quantity, 4000 each of eight sizes. Delivery, soon. Materials on hand by prime contractor. Drawings at Minneapolis office.

S.O. No. 313: Cutters, various, counterbore, end mills. Facilities, complete for manufacture of cutters. Quantities, 50 to 5000 of each size. Material, furnished. Prices and drawings available.

S.O. No. 314: Various taper shanks, sleeves, collets, etc. Facilities, automatic screw machines or production setup on single-purpose machines. Quantities, 50 to 5000 of each size. Material furnished by prime. Prices and drawings available.

S.O. No. 315: Ring, 1 1/2-inch O.D. x 3/4-inch. Quantity, 25,000 or more, delivery 6000 per month. Tolerance, .002. Material, brass rod, furnished. Priority AA-1, end use 1.00. Drawings at Minneapolis office.

S.O. No. 318: Engine bed base, 20 1/2 x 12 1/2 x 4 1/2 feet. Facilities, large planer. Operations, three sections fitted together, then machined. Quantity, 96. Delivery, early, urgent. Material furnished, price, open. Drawings at Minneapolis office.

S.O. No. 319: Instruments. Operations, etching or engraving flat calibrations on instruments, 3-inch scale, 1/4-inch. Flat .001 calibrations on verniers. Quantity, 50,000, with deliveries of 1000 per day. Samples available.

S.O. No. 320: Collets, 5C rivets. Operations, cutting, tempering, grinding. Quantities, 15,000. Deliveries to start at once. Material, subcontractor to supply.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-42: Hand screw machine work for machines having 1-inch bar diameter capacity. Also secondary operation of internal broaching, 1/2-inch diameter hole. Length of part, 2 1/2 inches overall. Material, WD3415, supplied by prime contractor. Quantity, 15,000 required at rate of 3000 per week. Reference, 1-A-268.

SC-43: Automatic turret lathe for machining elbows with plain holes and external threads. Two items, 1 and 1 1/2 inches overall. Material, drop-forged steel, SAE X1020, supplied by prime contractor. Quantities, 15,000 of large size, 30,000 of small size at rate of 1000 each week. Reference, 1-F-398.

SC-44: Hand turret lathe having 3-inch diameter bar capacity. Secondary operations of milling, broaching and assembly. Three items ranging in length from 3/8 to 4 inches. Material, SAE X4130 steel, supplied by prime contractor. Quantity, 3500 assemblies, at rate of 300 per week. Reference, 1-A-439.

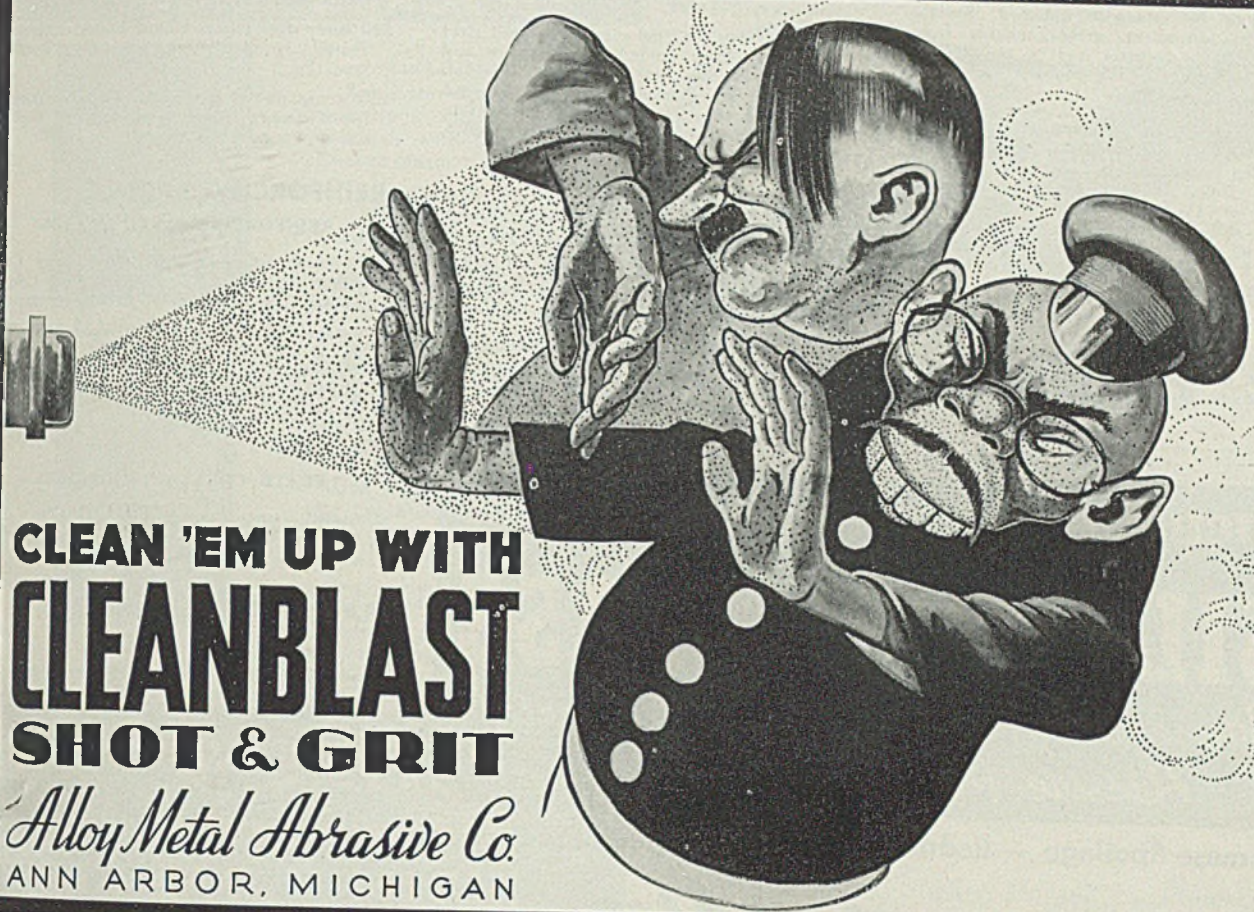
ASC-53: External thread milling machine work for machines having 1 1/4-inch diameter capacity. Naval brass and gages supplied by prime contractor. Class No. 3 ft. Quantity, 5000, to be delivered as promptly as possible. Reference 1-A-506.

SC-54: Surface grinding machine work for machines equipped with magnetic plate suitable for accommodating items up to 10 x 15 inches. Mattison machine or equal is specified. Tolerance, .0003. Material, steel, supplied by prime contractor. About three days work required per month. Reference, 1-A-508.

SC-55: Single or multiple-spindle automatic screw machine work for machines having 3/8-inch diameter bar capacity. Material,

CLEAN 'EM UP WITH CLEANBLAST SHOT & GRIT

Alloy Metal Abrasive Co.
ANN ARBOR, MICHIGAN



CAN'T GET 'EM UP *in the morning!*

It's those luxuriously comfortable
beds at all
DEWITT OPERATED HOTELS

In Cleveland *In Columbus*
HOTEL HOLLENDEN **NEIL HOUSE**

In Lancaster, O. *In Corning, N. Y.*
THE LANCASTER **THE BARON STEUBEN**

Check IN

THEO. DEWITT

PRESIDENT



What is a MICRO-CHEK?

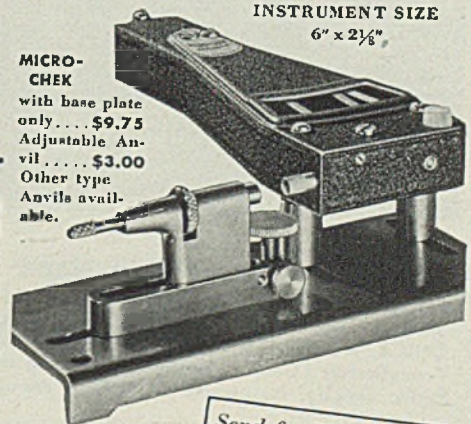
● The Trico Micro-Chek is a new type of comparator gage, used on inspection lines, or at machines, which speeds up the gaging of precision parts. It visually multiplies dimensions by 200. Its big, highly visible indicator greatly reduces eyestrain and fatigue. Its simplicity enables inexperienced workers quickly to become accurate inspectors. Our booklet tells more about its many applications.

WHO USES IT?

More than 1500 war plants and government arsenals—many of which time and again have re-ordered additional scores of Micro-Cheks.

MICRO-CHEK
with base plate
only . . . \$9.75
Adjustable Anvil . . . \$3.00
Other type
Anvils avail-
able.

INSTRUMENT SIZE
6" x 2 1/8"



Send for **FREE** Micro-Chek booklet. Address:

TRICO

TRICO PRODUCTS CORP.
Dept. S, Buffalo, N. Y.

stainless steel, supplied by prime contractor. Cannot be otherwise obtained. Several boxes of instrument screws, ranging from 1/4 to 3/4-inch diameter and 1/4 to 1 1/4-inch long. NF ft. Large quantities each size. Reference, 1-A-507.

SC-56: Single-throw automatic or hand screw machine work for machines having 3/4-inch diameter bar capacity. Length of part 2 1/4 inches. Hole, .161-inch diameter, drilled to depth of 1 1/4-inch. Tolerance, plus .000, minus .001. Hot-rolled steel SAE 3135 supplied by prime contractor. Quantity, 15,000. Weekly requirement 1000. Reference, 1-A-498.

SC-57: Milling machine work for machining parts requiring standard type plain B & S No. 2B or equal, with rigid supports for triplex milling. Tolerance, .0005. Materials and tools furnished by prime contractor.

Miscellaneous items, continuous production. Reference, 1-A-494.

SC-58: Facilities for producing high-speed steel taps with sleeves, ground threads, fluted and spiral points. Sizes, 1/4 to 1 1/4-inch diameter. Quantities range from 50 to 750 of each of several sizes. Probable continuous production. Urgent requirements. Reference, 1-A-514.

STRUCTURAL SHAPES...

SHAPE CONTRACTS PLACED

700 tons, check plates and aprons for door framing for iron ore docks at Escanaba, Mich., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, storage racks for Aluminum Co. of America, Phoenix, Ariz., Defense Plant Corp.

to Converse Bridge & Steel Co., Chattanooga, Tenn.

200 tons, steel piling, United States engineers, Seattle, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, power house, La Grande, Wash., for Tacoma's Nisqually project, to Pacific Car & Foundry Co., Seattle.

REINFORCING BARS...

REINFORCING STEEL AWARDS

1212 tons, extension, Utah Oil Refinery Co., Salt Lake, Utah, to Sheffield Steel Corp., Kansas City, Mo.; M. W. Kellogg contractor.

700 tons, butadiene plant for Wood River Refining Co., Wood River, Ill., to Laclede Steel Co., St. Louis; Stone & Webster Engineering Co., contractor.

PLATES...

PLATE CONTRACTS PENDING

Unstated, surge tanks, penstocks, etc., La Grande, Wash., powerhouse, Nisqually project; bids to Tacoma, Jan. 28.

RAILS, CARS...

BUSES BOOKED

Twin Coach Co., Kent, O., fourteen 41-passenger for Southern Coach Lines Inc., Chattanooga, Tenn.; seven 31-passenger for Syracuse Transit Co., Syracuse, N. Y.; ten 41-passenger for Southern Coach Lines Inc., Nashville, Tenn.; five 31-passenger for British Columbia Electric Railway Co., Vancouver, B. C.; six 31-passenger for New York State Railways, Utica, N. Y.; five 31-passenger for Winnipeg Electric Co., Winnipeg, Man.; one 44-passenger for Georgia Power Co., Atlanta, Ga.

CONSTRUCTION AND ENTERPRISE

MICHIGAN

DETROIT—Haberkorn-Barry Co. has been awarded contract for factory on East McNichols road for Hercules Forge Co. Cost estimated over \$14,000.

DETROIT—Hoover Tool & Die Co., 20550 Hoover road, has been formed with \$100,000 capital to deal in dies, jigs and tools; John J. Paulus, 19100 San Jose, Birmingham, Mich.

DETROIT—Producto Corp., Dime building, has been organized with \$250,000 capital to manufacture all types of machinery; Theodore Sirene, 460 Wimbleton drive, Birmingham, Mich.

GRAND RAPIDS, MICH.—Owen, Ames & Kimball, Grand Rapids, has contract for factory and office building for Haskell Corp., Grand Rapids. Estimated cost \$70,000. (Noted Sept. 21).

GRAND RAPIDS, MICH.—Brummeler Steel Products Corp., 1415 Ionia street Southwest, has been organized to deal in iron, steel, copper and aluminum products; Anna B. Brummeler, 1515 Logan street Southwest.

GROSSE POINTE, MICH.—Renson Tool Co., 15122 Mack avenue, has been formed to design and fabricate tools and metal products; Louis Renzella, 3452 Devonshire.

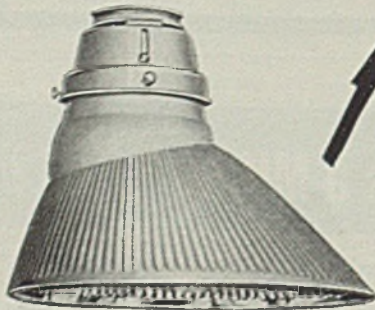
MT. PLEASANT, MICH.—Central Tool & Engineering Co., 710 South Oak street, has been organized with \$35,000 capital to manufacture tools and dies. Correspondent: George Jack Miller, R.R. No. 2, Remus, Mich.

RHODE ISLAND

CUMBERLAND, R. I.—Owens Corning Fiberglass Corp., Railroad street, has let contract

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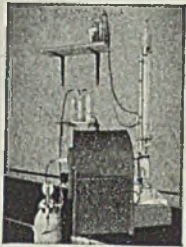
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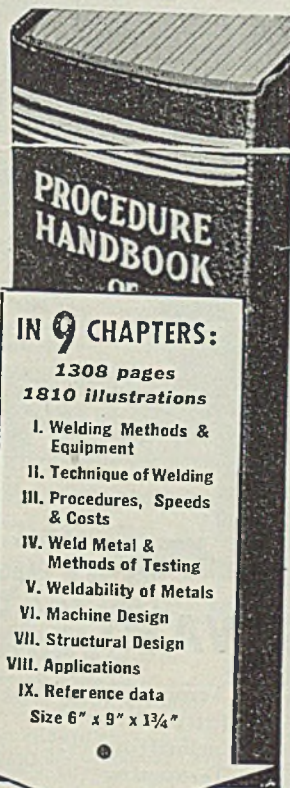
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 - VIII. Applications
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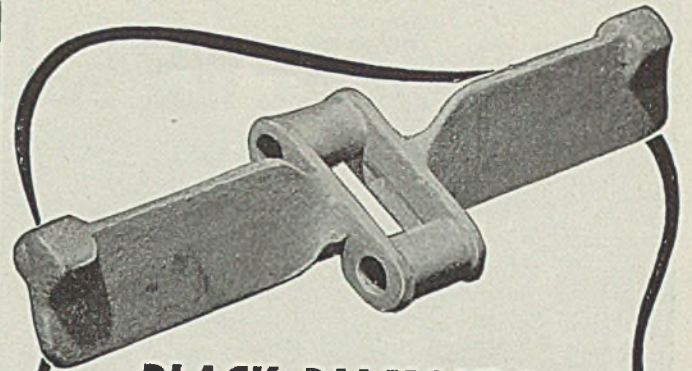
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PROVIDENCE, R. I.—United States Rubber Co., 355 Valley street, has let contract for one-story plant addition to V. H. Collins, 7 Dyer street, Providence.

NEW JERSEY

HILLSIDE, N. J.—G & H Sheet Metal Works, 51 Smith street, Irvington, N. J., plans one-story manufacturing building costing about \$40,000.

NEWARK, N. J.—Industrial company has awarded contract to W. L. Blanchard, 35 Pointer street, Newark, for one and two-story manufacturing plant.

PORT READING, N. J.—Reading Co., A. E. Owen, chief engineer, Twelfth and Market streets, Philadelphia, has let contract for two-story boiler house to U. F. Richard Co., 566 Irvington avenue, Elizabeth, N. J. Estimated cost \$45,000 (Noted Jan. 11).

WEST ORANGE, N. J.—Thomas A. Edison Inc., 51 Lakeside avenue, has plans by Epple & Kahrs Inc., 15 Washington street, Newark, N. J., for one-story shipping building and one-story loading building.

OHIO

AKRON, O.—Atlantic Foundry Co., Charles Reyman, president, 182 North Beaver street, will build \$14,000 addition to foundry.

CLEVELAND—Industrial Rayon Corp., 9801 Walford avenue, is adding about 3000 square feet of floor space in two-story addition costing about \$32,000.

CLEVELAND—Republic Steel Corp., Republic building, is erecting \$16,500 shearing building at 800 Denison avenue Southwest.

CLEVELAND—National Smelting Co., 13500 Daisy avenue Southwest, will build an addition to its foundry. Leo W. Schmidt Inc., contractor.

CLEVELAND—Aluminum Co. of America, 2210 Harvard avenue, Cleveland, and Gulf building, Pittsburgh, has plans for pattern shop and storage building. The company is moving casting division headquarters from Cleveland to Pittsburgh.

YOUNGSTOWN, O.—National Metal Products Inc. is being organized through Marvin Itzkovits, 4021 Mahoning avenue.

PENNSYLVANIA

MONACA, PA.—Koppers Co., Koppers building, Pittsburgh, will operate a new synthetic rubber plant to be completed here this spring.

PHILADELPHIA—Polle Casting Co., 2812-18 Bridge street, has awarded contract for foundry to William K. Jones, 3223 Fuller street. Cost over \$40,000. (Noted Jan. 18).

PHILADELPHIA—Vibration Specialty Co., 1532-38 Winter street, has let contract for machine shop to Federal Homes Improvement Co., 1211 Chestnut street. Cost over \$40,000. (Noted Jan. 18).

SCRANTON, PA.—Wilkening Mfg. Co., 2000 South Seventy-first street, has given contract for manufacturing plant to Henry E. Baton, 1717 Sansom street, Philadelphia. Cost over \$40,000. E. A. Stopper, Liberty Trust building, Philadelphia, architect.

ILLINOIS

CICERO, ILL.—Electrocast Steel Foundry sustained damages to its foundry caused by explosion of molten metal.

MARYLAND

BALTIMORE—Somerset Construction Co., 1126 South Sharp street, has begun erection of one-story structure.

BALTIMORE—Baltimore Steel Drum Co. Inc.,

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CARNEGIE, PENNSYLVANIA

1543 Ridgely street, is erecting an addition to its plant.

BALTIMORE—Johnson & Jansen, 509 South Eden street, manufacturer of auxiliary diesel cylinders, valves and jigs, is adding equipment to handle increasing business.

BALTIMORE—Bendix Radio Division of Bendix Aviation Corp., with plant at Towson, Md., has leased 12,000 square feet of space at Mathews and Twenty-sixth streets, for warehouse purposes.

BALTIMORE—Standard Gas Equipment Corp., Bayard and Hamburg streets, has acquired a one-story building, containing 25,000 square feet, adjacent to its plant, to provide greater manufacturing facilities.

BALTIMORE—Bureau of Yards & Docks, Navy Department, Washington, has awarded contract to Victor Krenkil, 23 North Central avenue, Baltimore, for aviation facilities adjacent to Glenn L. Martin Co. plant.

BALTIMORE—Morrow Bros. Inc., 14 East Eager street, has contract for factory building, No. 3, alterations, Bush and Hamburg streets for American Hammered Piston Ring Division, and for boiler house at Scott & McHenry streets for Bartlett-Hayward Division of Koppers Co.

BALTIMORE—D. & G. Mfg. Co. Inc., which several weeks ago equipped one floor of a building at 23-25 South Gay street for manufacture of metal caps for beer bottles, has recently equipped also an establishment at 5001 Fleet street for cleaning tin plate from used metal containers and preparing it for stamping.

ALABAMA

BIRMINGHAM, ALA.—Fischbach & Moore Inc., 1410 H street Northwest, Washington, has contract for electrification of airplane modification plant now under construction here. Plant is being built by Defense Plant Corp. and will be operated under contract with the United States Army Air Forces

under Bechtel-McCone-Parsons Corp., Los Angeles.

KENTUCKY

LOUISVILLE, KY.—Defense Plant Corp. has awarded contract to Tube-Turns Inc., 224 East Broadway, Louisville, for additional equipment for plant in Kentucky. Cost in excess of \$400,000.

TENNESSEE

NASHVILLE, TENN.—Tennessee Products Co., American National Bank building, has been granted additional plant facilities by Defense Plant Corp.

WEST VIRGINIA

CHARLESTON, W. VA.—Westvaco Chlorine Products Corp., Eastern avenue, is having plans prepared for an addition to manufacturing plant to cost between \$500,000 and \$1,000,000. H. K. Ferguson Co., Hanna building, Cleveland, general contractor.

MISSOURI

KANSAS CITY, MO.—Defense Plant Corp. has authorized execution of contract with Shawhan Distillery Co., 2101 Central, Kansas City, to provide equipment for plant in Kentucky.

ST. LOUIS—Defense Plant Corp. has executed contract with Woodford Distillery Inc., St. Louis, to provide equipment for plant in Missouri.

ST. LOUIS—Neidt Realty Co., A. E. Neidt, president, care of Steelcote Mfg. Co., 3418 Gratiot street, has acquired site for warehouse and factory addition.

ST. LOUIS—McCabe Powers Auto Body Co., 5900 North Broadway, has let contract for one-story factory to A. P. Daly, Syndicate Trust building. Cost estimated at \$40,000 with equipment. C. A. Koerner, Syndicate Trust building, engineer.

ARKANSAS

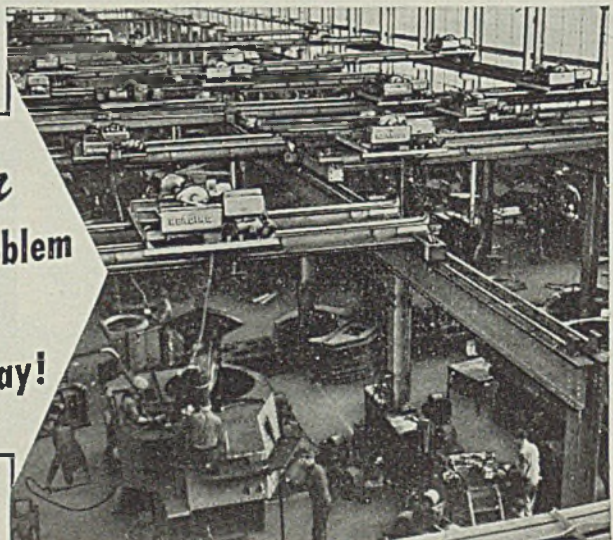
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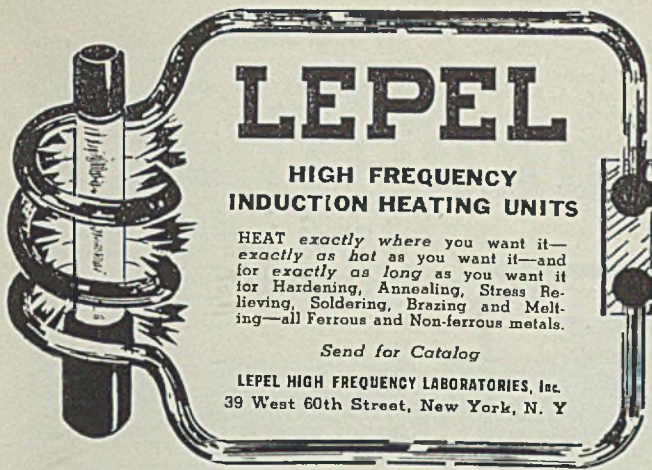
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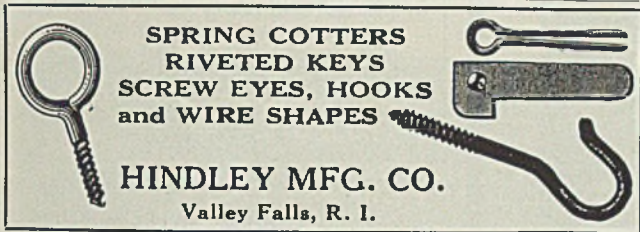
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WISCONSIN

MARINETTE, WIS.—M & M Box Co. has plans by Hubert & Gjelsteen, 1065 Sheridan road, Menominee, Mich., for one and

two-story factory addition.

MAYVILLE, WIS.—Maysteel Products Inc. plans one-story factory addition. A. Kuenzli, Watertown, Wis., engineer.

MILWAUKEE—Milwaukee Valve Co. has begun expansion of its plant.

MILWAUKEE—Thurner Heat Treating Co. has

been issued permit to erect \$15,000 addition.

WISCONSIN RAPIDS, WIS. — Consolidated Water Power & Paper Co. will build addition to factory.

CALIFORNIA

LOS ANGELES—Contract has been awarded for addition to plant of Los Angeles Steel Forming Corp., 1619 South Alameda street.

LOS ANGELES—Industrial company has let contract to Robert E. Millsap, 437 South Hill street, Los Angeles, for plant. Cost estimated at \$71,000.

LOS ANGELES—Earl M. Jorgenson Co., 10510 South Alameda street, has awarded contract for extension to forge and press plant to Myers Bros., 3407 San Fernando road. Approximate cost \$100,000.

OAKLAND, CALIF.—Ralph N. Brodie Co., Sixty-first and Lowell streets, has let contract for one-story factory to W. F. Lynn, 1037 Ashmont avenue. Cost over \$40,000. J. B. Anthony, 2829 Forest street, Berkeley, Calif., architect.

CANADA

ESQUIMALT, B. C.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Keyes Construction Co., 5595 Blenheim avenue, Vancouver, for addition to H.M.C. Drydocks here to cost \$40,000.

GALT, ONT.—Galt Metal Industries Ltd., 385 Dundas street, has received bids and will let contracts soon for plant here to cost, with equipment, about \$25,000.

HAMILTON, ONT.—Hamilton Bridge Co. Ltd., Bay street North, is taking bids for addition to plant to cost about \$20,000.

OWEN SOUND, ONT.—William Kennedy & Sons Ltd., First avenue West, has given general contract to Wells & Gray Ltd., 17 Queen street East, Toronto, for plant addition to cost \$50,000.

PRESTON, ONT.—Clare Bros. & Co. Ltd., King street, has plans for machine shop addition to cost about \$10,000.

TORONTO, ONT.—Canadian Acme Screw & Gear Ltd., 207 Weston road, has given general contract to J. Robert Page, 18 Toronto street, for addition to No. 5 plant here to cost about \$30,000.

TORONTO, ONT.—Dominion Bridge Co. Ltd., 1139 Shaw street, has given general contract to Anglin-Norcross Ltd., 57 Bloor street West, for plant addition to cost \$10,000.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., Sandwich street East, is having plans prepared for further addition to plant here to cost, with equipment, about \$65,000.

AMQUI, QUE.—J. A. Gagnon will erect saw and planing mills here and install equipment at cost of about \$15,000.

CHANDLER, QUE.—Gaspesia Sulphite Co. Ltd., 10 des Capucins boulevard, Quebec, E. M. Little, president, will make improvements and repairs to plant here and install equipment to cost about \$100,000.

LACHINE, QUE.—Dominion Engineering Works Ltd., First avenue, is having plans prepared for further plant addition to cost about \$15,000. Archibald & Illsley, 1440 St. Catharine street West, Montreal, architects.

LONGUEUIL, QUE.—Fairchild Aircraft Ltd. has given general contract to A. F. Byers Construction Co. Ltd., 1226 University street, Montreal, for plant addition to cost \$90,000.

MONTREAL, QUE.—Dowty Equipment (Canada) Ltd., 1010 St. Catharine street West, plans plant here estimated to cost, with equipment, about \$75,000.

MONTREAL, QUE.—Sicard Ltd., 2055 Bennett avenue, is considering plans for plant addition, estimated to cost, with equipment, \$50,000.



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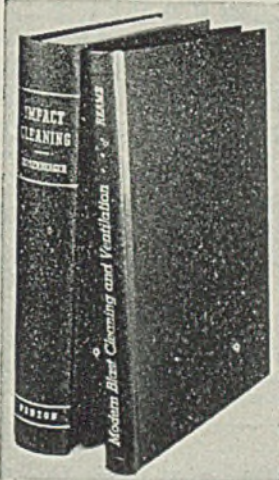
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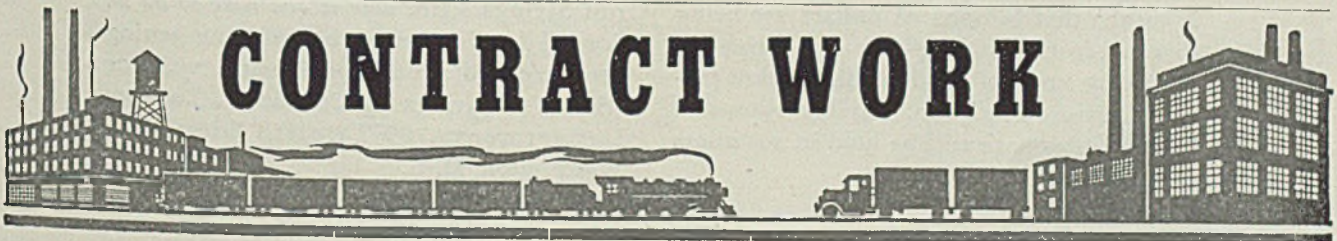
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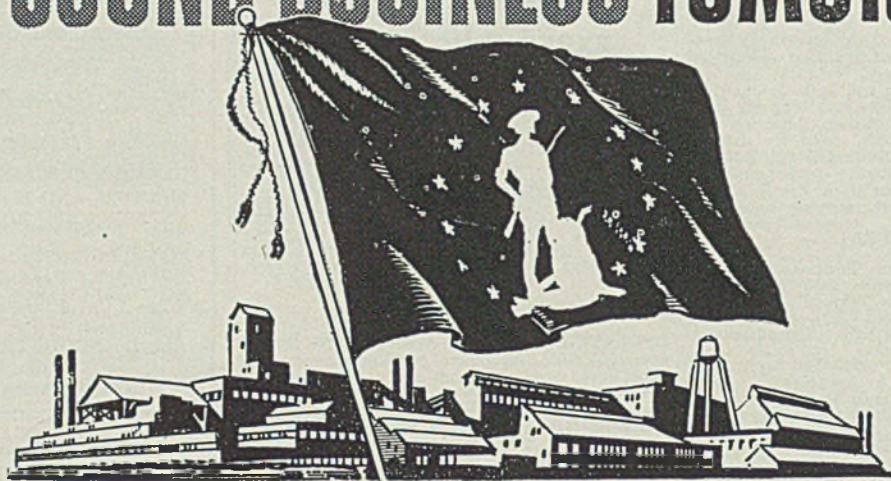
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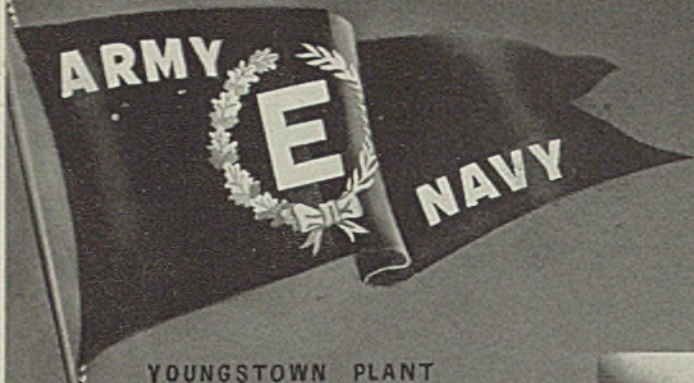
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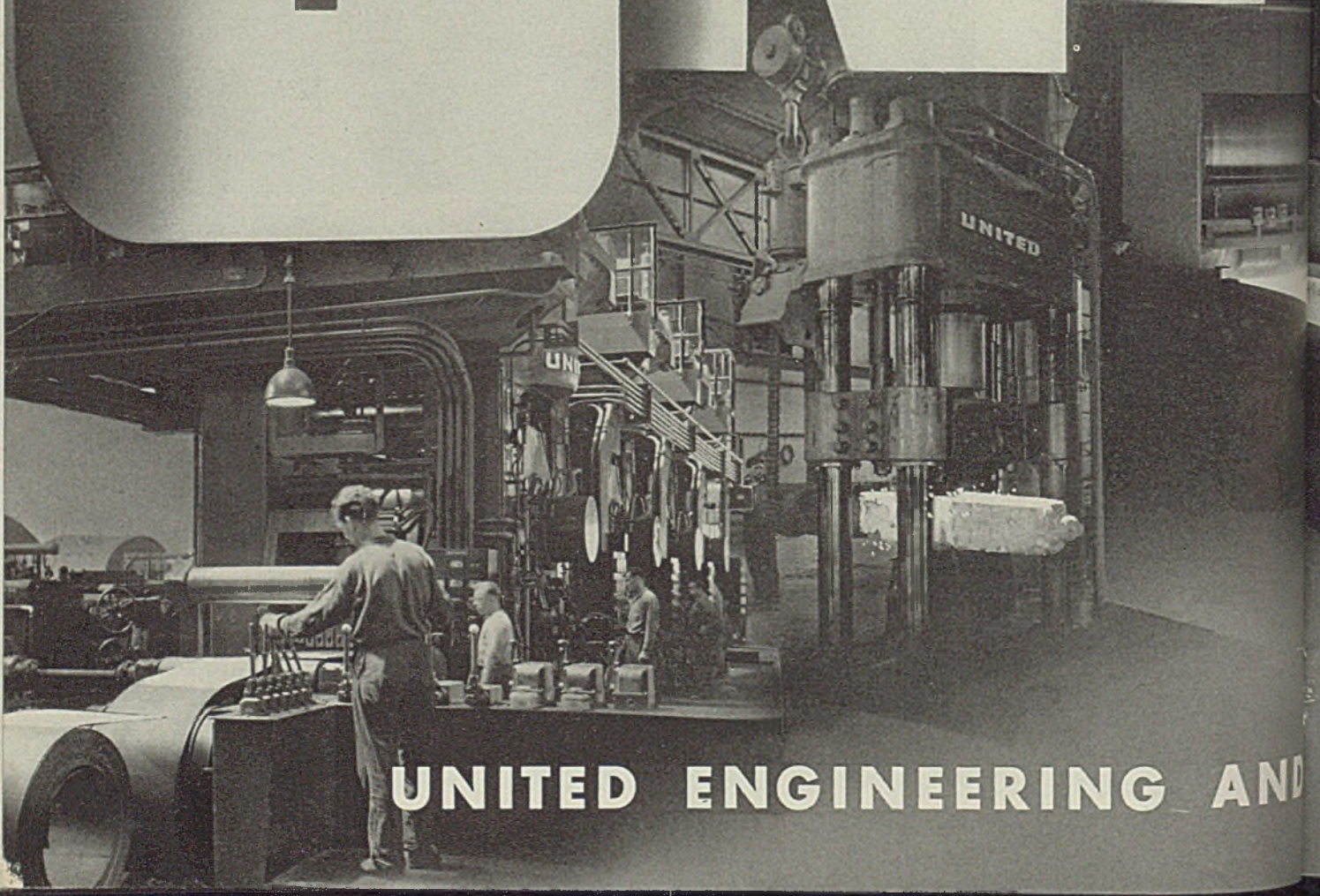
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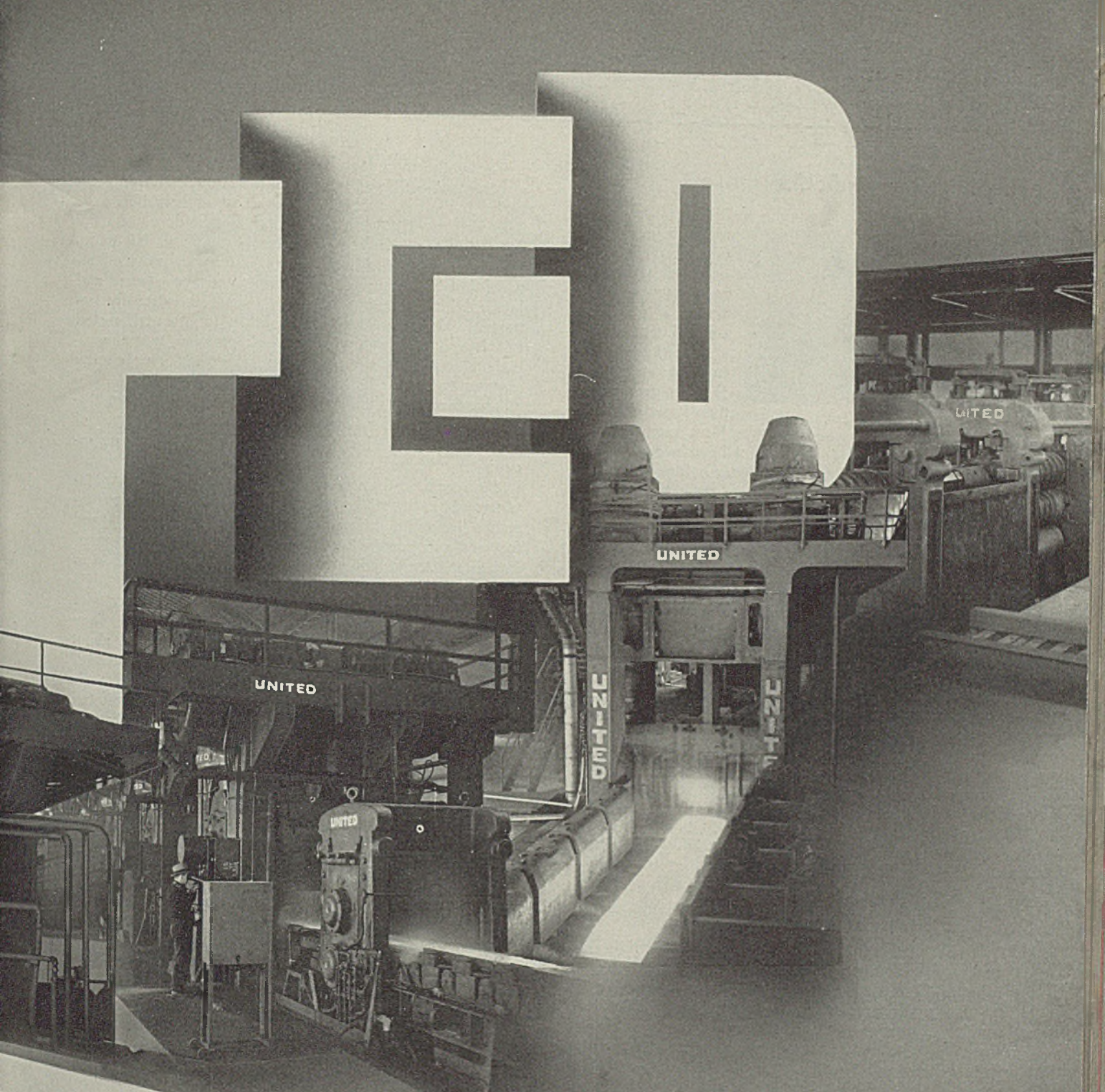


YOUNGSTOWN PLANT

U N I T E D



UNITED ENGINEERING AND



**Complete
Rolling Mill
Equipment**

FOUNDRY COMPANY *Pittsburgh, Pa.*

BEHIND THE SCENES

The Editors' Roundtable



E. C. Kreutzberg, Editor of STEEL

■ Based on a large amount of experience at Washington, over a period of many years, this writer is convinced that industry in general is loser by having less understanding of government than it should have. Most manufacturers have a real fear of

the government; an invitation to appear before a Congressional committee, or a communication from the Treasury Department or Department of Justice is apt to give them the jitters.

It is true that Congress and certain departments of the government are not always predictable—it is true that industrialists on numerous occasions have been subjected to treatment they did not consider fair. It readily can be understood why such men might want to have as little to do with the government as possible and follow a policy of keeping out of the government's sight insofar as that can be done.

Such a policy is not a wise one, particularly in these days when Washington sets up the framework and operates the red and green lights that control business. At a time when a manufacturer has nothing to say as to where he sells his product, when he has nothing to say about prices he charges or that he pays, when he has nothing to say about wages he pays his employes, and when he has little to say about his labor policy, he stands to gain by finding and having friends in the government.

This is all the more true for the reason that government control of business is sure to continue elaborate in the postwar period.

The postwar plans sponsored by this administration are aimed at full employment and high productivity, and prevention of the alternate booms and depressions which formerly featured our economy. Through control of money, through methods of taxation, through a program of government-financed public improvements and by fully using private enterprise, the administration hopes to attain its objective. It is a bold, ambitious plan that challenges full attention from all key men in industry. Its main features are being set forth in the Windows of Washington section from week to week. As it made clear in this series of articles, the plan is the product of men of broad practical business experience, rather than of theorists.

In fact, a profound change has been reflected in Washington over the past year. The war has exploded many of the unsound theories about business that were so widely discussed before Pearl Harbor. There now is a general appreciation of the fact that without our private enterprise system, including both large and small organizations, we could not produce for war as we are. There also is a general appreciation of the fact that we must rely on private enterprise if we are to have full employment and high productivity after the war.

Today the manufacturer will find many friends in the government—if he will only seek them out. He can get a lot of help if he will explain the sort of help he needs. This writer will go so far as to say that he does not know of a single government department that will fail to respond to a bid for friendly, fair attention, provided always that the manufacturer is frank and above-board and lays all his cards on the table. That is extremely important. In most cases where harsh treatment is meted out it usually results from the impression that the recipient has been trying to put something over on the government.

The foregoing holds true in regard to the much discussed subject of renegotiation of contracts. Instead of fearing this as a bug-a-boo which possibly can be escaped by hiding under the bed clothes, manufacturers will do well if they face this thing squarely and voluntarily. It is a strictly business proposition and in no instance has any manufacturer suffered when he has stepped forward and dealt with the government as "man to man" in this matter of adjusting his profits on war work so as to keep them within reasonable limits.

Manufacturers can do themselves and the country a lot of good by seeking out friends in the government. They are to be found in large numbers. A lot is said about the evils of bureaucracy—and a lot of this talk is justified. At the same time when one penetrates behind the bureaucratic mask one finds that bureaucracies are constituted of human beings, men who respond just as quickly to a friendly approach as anyone in business.

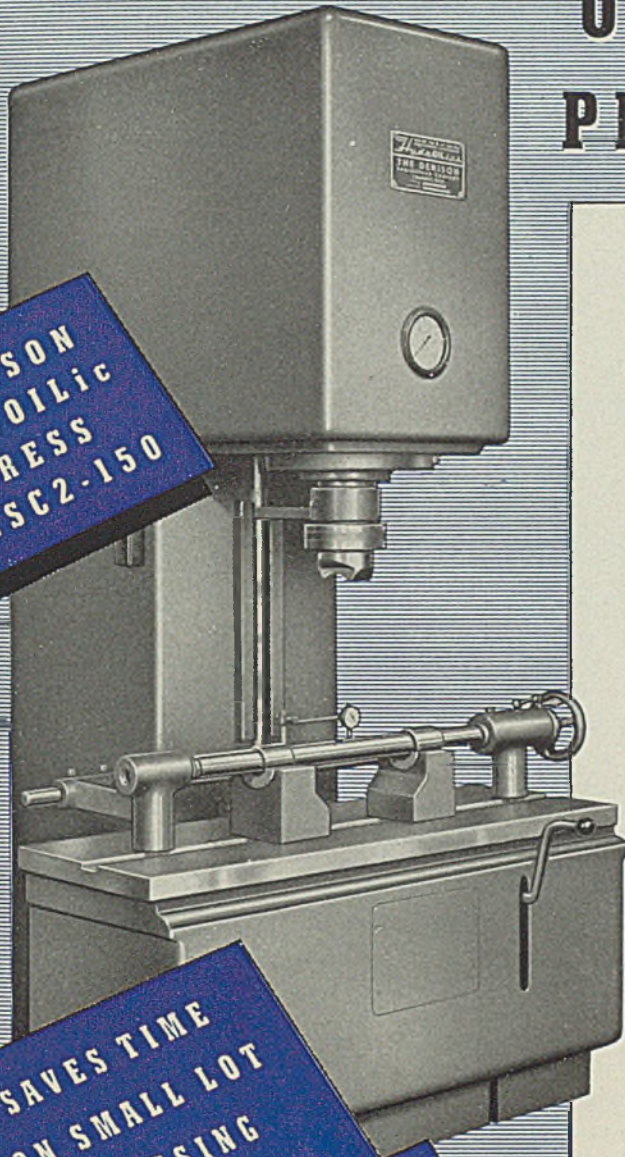
A good many manufacturers have discovered the truth of this statement in recent years. In fact, much of our government personnel of today has been recruited from the ranks of businessmen and manufacturers who originally went to Washington to get acquainted with the government. Men like W. L. Batt, Donald M. Nelson, W. A. Harriman, E. R. Stettinius Jr., Charles R. Hook, W. Gibson Carey Jr.—to mention only a very few. Not to be overlooked is the influence these men have brought to bear in respect to present government attitude toward business.

Rich dividends can be obtained through a better understanding of government!

Thirty Three Years of "Know-How"

■ E. (for Edgar) C. Kreutzberg, editor of STEEL for the past six years and contributor this week to the Editors' Roundtable, knows wartime Washington as few business paper editors do. He has personal friendships of long standing with many an executive now with WPB, OPA and other government agencies. From the time he first joined STEEL's staff back in 1910 Ed Kreutzberg has made it a point to get thoroughly acquainted not only with the industry as such but with the men who make the industry. From Princeton he came to STEEL's New York office from which he covered the eastern section of the country. In 1931 he conducted a National Steelworks Survey, spending six months visiting the steel mills throughout the country. Mr. Kreutzberg came to Cleveland in 1934 as Engineering Editor and was appointed Editor in 1937. More recently he has been spending more and more time in Washington, reporting and interpreting developments of vital interest to the readers of STEEL and at the same time clarifying industry's position with government officials on various phases of the war production program. His present series on postwar planning, the second article of which is under "Windows of Washington" this week, is a particularly timely report which you will not want to miss.

WAR-TIME PRODUCTION SPEED ON ONE-OF-A-KIND PRESSING JOBS!



**DENISON
HydroILic
PRESS
DLSC2-150**

**SAVES TIME
ON SMALL LOT
PRESSING
OPERATIONS**

**ANY PRESSURE
FROM 15 TO 150
TONS WITHOUT
ADJUSTMENT**

The high-speed efficiency which Denison HydroILic Presses show on straight production-line work, can be closely approached on small-lot operations. Operating features of the new 150-ton HydroILic Straightening Press shown here are typical . . . this press enables your operator to select the exact pressure needed for each different operation *without making adjustments* (stroke and pressure limits may be pre-set if desirable). Through a single, "feel-the-action" lever, he has full control of both movement and power of the ram at every stage of the operation . . . the pressure gauge shows him exact tonnage exerted at all times.

When the control lever is released, the ram returns immediately to full daylight opening (or to the pre-set upper stroke limit). Hydraulically held in the up position until the next operation, there's no "drift."


Like all Denison Presses, DLSC2 is fully self-contained. Yet all working parts are easily accessible. This clean-cut, compact press has rounded corners and edges for maximum safety. Ample toe space permits the operator to avoid hazardous leaning.

DLSC2 Presses are available with either hand-lever or footpedal control, or both. Working pressures range from 15 to 150 tons. Four sizes offer maximum capacities of 25, 50, 100 and 150 tons. For complete details, call your Denison representative, or write us today.

The **DENISON**
ENGINEERING COMPANY
1163 DUBLIN RD., COLUMBUS, OHIO



DENISON
EQUIPMENT *in* APPLIED
HydroILic



POWER -packaged for Victory

DEADLY in its compact power—this carrier-based plane provides the sting that makes great naval air victories possible.

"A motor with wings," it has been aptly termed, for a single engine of more than 2,000 horsepower roars this mighty ship to Victory.

Engines of such tremendous horsepower are possible because of new techniques in engineering and manufacture, not the least of which have been the advances made in the Foote Bros. Gears that power them. For an engine of this size—swinging propellers at high speed offers problems in gear design and manufacture that, until a few months ago, might well have been considered unsolvable.

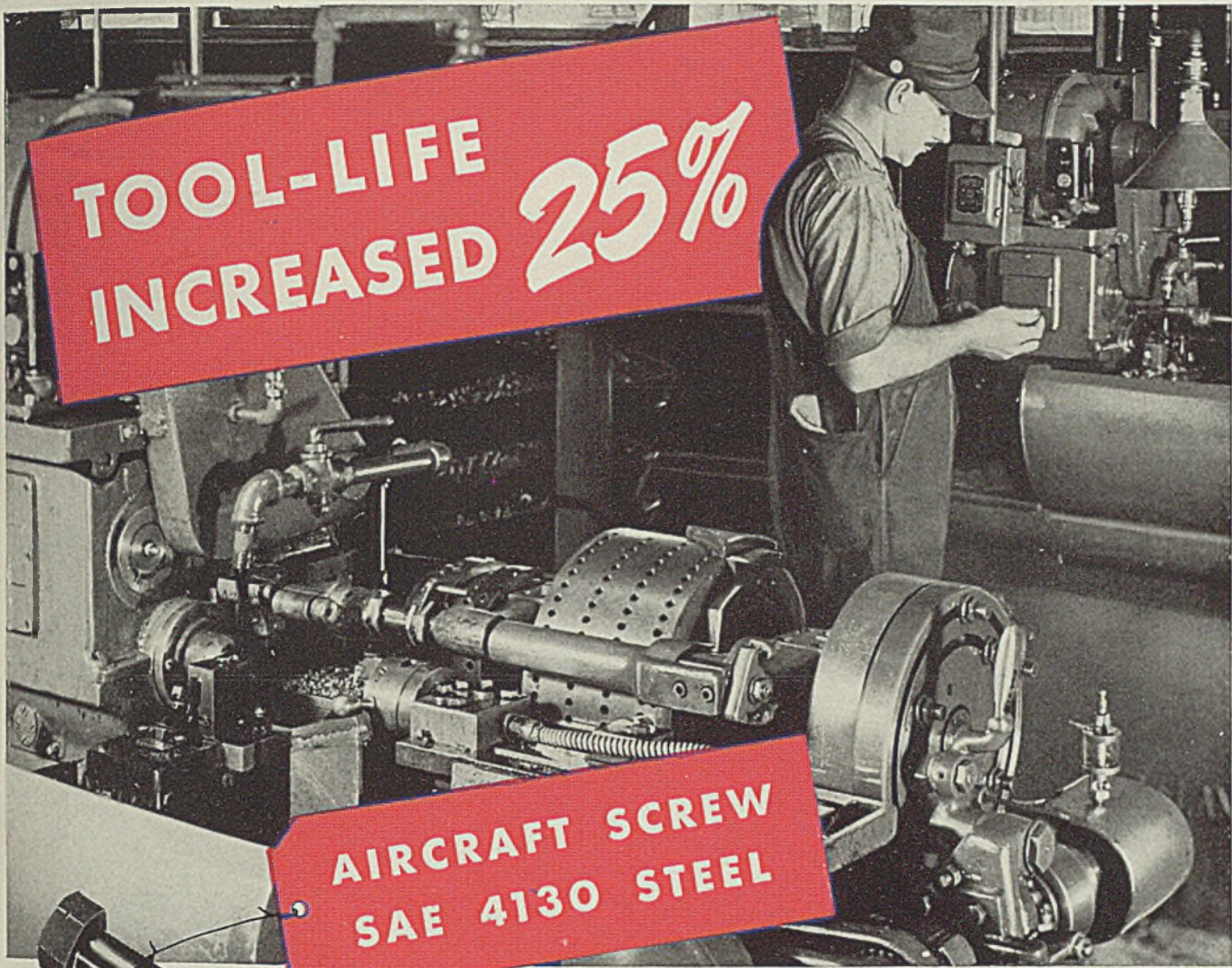
How well these problems were solved is evidenced by the flow of Pratt & Whitney engines rolling off production lines in huge engine plants throughout the country. The extreme precision of the gears is a tribute to the engineering back of them, but even more to the new methods of manufacture that have made their mass production possible.

When the war is won these gears, produced in the Precision Gear Plant of Foote Bros., can be applied to peacetime engines and peacetime machines. Manufacturers are then assured of a new era in the transmission of power through gears and speed reducers—an era of more compact, more efficient machines.

FOOTE BROS. GEAR AND MACHINE
CORPORATION
5301 South Western Boulevard • Chicago, Illinois

FOOTE BROS.

Better Power Transmission Through Better Gears



**TOOL-LIFE
INCREASED 25%**

**AIRCRAFT SCREW
SAE 4130 STEEL**

SAE 4130 aircraft screw $\frac{3}{8}$ " hex. head, $\frac{3}{8}$ " body, 2" long, threaded 1" on Model B Cleveland Single Spindle Automatics. Tool-life increased 25% . . . using *Texaco Sultex B*.

CHANGING cutting coolants on this job of machining Molybdenum steel aircraft screws produced as good a finish, but TOOL-LIFE increased 25%.

The cutting coolant that made this substantial improvement was *TEXACO Sultex Cutting Oil B*.

This is one more instance of the fact that the selection of *Texaco Cutting Oil* not only can increase tool-life, but by keeping down the heat, can prevent chip welding, improve finish, reduce tool adjustment, minimize spoilage.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred by prominent users in the metal-cutting field.

Texaco users enjoy many benefits that can also be yours. A Texaco Engineer specializing in cutting coolants will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

THEY PREFER TEXACO

- ★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.
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- ★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.
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**TEXACO Cutting and Soluble Oils
FOR FASTER MACHINING**

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

February 1, 1943



Nowhere is there a better example of Washburn care and precision than in Eagle MUSIC WIRE. Our own basic steel—close tolerances and care in handling, all make for superlative quality.

WASHBURN

WASHBURN WIRE CO., NEW YORK CITY

CLEAN, UNIFORM BILLETS—STRIP—RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

Neglect a Motor AND YOU Sabotage a Motor!

AS ONE of the world's leading builders of electric motors, Allis-Chalmers takes its hat off to the men of maintenance who are working day and night to keep America's motors *rolling!*



Like an overloaded horse, a motor worked too far beyond its horsepower capacity is sure to break down. So while maintenance men know that we've got to get maximum protection out of every motor to win this production war... they also know that a close eye must be kept on every motor's overload protection. New fuses and heater coils are a whole lot cheaper than new motors!



The oil film protecting a motor's bearings often is no thicker than the wall of a soap bubble. And if pressure on it becomes too great, the film can fail just as suddenly and *completely!* To protect bearings, maintenance must first protect the *oil film*... by guarding against excessive pressures from misalignment.



Spur gears constantly try to push apart, foundations are apt to settle, floor loading can be too heavy... all threatening to disturb alignment. Misalignment sometimes

WHOSE MOTORS LAST LONGEST
MAY HAVE A LOT TO DO
WITH WHO WINS THIS WAR!

gives a warning before causing damage. But to play safe, maintenance checks alignment *regularly.*



Ability to absorb harmful matter makes water doubly dangerous. Evaporated moisture is pure water when it first condenses in a motor — isn't yet an active destructive agent. That's the time to get it out — *fast!*



Dust fights lubrication. Once inside bearings, it can be as harmful as sandpaper to highly polished surfaces. To keep dust out, oil filler caps must be kept closed — dust seals and gaskets replaced when worn.



Is Allis-Chalmers' new maintenance handbook helping maintenance do its big new wartime job in *your* plant? It's the latest and last word on the subject, easily understood, abundantly illustrated (with dozens of sketches such as above). Send in today for *your* free copy to ALLIS-CHALMERS MFG. CO., MILWAUKEE, WIS.

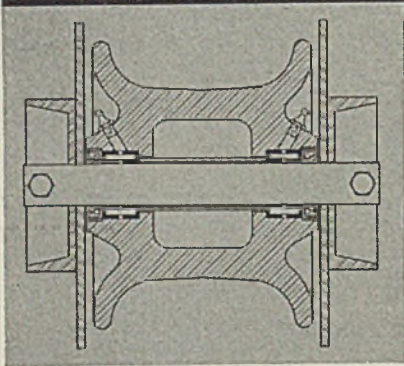
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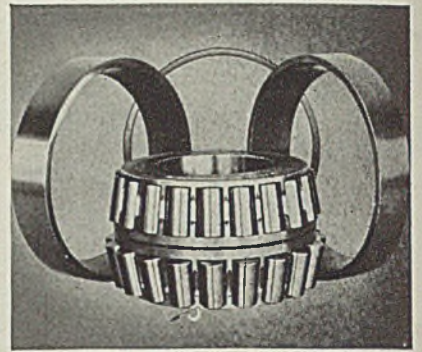
ALLIS-CHALMERS



IN THE NEWS WITH BANTAM BEARINGS



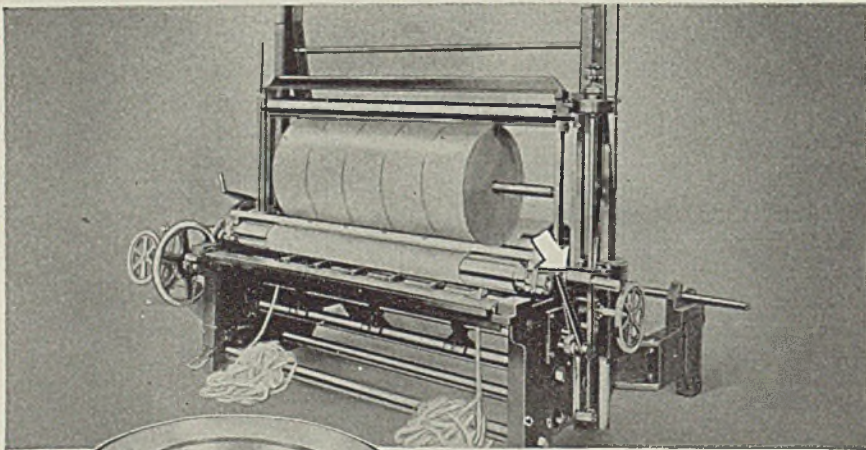
MECHANICAL "STEVEDORES" like this 5-ton STEVE-KRANE built by Silent Hoist Winch & Crane Co. are playing an important part in speeding the loading of goods and equipment for distant fronts. And Bantam Quill Bearings on the boom sheaves and rollers (shown in cross-section view) contribute to the efficiency of these cranes, because of their low coefficient of friction, high load capacity, and effective method of lubrication—while their unit construction facilitates assembly. For full details on these compact anti-friction bearings, write for Bulletin H-104.



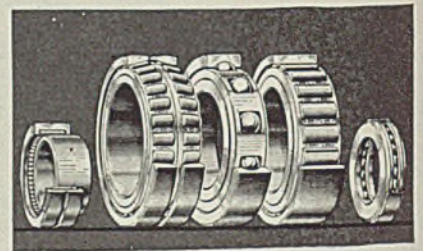
38" O.D., 21" I.D., 19½" LONG, this two-row tapered roller bearing for steel mill service is a typical instance of Bantam's skill in the design and manufacture of large bearings for special jobs. To meet the needs of America at war, Bantam today is manufacturing some of the largest anti-friction bearings ever built.



METALLURGICAL CHECK-UP is a regular part of Bantam inspection on bearings of all types. Here the grain structure of rollers and races is undergoing microscopic examination to assure conformity to metallurgical specifications.



FAST, ACCURATE SLITTING of paper is the job of the Camachine 8, Model 10, product of Cameron Machine Company. Among the factors in the popularity of this machine in paper mill finishing rooms and converting plants is the use of Bantam Ball Thrust Bearings.



ENGINEERING COUNSEL based on the design and application of straight roller, tapered roller, needle, and ball bearings is a vital phase of Bantam's service to industry. If you are seeking competent advice on your anti-friction bearing problems, **TURN TO BANTAM.**


BANTAM BEARINGS

STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL
BANTAM BEARINGS CORPORATION · SOUTH BEND · INDIANA
SUBSIDIARY OF THE TORRINGTON COMPANY · TORRINGTON, CONN.

THE Beginning OF Better Steel

WHAT SUPERIOR IS DOING BETTER FOR WAR TODAY,
IT WILL DO BETTER FOR YOU TOMORROW

The pressure of war demand for high quality steel is emphasizing the importance of scrap. To the layman scrap may mean a short cut in steel making; but to the metallurgist scrap is the secret of quality control. Sorting scrap by scientific selection enables the steel maker to control the properties of open hearth steel to a precision not practical in any other way.

SUPERIOR sheets have always been made largely of open hearth, special analysis steel in which scrap is an important ingredient. Superior's specialized experience in the production of steel sheets of all kinds means a superior product.

Remember, one ton of your idle scrap makes two tons of fighting steel. Search your plant again and again.

THE SUPERIOR SHEET STEEL COMPANY
CANTON, OHIO

Division of Continental Steel Corporation, U.S.A.

Get in the
SCRAP



Sold under well-known trademarks, SUPERIOR steel sheets are made with more than 30 different kinds of surface treatments, finishes and coatings to suit the needs of manufacturers and sheet metal workers.



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FOR SALE

USED STEEL MILL MACHINERY AND EQUIPMENT

250 TON HOT METAL MIXER
12" DIAMETER BLAST FURNACE BELL 45°
FOUR (4) BLOOMING MILL STACKS
NO. 3460 DIXIE NON-CLOG CRUSHER
PUNCH & SHEAR (LONG & ALSTATTER)
RECIPROCATING PUMP (LAIDLAW-DUNN GORDON
COMPOUND DUPLEX)
SOUTHWARK BLOWING ENGINE (VERTICAL STEEPLE
CROSS COMPOUND CONDENSING)
EVAPORATOR AND PUMP (GRISCOM-RUSSELL)
OPEN FEED WATER HEATER (GRISCOM-RUSSELL)
VACUUM PUMP (INGERSOLL-RAND)
NO. 9 CONTRAFLO DEAERATING HEATER
OIL HYDRAULIC UP-CUT BLOOM SHEAR
BAR TWISTER MACHINE
WESTINGHOUSE STEAM DRIVEN AIR COMPRESSOR
TYPE Z-1 TERRY STEAM TURBINE
TROY 4-1/2" x 5" VERTICAL, THROTTLING,
SELF-OILING ENGINE

MOTORS

Included in our list of used equipment are 25 AC and DC motors put out by leading manufacturers of the country and ranging in size up to 75-horsepower.

CONTROL EQUIPMENT

A quantity of steel mill control equipment, mostly General Electric and Westinghouse are also available for immediate shipment.

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WISCONSIN STEEL DIVISION

180 NORTH MICHIGAN AVE.

CHICAGO, ILLINOIS

PHONE: ANDOVER 4200

a 100-page Blueprint...to help you plan your

Conservation Strategy

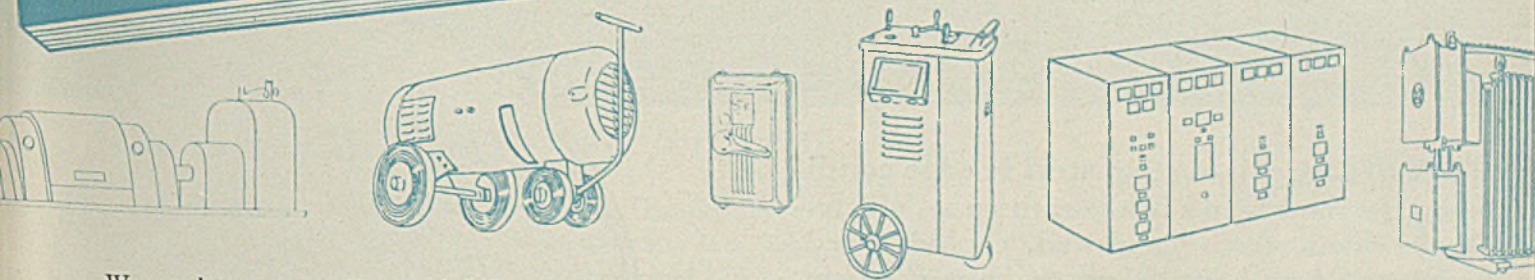
Wartime Conservation

RECOMMENDATIONS FOR EFFECTING IMMEDIATE SAVINGS OF CRITICAL MATERIALS IN THE APPLICATION AND USE OF WESTINGHOUSE EQUIPMENT... AND AT THE SAME TIME GETTING MORE PRODUCTION OUT OF PRESENT EQUIPMENT

WESTINGHOUSE ELECTRIC & MANUFACTURING CO. EAST PITTSBURGH, PA.

THIS BOOK CONTAINS DEFINITE RECOMMENDATIONS...

- From generator to motor... Critical Material savings in selection, application and use of electrical equipment.
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- Keep 'em running! Maintenance and repair service as an aid to production.
- Replacement—not substitution... Micarta and Prestite are superior to the Critical Materials which they replace.
- All in the day's work... How Westinghouse is saving Critical Materials in its own manufacturing operations.



We no longer are "too rich" to worry—the Axis has more Critical Materials than we do.

To help America save Critical Materials... to assist industry in planning its conservation strategy, Westinghouse has published an authoritative 100-page book. It contains recommendations for effecting immediate savings of Critical Materials in the selection, application and use of electrical equipment... and at the same time getting more production from present equipment.

Write for your copy today (company letterheads, please!). Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N.

J-90461

Comparison of United Nations and Axis resources prior to war and today

	Before the war		Now	
	United Nations	Axis	U. Nations	Axis
STEEL	73%	27%	50%	50%
COPPER	94%	6%	83%	17%
TIN	99+%	1-%	35%	65%
ALUMINUM	68%	32%	42%	58%
PIG IRON	75%	25%	44%	56%
TUNGSTEN	95%	5%	65%	35%
MAGNESIUM	44%	56%	32%	68%

Westinghouse

PLANTS IN 25 CITIES ...OFFICES EVERYWHERE

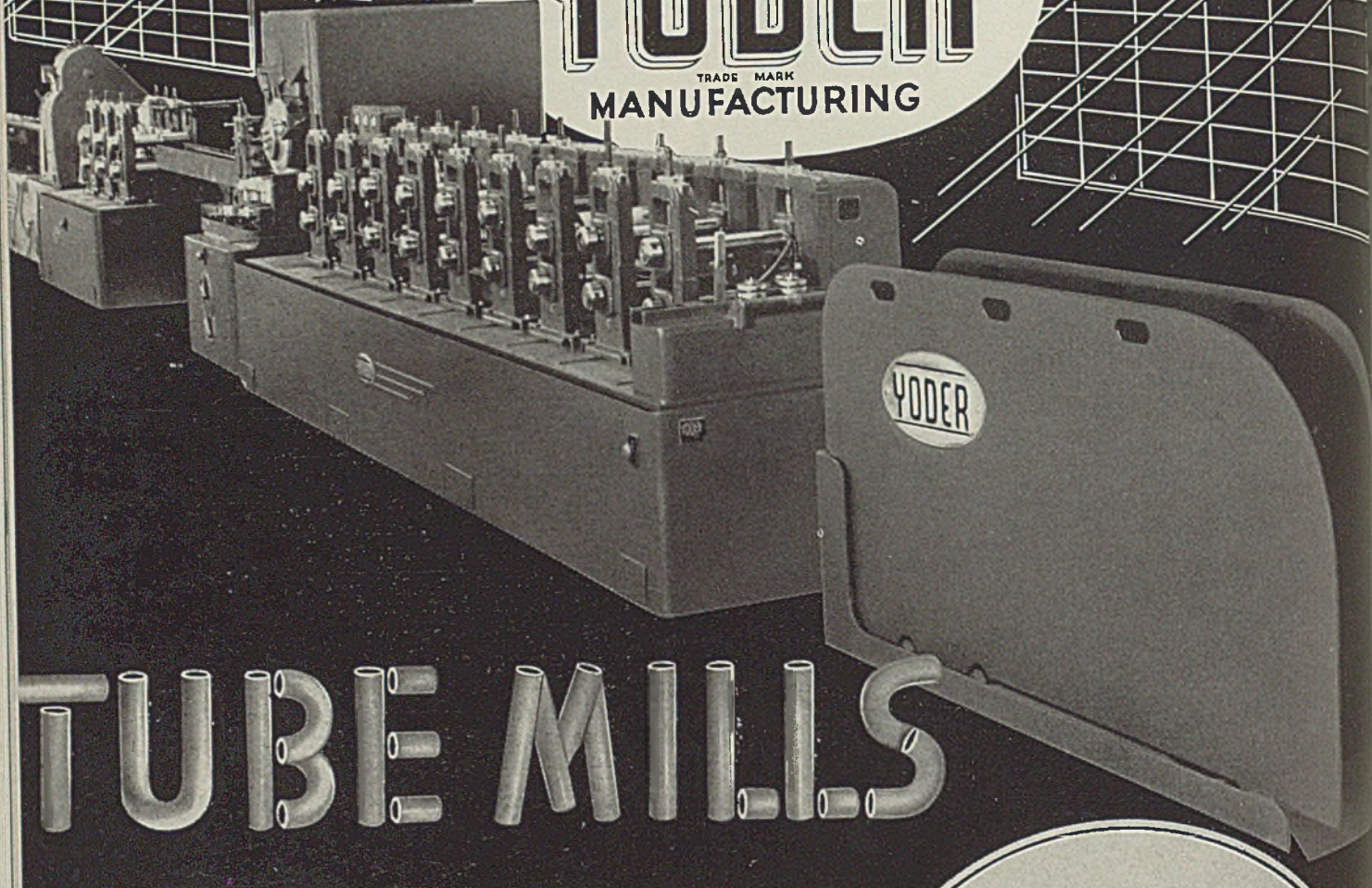


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YODER

TRADE MARK

MANUFACTURING



TUBE MILLS

COMPLETE. A coil of strip steel is edge conditioned, formed into a butt seam tube, electrically welded, flash trimmed, cooled, sized, straightened and cut to length, continuously, automatically by a YODER TUBE MILL LINE.

YODER EXPERIENCE in the development of Tube Mill Equipment insures your getting the best in patentable features and the latest in improvements.

SATISFIED CUSTOMERS will testify to the soundness of Yoder engineering practices and quality manufacturing policies.

Manufacturers using tubing or parts made of tubing should be interested in a Yoder Tube Mill. Write for information.

The mill pictured will produce tubing up to 4" diameter by 3/16" wall. Other standard mills available to make pipe and tubing from 1/4" to 26" diameter.

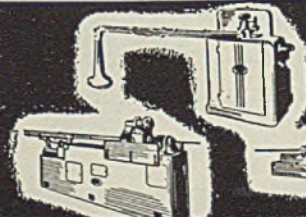
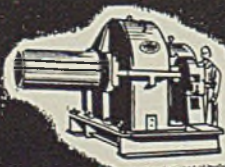
THE YODER COMPANY, CLEVELAND, OHIO, U. S.

METAL • FORMING • PRODUCTION • MACHINERY

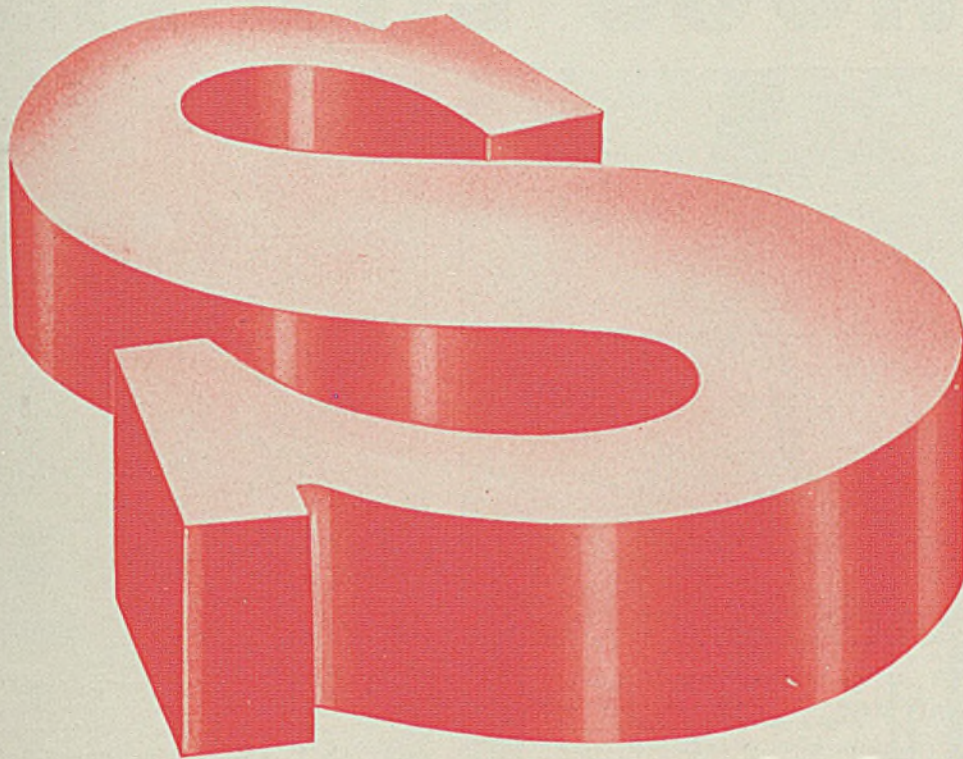
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IN QUENCHING OILS...



stands for—

✓ **SPEED**

War-time steels require a *fast* rate of quenching to attain the necessary hardness. HOUGHTO-QUENCH provides a speedier quench, important to steels of lower alloy content when passing through the temperature range of 1300 to 900° F.

✓ **STAMINA**

HOUGHTO-QUENCH has what it takes to stand up under continued use, month after month. It's made solely for quenching, is fortified in three ways—for wetting speed, heat absorbency and resistance to oxidation.

✓ **STABILITY**

A very minimum of sludge formation; no fractional distillation of light ends. Retains the required physicals after long use. This stability is most important in vital war production which demands uniformity, heat after heat.

Developed as a result of 77 years of Service to the Metal Industries.

Ask the Man who uses it!

E. F. HOUGHTON & CO.
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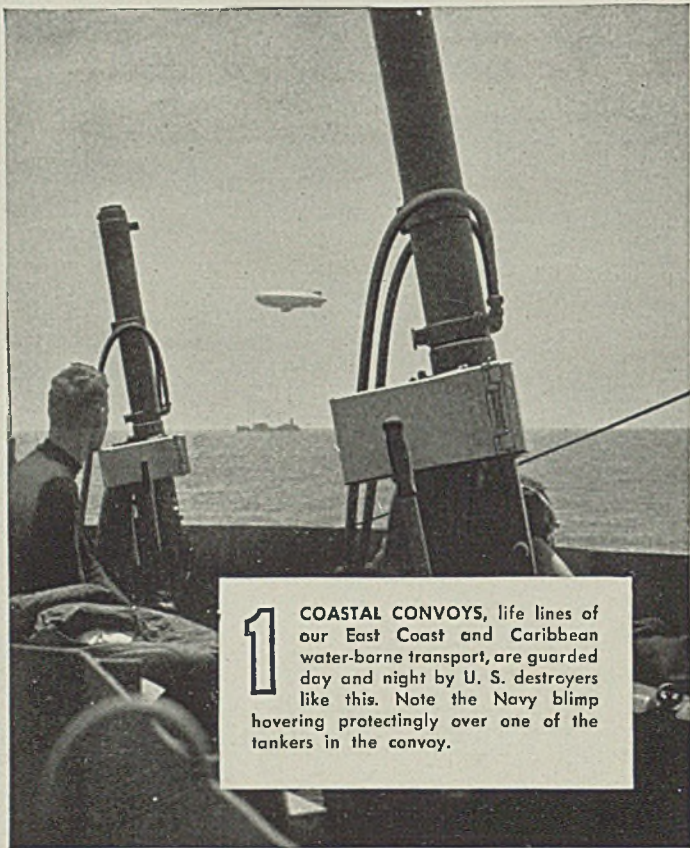
Chicago

- San Francisco

- Detroit

HOUGHTO-QUENCH

FAMOUS LIFE LINES



1 **COASTAL CONVOYS**, life lines of our East Coast and Caribbean water-borne transport, are guarded day and night by U. S. destroyers like this. Note the Navy blimp hovering protectingly over one of the tankers in the convoy.

Official U. S. Navy Photograph



2 **BELL AIRACOBRAS**—so-called “flying cannon”—in a dive. Many of the life lines of U. S. warplanes—primer tubes for engines, control tubes and air bleeder tubes for propellers, carburetor compensator tubing—are by Bundy.

Official Photograph, U. S. Army Air Forces

THIS IS a war of *little* things as well as big. On slender lines of tubing, for example, may depend the lives and fighting effectiveness of the men in tanks, jeeps, bombers, PT boats, destroyers.

Life lines of Bundy Tubing transmit hydraulic pressure for tank turrets and for all types of motor vehicles. They carry refrigerants to cold rooms of warships to chill both food and ammunition. They feed

power boats, mine sweepers, tractors. Diesel engines with needed fuel and lubrication lines. They supply mechanical or structural tubing on radios, aircraft, gliders, tanks. And this is just a partial list.

We at Bundy are proud to assume the responsibility of seeing that these and many other forms of fighting equipment get the finest, most dependable tubing we can make. Bundy Tubing Co., Detroit, Mich.

Buy U. S. War Bonds — Get in Your Scrap

BUNDY TUBING



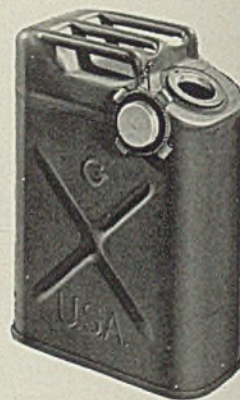
BUNDYWELD double-walled steel tubing, hydrogen-brazed, copper-coated inside and outside. From Capillary sizes up to and including $\frac{1}{4}$ " O. D. This double-walled type is also available in steel, tin-coated on the outside, and in Monel.



BUNDY ELECTRICWELD steel tubing. Single-walled — butt welded — annealed. Available in sizes up to and including 2" O. D. Can be furnished tin-coated outside in smaller sizes.



BUNDY "TRIPLE-PURPOSE" tubing. Double-walled, rolled from two strip, joints opposite, welded into a solid wall. Available in all Monel; all steel; Monel inside—steel outside; Monel outside—steel inside. Sizes up to and including $\frac{3}{8}$ " O. D.



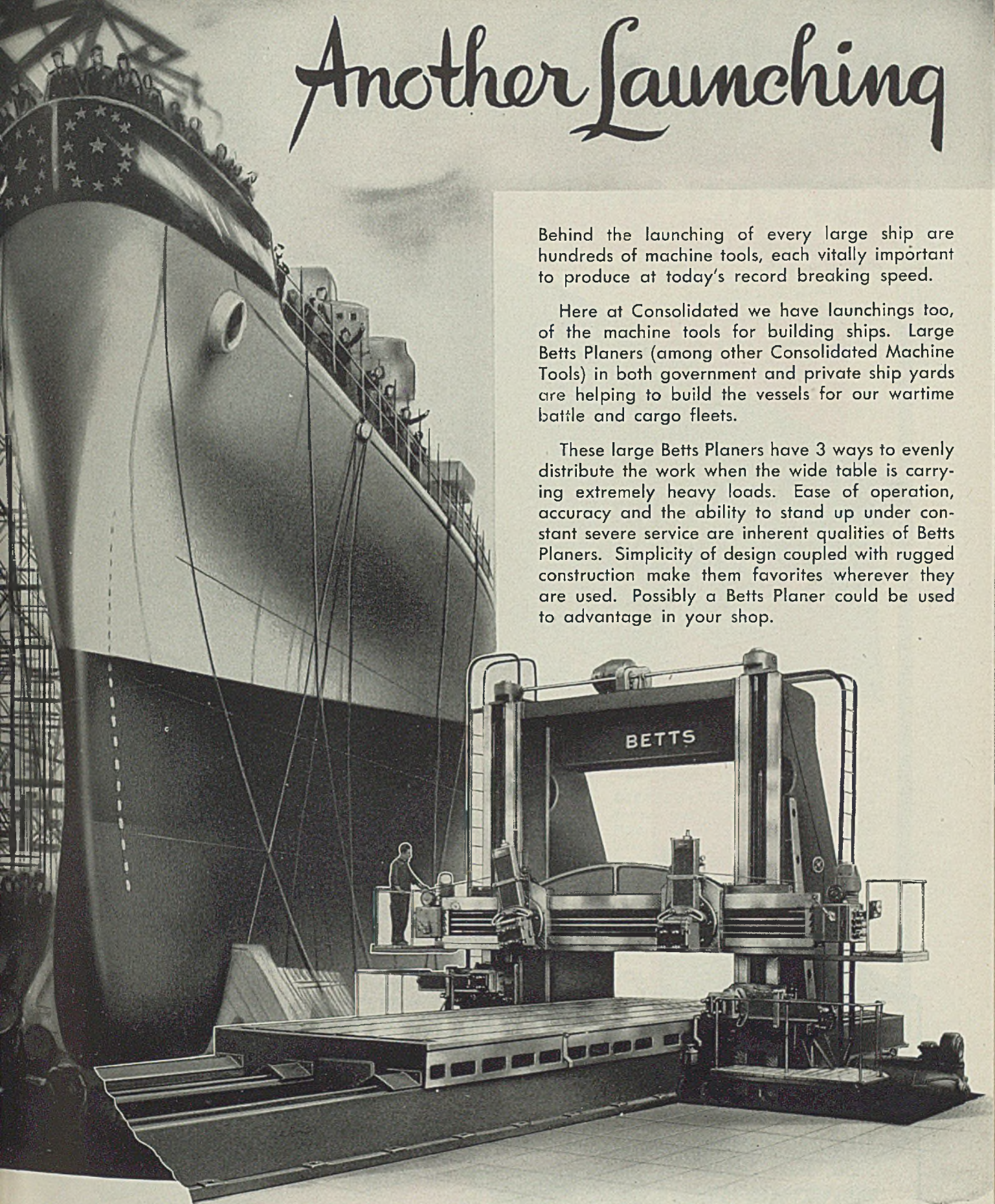
U. S. ARMY EXPEDITIONARY GAS CANS, used by hundreds of thousands wherever there are gas-propelled military vehicles, tanks or aircraft, have their life lines—their air vent tubes — of Bundy Tubing.

Another Launching

Behind the launching of every large ship are hundreds of machine tools, each vitally important to produce at today's record breaking speed.

Here at Consolidated we have launchings too, of the machine tools for building ships. Large Betts Planers (among other Consolidated Machine Tools) in both government and private ship yards are helping to build the vessels for our wartime battle and cargo fleets.

These large Betts Planers have 3 ways to evenly distribute the work when the wide table is carrying extremely heavy loads. Ease of operation, accuracy and the ability to stand up under constant severe service are inherent qualities of Betts Planers. Simplicity of design coupled with rugged construction make them favorites wherever they are used. Possibly a Betts Planer could be used to advantage in your shop.

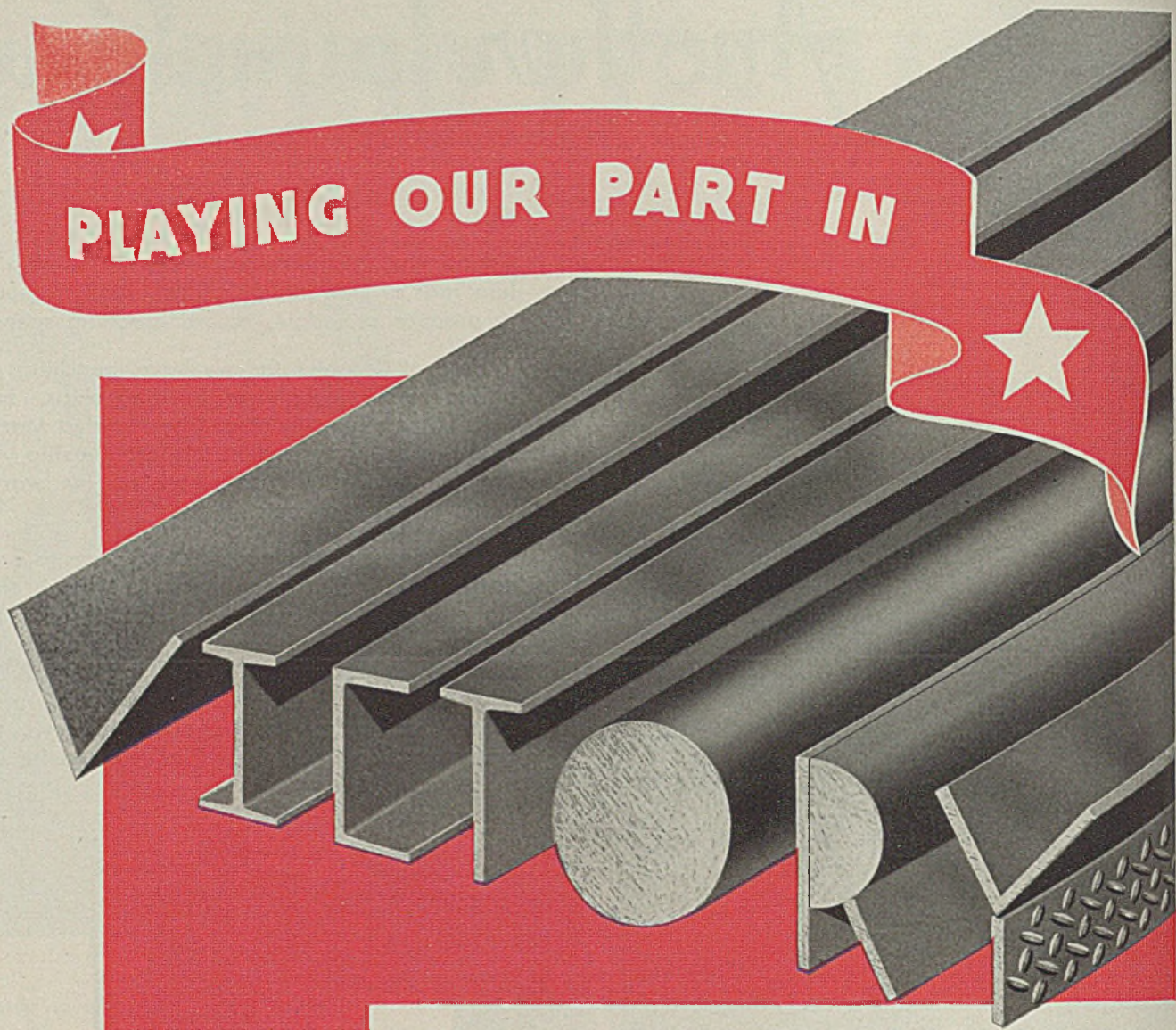


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C O N S O L I D A T E D
M A C H I N E T O O L C O R P O R A T I O N
R O C H E S T E R , N E W Y O R K



PLAYING OUR PART IN




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the privilege*

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Flats, Bands, Rounds,
Squares, Hexagons; Bar-
Sized Angles, Channels,
Zees, Tees; Structural
Angles, Beams, Channels;
Plates and Checker Plates;
Reinforcing Bars.

Distributors for  Protected Steel
ROOFING • SIDING • FLASHINGS



Production Doubled

... ON SHRINK FIT
ASSEMBLY OF AIRPLANE
LANDING STRUTS!

COMPANY NAMES
STARTING WITH C*

increased production

Case Study from the Files of Deepfreeze

The Sub-Zero Method
of Shrinking, Testing and Treating of Metals

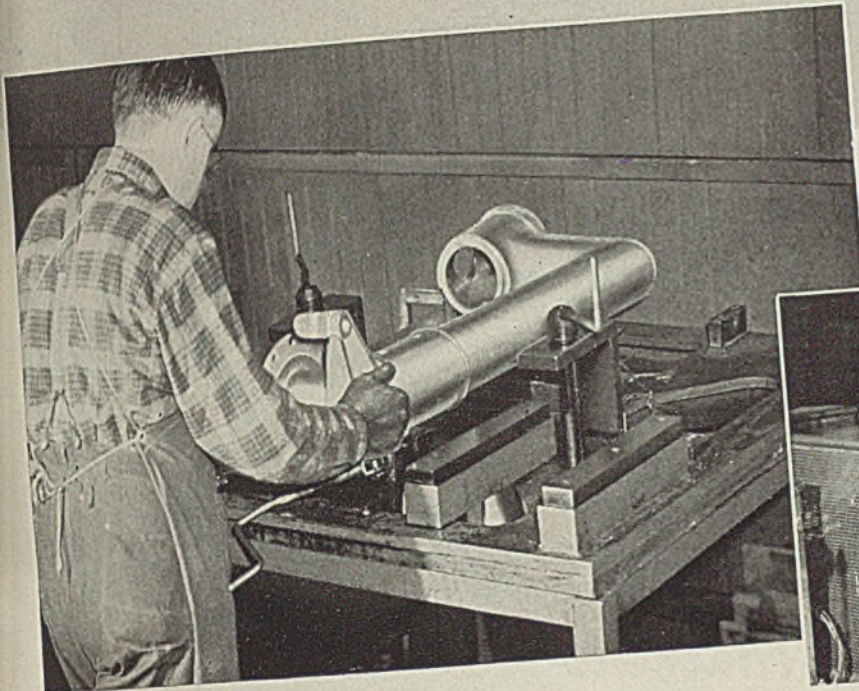
* Name on request to bona-fide inquiries

Data and Part Information

Shrink-fit assembly of aircraft landing struts.

Diameter of bore—4.843" \pm .002".

Diameter of mating part—4.843".



Deepfreeze metal chilling assures permanent assembly —reduces cost

These airplane landing struts, requiring a permanent shrink-fit, were formerly assembled in 20 minutes including heating time. This was done by heating the female part only.

With the installation of a Deepfreeze Cascade Industrial Unit, in conjunction with heating, the time has been reduced to 10 minutes—rejects minimized.

HOW IT'S DONE

The female part is heated in an oil bath at 450° F. and expanded .005". The male part is shrunk .003" in a Deepfreeze Cascade -120° F. Chilling Unit. The time in oil bath is 5 minutes—time in Deepfreeze 5 minutes. The cooling time to room temperature, in a jig, is 5 minutes—total 10 minutes. They are then inspected and wheel spindle must indicate within .003".

HOW DEEPFREEZE CAN HELP YOU... Deepfreeze sub-zero tempera-

tures (as low as -120° F.) can help you in any one or all three of the following metal working operations:

- 1—Shrinking of metals for ease of bearing assembly, etc.
- 2—Testing of metals for reaction of sub-zero temperatures to aircraft instruments, etc.
- 3—Treating of metals for preventing growth or warp in gauges, etc.



FREE Additional Data and proof of the outstanding success of the Deepfreeze method for chilling metals are included in this booklet. Write for your copy today.

REQUIREMENTS

To obtain a permanent shrink-fit assembly of airplane landing struts.

DIFFICULTIES

Former method by heat only, unsatisfactory—could not hold even temperature. Too many rejects requiring pulling apart or disassembly.

Other Difficulties . . .

Dry ice was too costly, took too much time to crack and prepare . . . would not handle present production requirements.

SOLUTION

The Deepfreeze Cascade -120° F. Unit used in combination with an oil bath for mating part, meets every requirement, doubles production.

SAVINGS

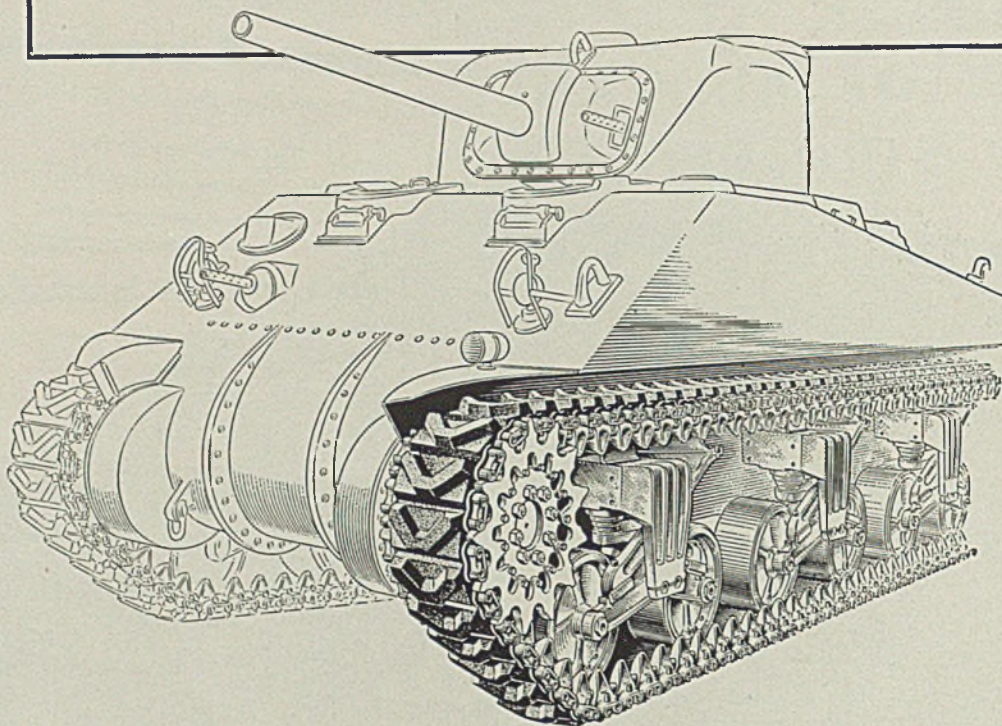
In addition to savings in time, new method saves approximately \$30.00 per day—cost of dry ice.

Deepfreeze

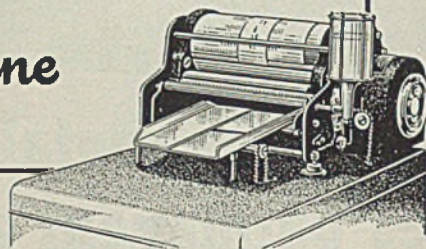
DIVISION

MOTOR PRODUCTS CORPORATION
2309 DAVIS ST., NORTH CHICAGO, ILLINOIS

the Tank took a hint from



the Duplicating Machine



THERE'S NO maintenance man in most offices, making regular trips with a grease gun to see that bearings have plenty of lubrication. That's one of the reasons why builders of business machines selected the Torrington Needle Bearing to lengthen the service life of their products.

With Army tanks, of course, it's entirely different. They're regularly and thoroughly inspected by highly skilled maintenance crews. But when a tank comes back from the battlefield, and the crew starts racing against time to get it ready for another lightning dash

against the enemy, there's a big advantage in having bearings that seldom need attention. So the tank designers, like the business machine builders, turned to the Torrington Needle Bearing because its high load capacity helps prevent overloading or breakdowns, because its simple, effective system of lubrication allows the bearing to run for long periods without *any* attention at all. And its ready availability helps speed the job of tank production.

WHEN YOU PLAN YOUR POST-WAR DESIGNS, here's something to think about. Your peacetime customers will probably

be looking for products that last longer, need less attention, work more efficiently—and the Needle Bearing can help you give them what they want. You will find a long list of typical Needle Bearing applications in Catalog No. 110. One of them may give you an idea for your own product—and Torrington engineers will be glad to help you work out the details.

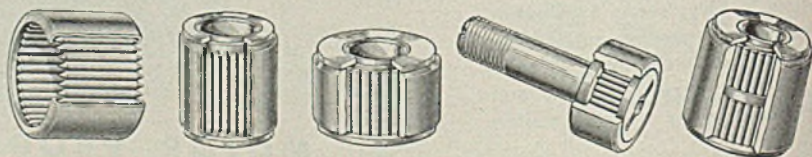
THE TORRINGTON COMPANY
 Established 1866 • Torrington Connecticut, U. S. A.
 Makers of Needle and Ball Bearings
 New York Boston Philadelphia Detroit
 Cleveland Seattle Chicago San Francisco
 Los Angeles Toronto London, England



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KEYED TO TODAY'S NEEDS

AND TOMORROW'S TRENDS



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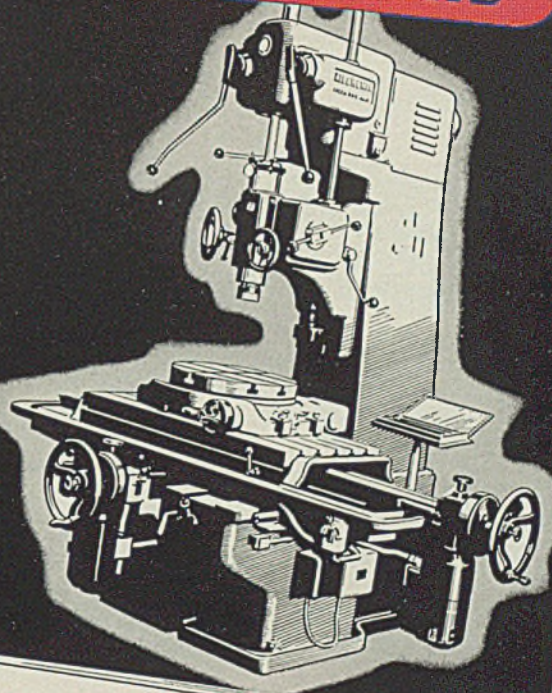


CATALOG No. 400

CLEEREMAN DRILLING MACHINES

For high-speed drilling, boring, and tapping. Sliding head, round and box column types, in 21", 25", and 30" sizes. Wide range of speeds for drilling or boring 3/16" to 6" holes at proper peripheral velocity of tool.

CLEEREMAN JIG BORERS



CATALOG No. 300

CLEEREMAN JIG BORERS

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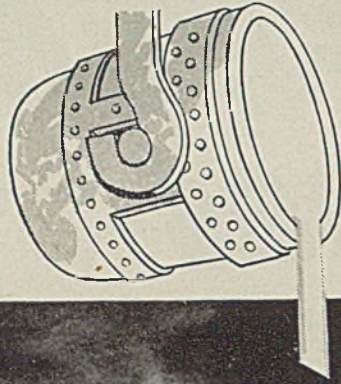


Cleereman now flies the Army-Navy "E" Flag

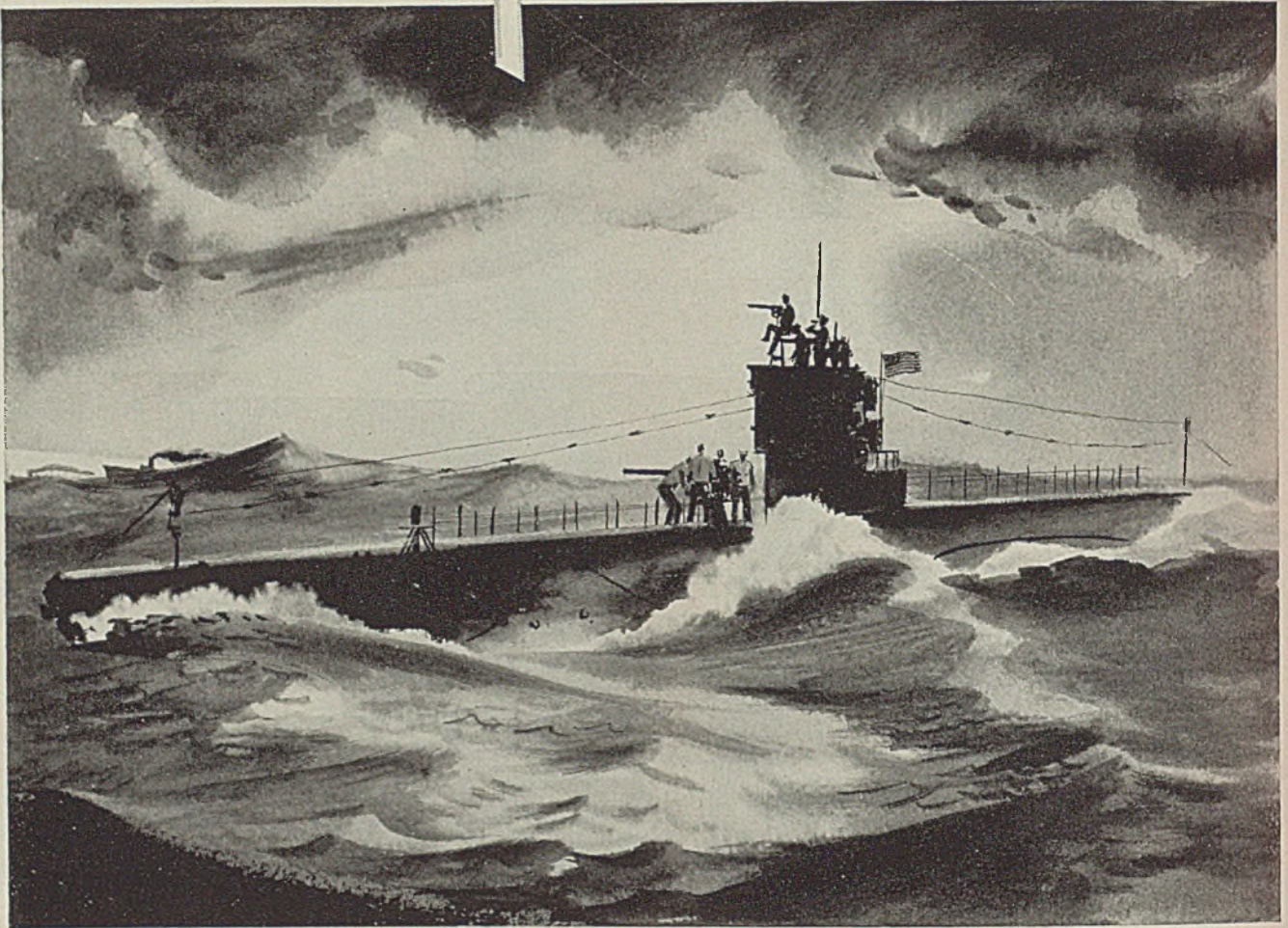
BRYANT MACHINERY & ENGINEERING COMPANY

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Weirton Steel



... and *submarines*

To build submarines, our shipyards need steel. Weirton's throbbing mills and alert workmen are supplying that steel—faster than ever before.

The uniformity and high quality of steel from Weirton is vitally important to all steel-users, in war and peace. "Double-control" by Weirton's men and machines, at every step in the manufacturing process, produces steel that meets the most exacting requirements.

Weirton Steel is pledged to maintain its standard of high quality—and to supply more steel for Victory.

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Division of

NATIONAL STEEL CORPORATION

Executive Offices · Pittsburgh, Pa.

LADISH

quality

DROP FORGINGS

ON EVERY BATTLEFRONT

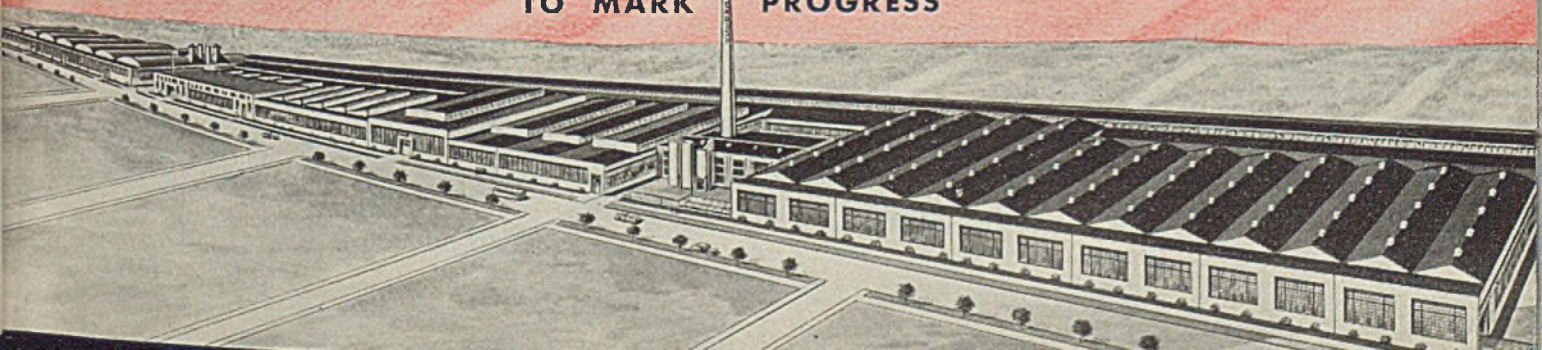
LADISH DROP FORGE CO.

PLANT AND GENERAL OFFICES

CUDAHY . . . WISCONSIN



TO MARK PROGRESS





Perhaps you can roll your own

This shape is rolled from Alcoa Aluminum Alloy sheet in a single operation. Its use may take the place of a thicker extruded shape, thereby releasing metal and extrusion presses for production of vital war materials. Its producer is one of many companies who are roll-forming similar aluminum-sheet shapes.

Many of these rolled-sheet shapes, being produced today for war products, are made of heat-treated aluminum alloys to give them high strength. Often, the "as-rolled temper" strip is fed right from the heat-treating furnace to the forming rolls, before the metal can age-harden, thus avoiding distortion that might

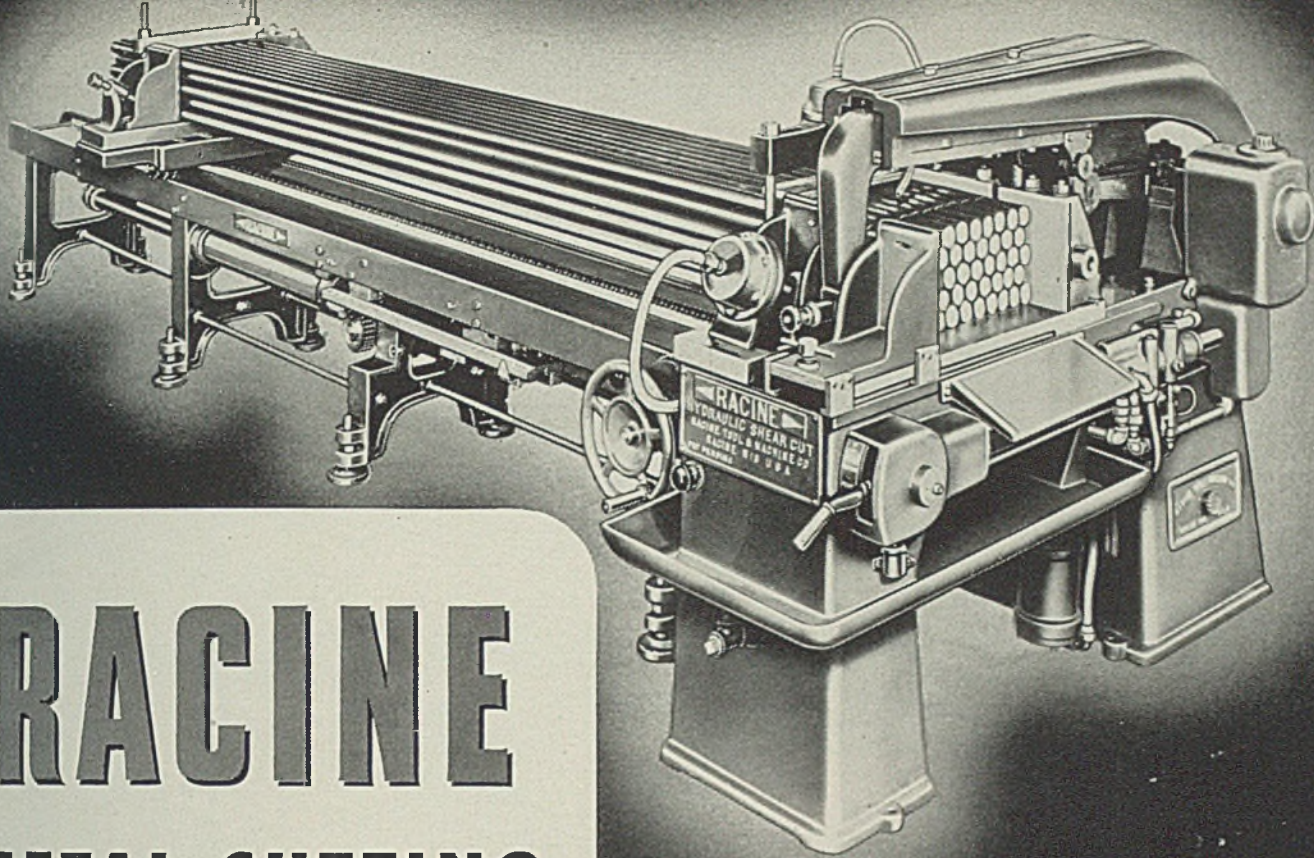
occur if heat treatment followed forming.

Also shown above, in silhouette, are other rolled-sheet shapes. It doesn't take much stretching of the imagination to visualize a great variety of these aluminum shapes used in numerous products. Exactly the right thickness and shape for strength and stiffness, but no more metal than is actually needed.

The economies possible with large quantity production are certain to cause these aluminum rolled-sheet shapes to be adopted widely for all kinds of postwar applications. ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh, Pennsylvania.

ALCOA  **ALUMINUM**

REG. U. S. P.



RACINE

METAL CUTTING MACHINES

*Standard for
Higher Quality and
Greater Precision*

THESE Hydraulic Fed and Controlled Metal Cutting Saws with oil cushioned operation save blades, permit faster cutting and heavier cutting feeds. Designed and built for modern production—cutting time and costs can now be accurately determined.

Modern designing of Racine saws produces these outstanding features. Hydraulic control allows complete range of feeds—positive progressive and self-compensating progressive. Single lever control—inexperienced help can operate. Extra heavy pivot shaft and wide pivot bearing construction in arm of Saw Guide prevents cocking or binding strain in bearings and ways.

Racine's complete line includes models for general purpose and production cutting in a wide range of prices and sizes. Capacities 6" x 6" to 20" x 20". Automatic Stock Feed Machines as illustrated, are also available.

RACINE *Variable Volume* HYDRAULIC PUMPS A Modern Source of Hydraulic Force

Speed up the production of your power operated equipment with Racine Variable Volume Oil Hydraulic Pumps and Valves.

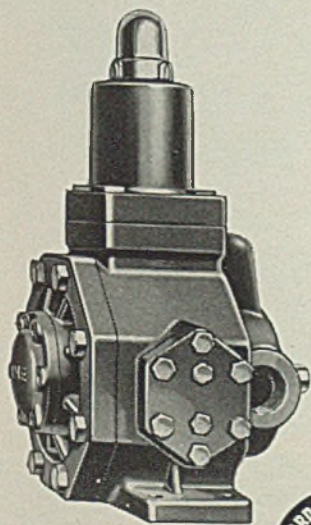
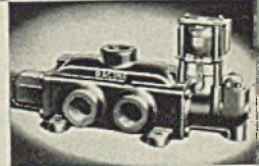
Pressure from 50 to 1000 lbs. per sq. in. for holding, pressing, clamping, feeding and forming operations.

No relief valve needed. Pumps only the amount of oil you require to do the job. Exclusive "Vane Type Variable Volume" feature. For vibrationless action in modern machine design. Capacities 0-12, 20 and 30 gal. per minute.



Four-way Hydraulic Valves are available with stem, lever, roller, latch, foot treadle and solenoid operating devices. Various porting arrangements can also be furnished to suit your requirements.

Racine's exclusive "Sleeve Type" Hydraulic Valves have balanced pistons. Made in 3/8" to 1 1/2" standard pipe sizes. Continuous bearing and sealing surface—piston cannot sag—always in alignment—insuring longer valve life.

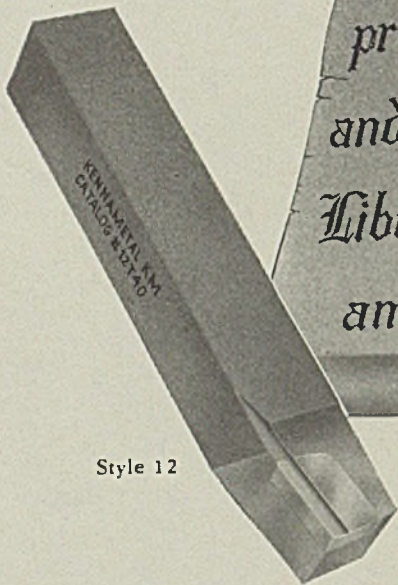


Our Engineering Department will be glad to help you work out your hydraulic application problems. Address your request for complete information to Dept. S.

RACINE TOOL and MACHINE COMPANY

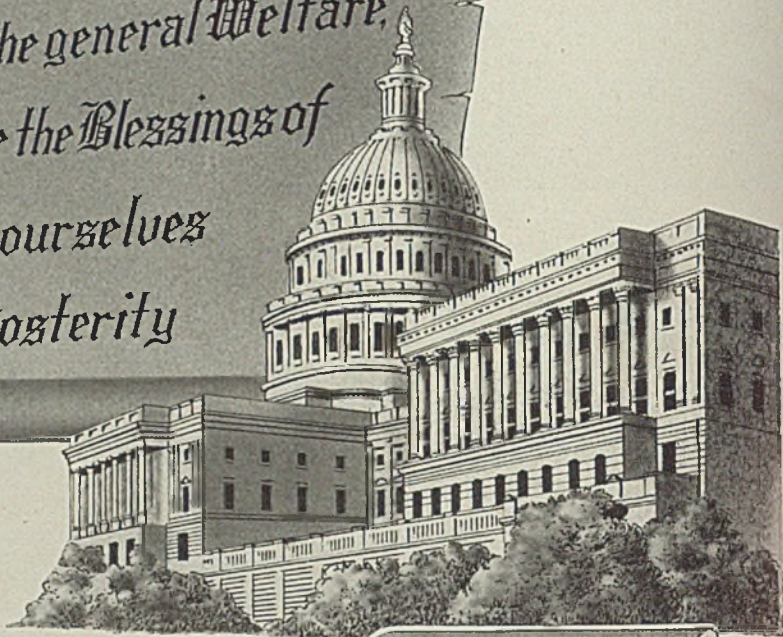
STANDARD FOR QUALITY AND PRECISION

RACINE, WISCONSIN • U. S. A.



Style 12

*to provide for the common defense,
 promote the general Welfare,
 and secure the Blessings of
 Liberty to ourselves
 and our Posterity*



KENNAMETAL* REPRESENTS MORE THAN ITS INGREDIENTS

★These strong, hard and efficient steel-cutting tools required in their making more than merely the material ingredients.

Another essential ingredient was the protection and encouragement guaranteed under the Constitution of the United States of America to all citizens, including the men and women who make these tools.

The Constitution also provided for the establishment of a patent system to secure to inventors, for a limited time, the exclusive right to their discoveries, and it was in reliance upon this encouragement and guarantee that, from 1936 to 1938, Kennametal was invented and perfected by the founder of McKenna Metals Co., as described in U. S. patents.

It is also because of provisions in the Constitution which guarantee freedom of trade that it is possible to introduce and sell Kennametal to machine shops in every state in the Union, as well as to those in allied countries.

American citizens are free because our form of government is based upon a Constitution which includes the Bill of Rights, and which provides for the making of laws by representatives in the Congress whom we elect.

We are proud in the knowledge that, in this national emergency, we have added strength to our country, and have made possible the more rapid production of arms.

That this new tool material was developed at this critical time was providential, but it would not have been possible without initiative which is characteristic of free men, and the independence of action guaranteed them by the Constitution.

*INVENTED AND MANUFACTURED IN THE U. S. A.

The Constitution

The Constitution of the United States separates the powers, the rights, and the freedoms of the legislative, judicial, and executive branches of the government.

*Article I
 Section 8, Clause 8*

The first article of the Constitution proper preserves the property rights of inventors stating—"To promote the general welfare to promote the progress of science, by securing for a limited time to inventors the exclusive rights to their discoveries."

The Bill of Rights

The Bill of Rights, composed of the first ten articles of amendment, preserves the specific rights and freedoms of the American people as individuals.



Trade Mark Reg. U. S. Pat. Off.

MCKENNA METALS Co.

200 Lloyd Ave. Latrobe, Pa.

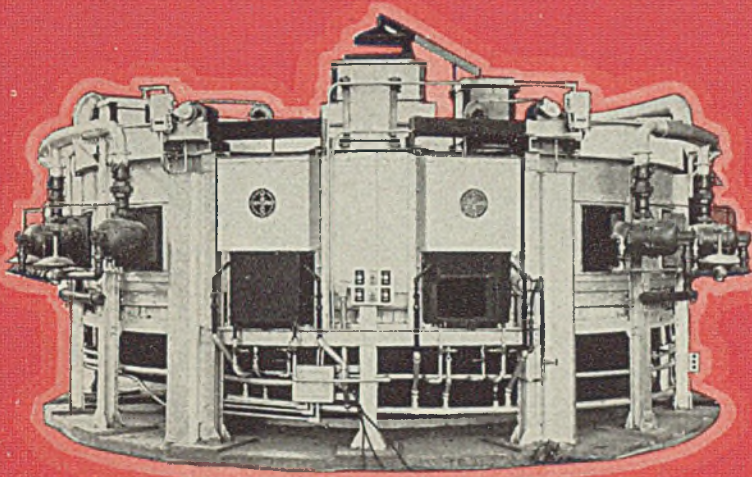
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PITTSBURGH, PA.

FACTS!

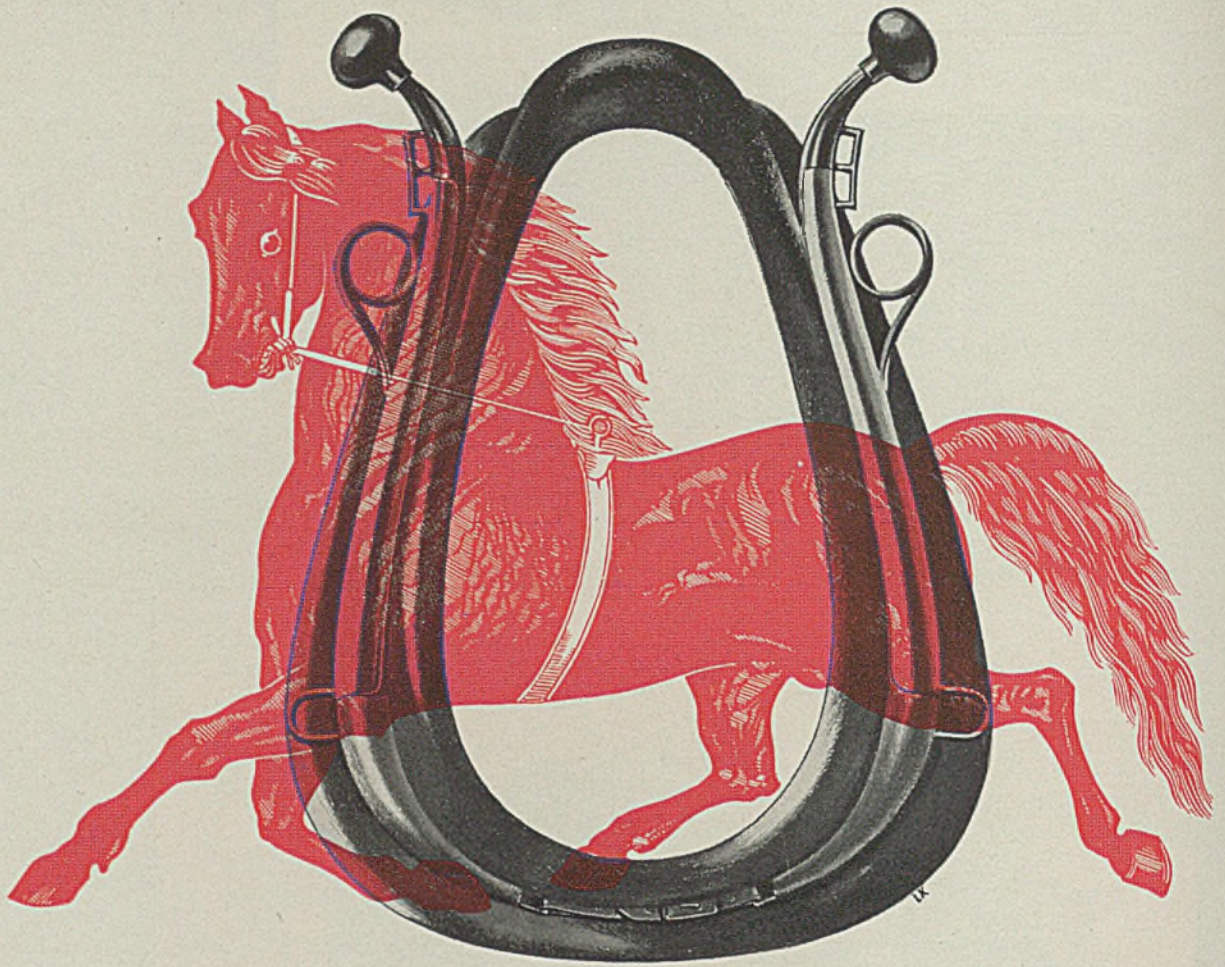
**THIS NEW FURNACE PUBLICATION WILL BE OF
REAL INTEREST AND VALUE TO EVERY FORGING
PLANT EXECUTIVE INTERESTED IN MORE UNI-
FORM CONTINUOUS HEATING OF STEEL BILLETS.**

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What ever happened to the Horse Collar Market?

Who won the World Series in 1935? Who was vice-president under Harding? Of 1481 makes of American automobiles, 16 are known today. How many of the *others* can you name? And what ever happened to the carriage wheel business, and where's the horse collar market?

People, products, markets and methods all succumb to *change* . . . and today that powerful factor of change is doing more to disrupt markets, create new products, and revise production methods than most businesses are even remotely prepared for!

A soap company and a roofing company are operating shell-loading plants. Shipbuilders are building cargo planes. The automotive industry is producing farm machinery, locomotives, air conditioning equipment, and literally hundreds of other unrelated products. Manufacturers are this year spending hundreds of millions of

dollars on research alone, and the day this war ends, a new age of production will begin.

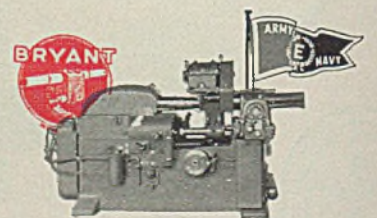
Part of this story of change we know first hand, as only specialists can. That part is in the vital and highly specialized field of internal grinding . . . and this much we can tell you on the basis of our own experience with the amazing developments in production that we have seen and helped to produce:

If your business is manufacturing with metal, and if you are planning ahead today for the products you will manufacture tomorrow, the surest way to protect your business against failure from uneconomical production methods is to consult with the leading specialists in machine tool engineering.

Bryant's Consulting Service is available to you at all times. Call upon us now!

Bryant Chucking Grinder Company

SPRINGFIELD, VERMONT, U. S. A.



... CRANE-EQUIPPED PRESSES

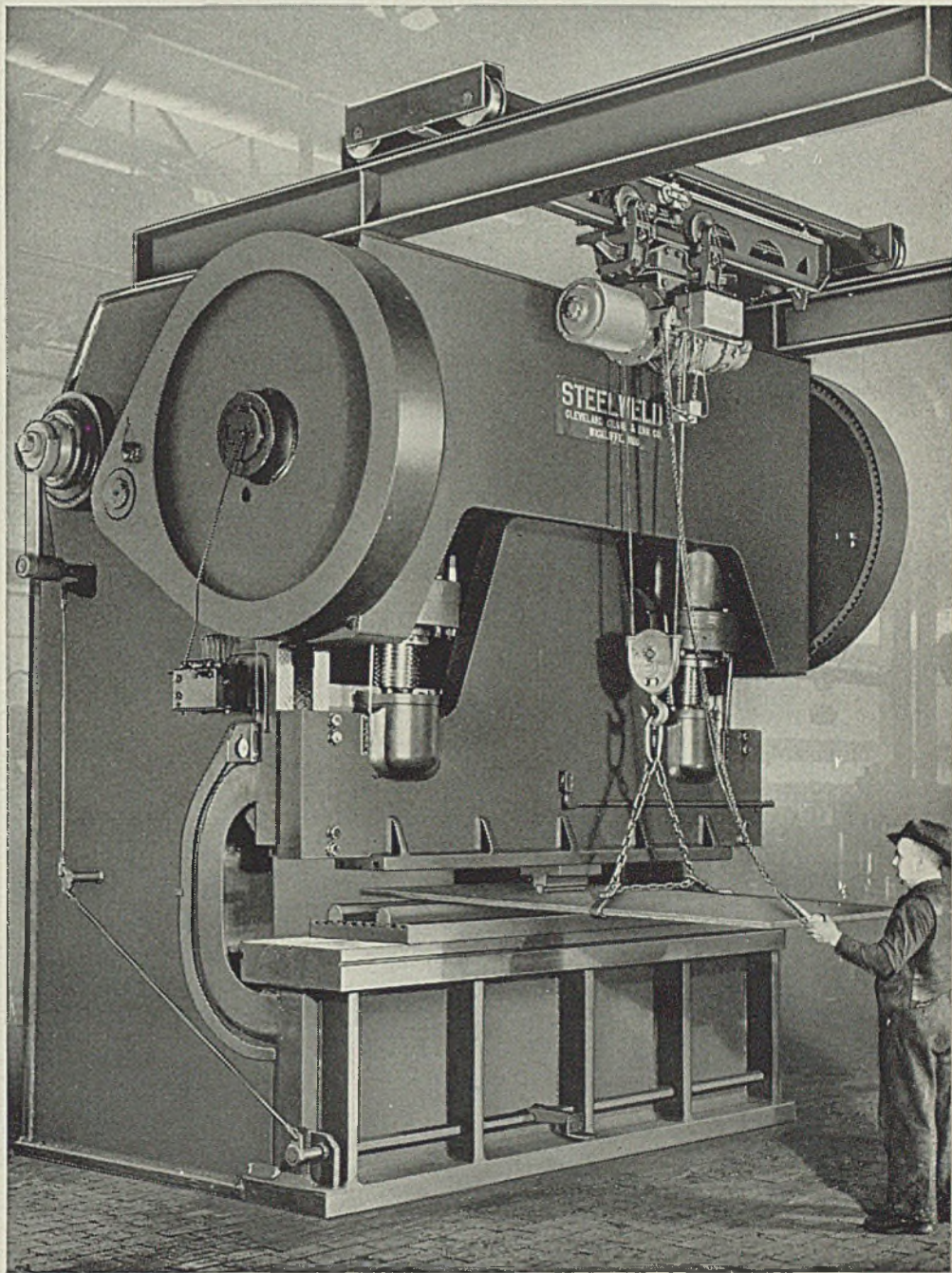
for Heavy Bending and Plate Straightening

The handling of heavy plate being formed or straightened in bending presses often is a very serious problem. In some shops costly overhead cranes or other handling equipment is tied up a large part of the time with such work.

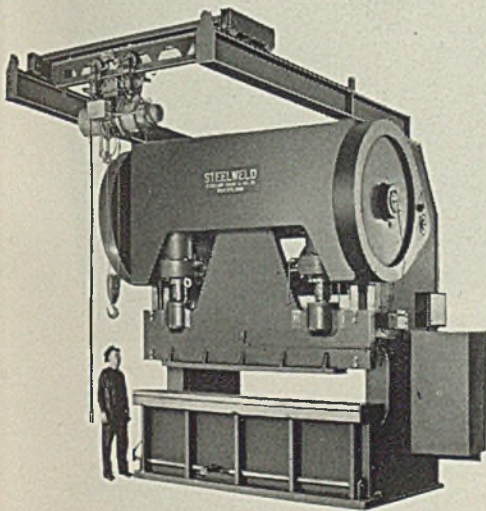
Some of the larger Steelweld Bending Presses are now being equipped with individual overhead traveling cranes which make it an easy task for an operator to handle heavy cumbersome plate in and out of the machine as well as to support it during press operations. The cranes are fabricated by Cleveland Tramrail and usually are hand-propelled with an electric hoist for the heavy lifting.

All Steelweld Presses now catalogued and nearly all older models now in service can be equipped with Cleveland Tramrail press cranes. The cranes are easily adapted to Steelwelds because all shafting is located at the rear of the machines away from possibility of being snagged and damaged by crane hooks, heavy plates, etc.

The application of individual cranes to presses is just one of many features pioneered by Steelweld to make press operation easier, faster, safer and better.



Model Mo5-8 Steelweld Press. Normal capacity 500 tons. Equipped with especially wide bed top and ram bottom to accommodate dies necessary for plate straightening.



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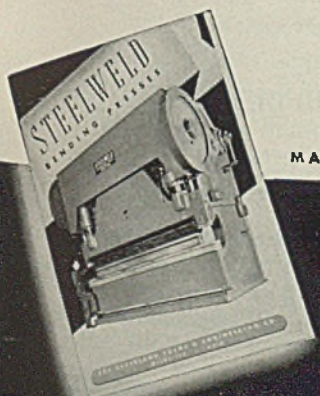
THE CLEVELAND CRANE & ENGINEERING CO.

STEELWELD MACHINERY DIVISION

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CATALOG No. 2002 gives complete construction and engineering details. Mail request for free copy on your company letterhead.

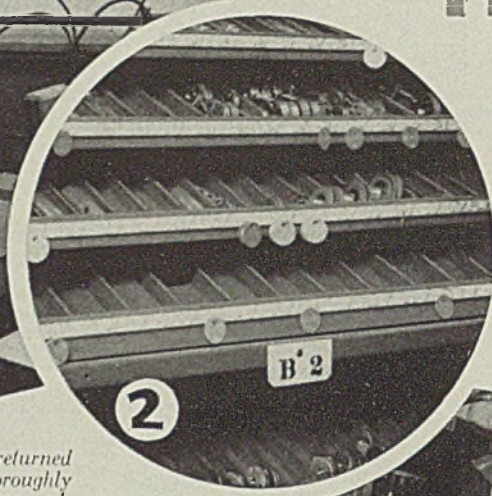
Tool Conservation Begins in the Tool Crib

Photographs Courtesy Weatherhead Company, Cleveland, Ohio

WITH GAGES IT'S *System*



Before a gage is returned to the storage rack, it is thoroughly checked and inspected, and any adjustments or repairs needed are made or ordered.



Fell-lined individual compartments protect the gages from injury and provide a practical visual check on the gage stock.



Metal check method of issuing and card record of stock condition, with carefully trained attendant, assure positive control of entire gaging system. This "Tool Crib" is air conditioned.

fore proper accounting for every gage at all times avoids disruption of the gaging system through delays in anticipating requirements.

1 Adequate checking and measuring equipment—gages need constant checking for significant wear, damage or tampering.

2 Convenient, safe, systematic storage—poor storage conditions can ruin gages even before they are used once, and a lost or misplaced gage means loss of valuable time as well.

3 A positive accounting method—when new gages are needed, they are usually needed badly, there-

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Here's the
\$64,000
 QUESTION!

**WHAT FIRE-KILLER WOULD YOU PICK
 FOR FIGHTING A BLAZE IN...**

- A VARNISH KETTLE?
- AN ELECTRIC MOTOR?
- RUBBISH?
- CARBON BISULPHIDE?
- RUBBER CEMENT?

Get the wrong answer and it costs plenty! Fire can gain headway too fast, if you hit it with the wrong extinguisher.

All fires aren't alike. Neither are fire extinguishers. Special fire hazards call for special fire-fighting equipment. How are you fixed?

There's one easy way to tell. Look at the Underwriters' Laboratories' approval notice on your extinguishers. It will say something like "Classification A-2, B-2." The letters "A," "B" or "C" are what you are looking for. They tell if the extinguisher is OK for use on Class "A" fires (wood, rubbish,

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This simple check tells you if you have the right extinguishers standing guard beside your plant's varied fire hazards.

Kidde carbon dioxide extinguishers are for flammable liquid (Class "B") and for electrical (Class "C") fires. They snuff these blazes fast, smother them in a blasting cloud of snow-and-gas. Kidde carbon dioxide gas is one of the fastest known extinguishing agents.

Walter Kidde & Company, Inc.,
 232 West Street, Bloomfield, N. J.



Power

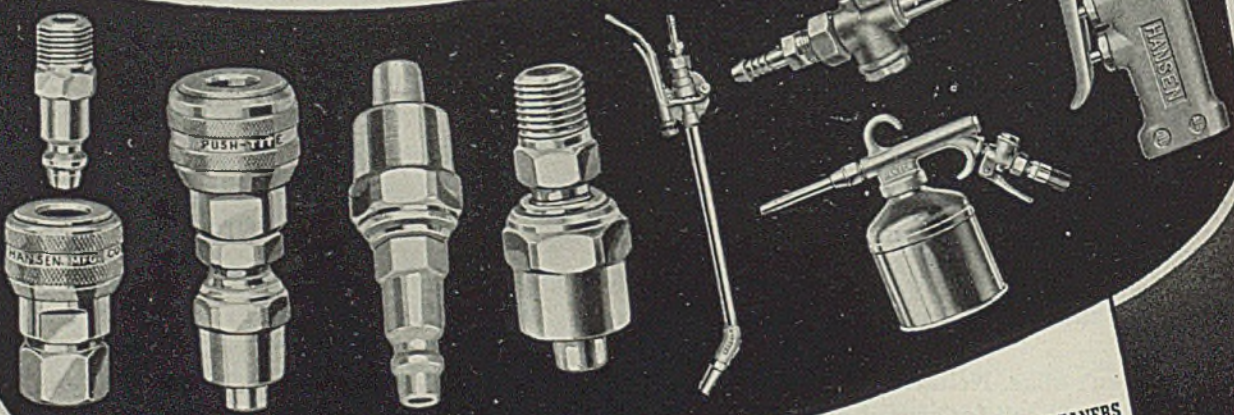
BEHIND THE PRODUCTION

HANSEN

INDUSTRIAL Air Line EQUIPMENT

To-day's battle front encompasses not only the front line trenches but the front line of factory production. In thousands and thousands of industrial plants, aeroplane plants, shipyards, etc. throughout the world, Hansen air line equipment is playing a vital part in speeding up production. For instance, Hansen equipment is used in 90 per cent of the aeroplane plants in this country where speed, efficiency, economy, haste without waste or breakdowns is absolutely essential. ♦ The trend is toward air and Hansen manufactures the most complete, most advanced engineered air line equipment on the market. Send in for free catalog covering the complete Hansen industrial air line equipment.

Hansen equipment costs no more because it lasts longer, produces more with less effort and eliminates tieups due to breakdowns.



AIR HOSE COUPLINGS • HOSE CLAMP SOCKETS • HOSE CLAMP PLUGS • HOSE CLAMPS • ENGINE CLEANERS
 AIR BLOW GUNS • SAND BLAST CLEANERS • AIR-LIQUID SPRAY GUNS

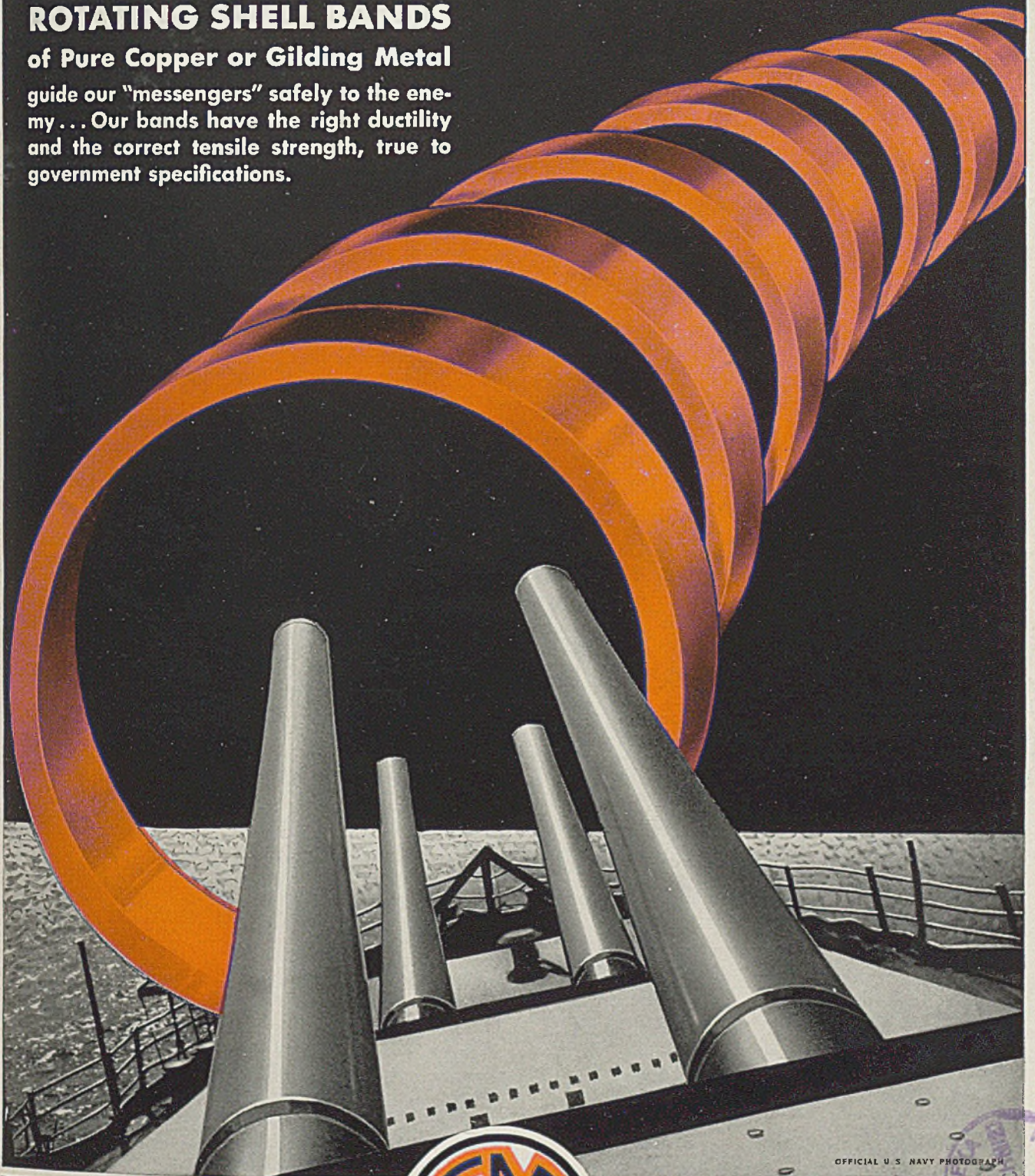
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MANUFACTURING CO.

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LEWIN-MATHES ROTATING SHELL BANDS

of Pure Copper or Gilding Metal
guide our "messengers" safely to the enemy... Our bands have the right ductility and the correct tensile strength, true to government specifications.



OFFICIAL U. S. NAVY PHOTOGRAPH

LEWIN MATHES

LEWIN-MATHES COMPANY • SAINT LOUIS, MISSOURI

Here at last

An A-C ELECTRODE

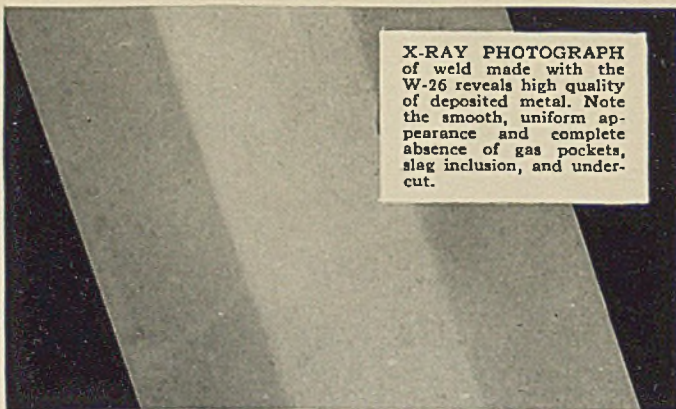
for first-class welding
IN ALL POSITIONS

THE GENERAL ELECTRIC ELECTRODE "W-26"

NOW through the development of the W-26 electrode you can extend the advantages and convenience of *high quality* a-c welding to all positions—both VERTICAL and OVERHEAD as well as flat and horizontal.

Developed by General Electric Welding Laboratories to meet the demands of industry, this a-c electrode complies with the following specifications:

- A.W.S. Filler Metal Specification E6011
- Navy Bureau of Ships, Specification 46E3, Grade 111, Class 1
- A.S.M.E. Boiler Code, Paragraph U68



X-RAY PHOTOGRAPH of weld made with the W-26 reveals high quality of deposited metal. Note the smooth, uniform appearance and complete absence of gas pockets, slag inclusion, and undercut.

OPERATING CHARACTERISTICS

In operating characteristics and quality of the finished weld, W-26 is superior to other all-position a-c electrodes heretofore available and is equal to the best direct-current electrodes used for mild-steel work. It provides a strong, forceful arc, free from magnetic blow, and enables operators to make finished welds with good fusion and excellent penetration.

PHYSICAL CHARACTERISTICS

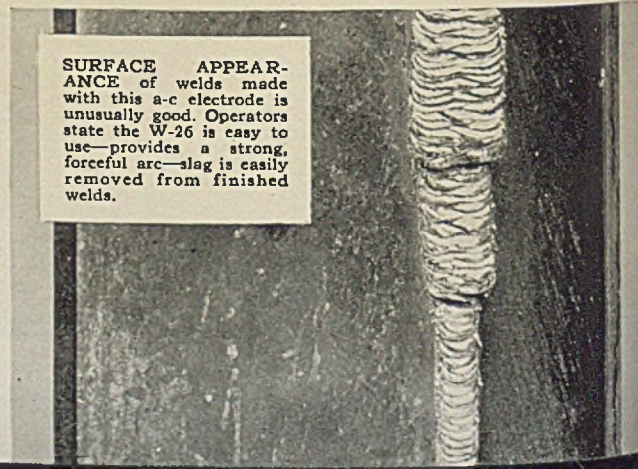
The following table reflects average results obtained from all-weld-metal specimens, tested "as-welded"

Physical Properties of Deposit	$\frac{5}{32}$ -in. Diam	$\frac{1}{8}$ -in. Diam
Ultimate tensile strength, lb per sq in.	72,500	72,000
Yield point, lb per sq in.	60,000	62,000
Elongation in 2 inches, per cent.	25	25
Reduction of area, per cent.	46	46

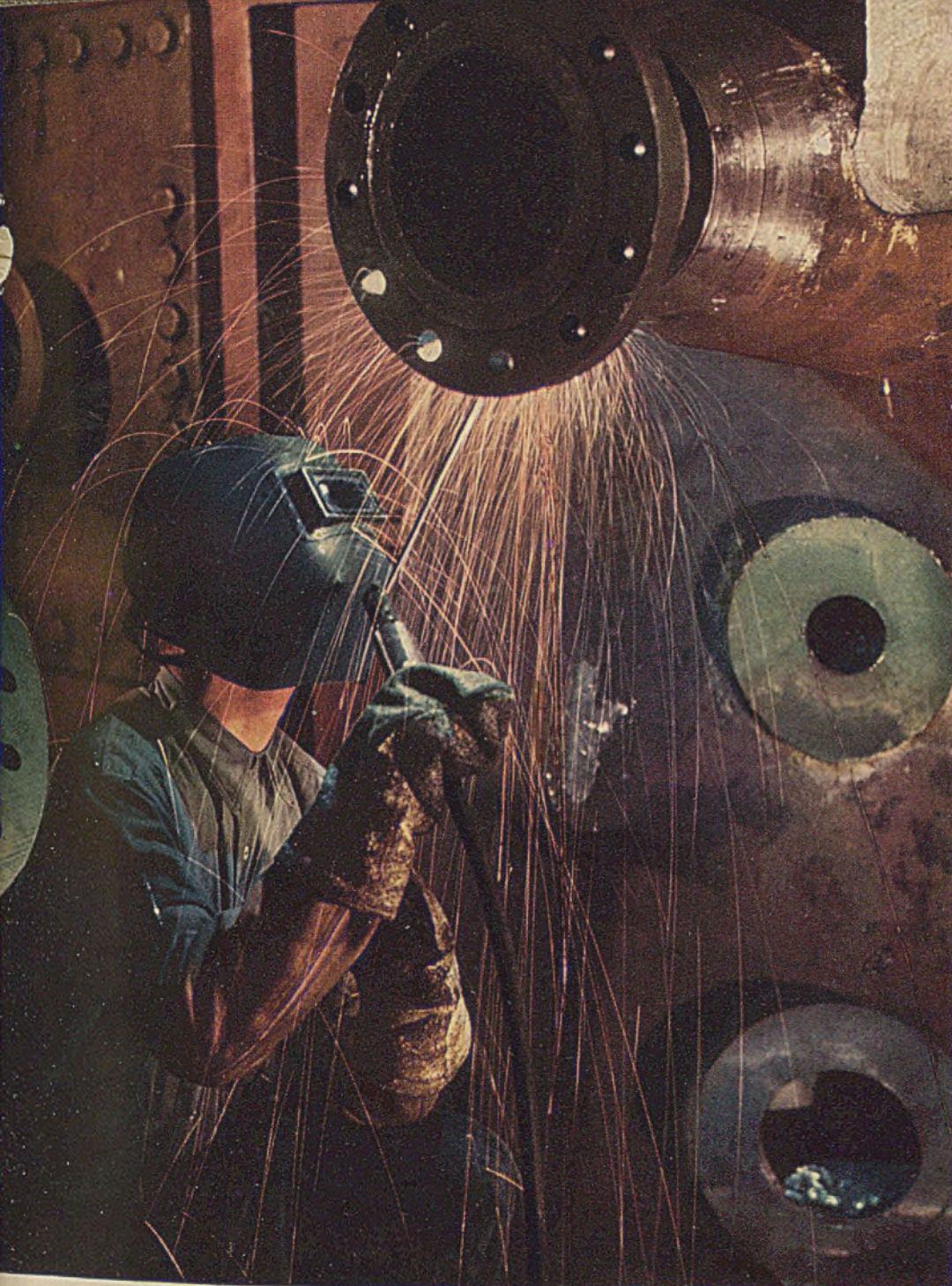
(The W-26 electrode is now available in $\frac{1}{8}$ in. and $\frac{5}{32}$ in. diameters. Other sizes, from $\frac{1}{16}$ in. to $\frac{1}{4}$ in. inclusive, will be made available as soon as possible.)

USERS to whom the W-26 has been submitted report especially favorable results. For example, Mr. R. Kraus, Welding Engineer of Stacey Brothers, Cincinnati, Ohio, says "—with these electrodes average welders can weld vertically and overhead at an equal output as with direct current and reverse polarity. This is a decided advantage for our type of work." Mr. E. H. Dunkman of the United Welding Co. reports "—this appears to be the best all-position a-c electrode we have ever tried—metal lays smooth with little or no undercutting."

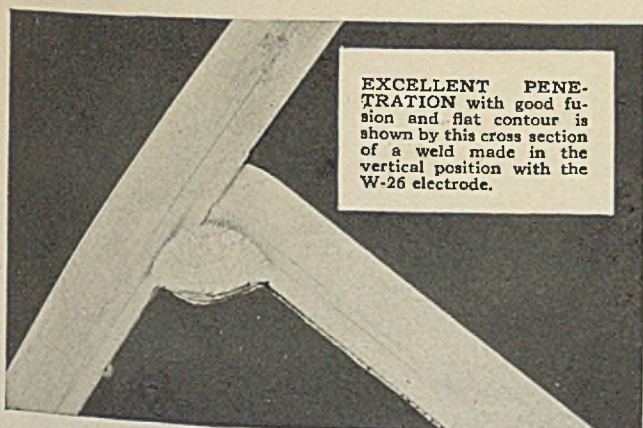
For further information and samples of the W-26 electrode, get in touch with your nearest G-E arc-welding distributor or write your nearest G-E office. General Electric, Schenectady, N. Y.



SURFACE APPEARANCE of welds made with this a-c electrode is unusually good. Operators state the W-26 is easy to use—provides a strong, forceful arc—slag is easily removed from finished welds.



FIRST-CLASS WELDING in the overhead position is easily accomplished with the W-26 A-C electrode.



EXCELLENT PENETRATION with good fusion and flat contour is shown by this cross section of a weld made in the vertical position with the W-26 electrode.

TRAIN OPERATORS FASTER

with the new
G-E training film

The INSIDE of ARC WELDING

This new training film, in full color and sound, covers all the basic principles of correct arc-welding technique. With it, welding instructors can train more operators faster and provide these important advantages:

INDIVIDUAL INSTRUCTION—

For both large and small classes alike

20% SAVING IN TIME—

based on unbiased, authoritative estimates

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technically correct in every detail

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each part 10 minutes
and complete in itself, 16 mm.

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GENERAL ELECTRIC



BAY STATE

MOUNTED WHEELS & POINTS

- Are formed from uniform blanks
- Will not come off the spindles
- Run absolutely true
- Are ready for immediate cutting action
- Are free from "hard and soft" spots



THE BAY STATE METHOD OF FORMING FROM UNIFORM BLANKS IS REALLY SOMETHING! -SEND FOR HELPFUL CATALOG, DESCRIPTIVE FOLDER AND STOCK LIST.



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... **THE MORE**
HIGH SPEED STEEL SCRAP
THE BETTER DELIVERIES
YOU'LL GET ON CUTTER ORDERS!!

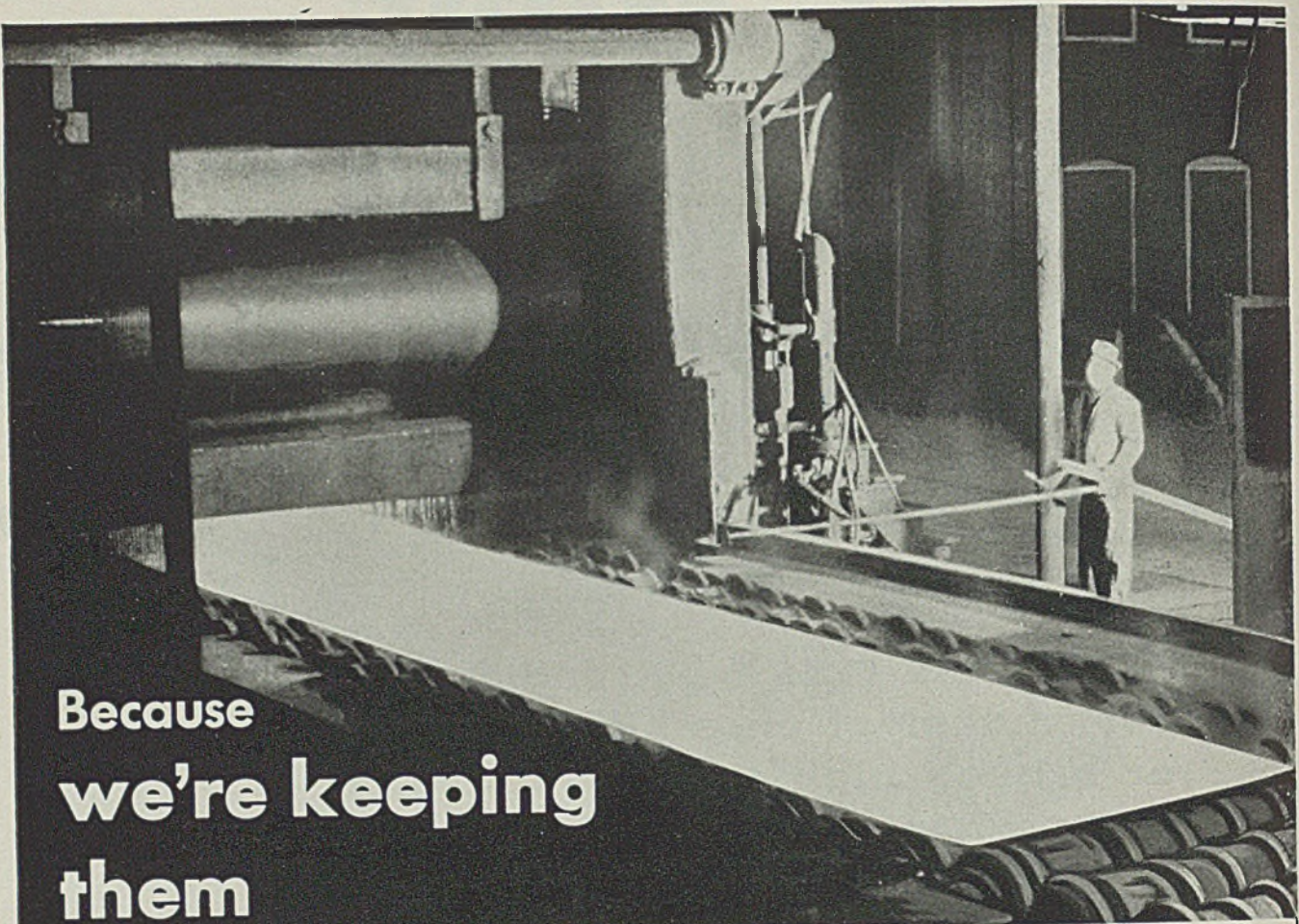
YOU CAN HELP by sending to the steel maker at once **EVERY** worn-out or broken high speed steel cutter in your plant.

The High Speed Steel situation is serious. Steel makers need much more High Speed Steel scrap than they are getting . . . if manufacturers are to be supplied with the required amount of steel of specified analysis for making new cutters.

Ship every pound of High Speed Steel in your plant in the form of worn-out or broken cutters back to the steel maker promptly. And watch out that this valuable scrap doesn't get mixed with your ordinary steel scrap . . . prevent it from becoming lost for use in new cutters so critically needed today on production for the united war effort.

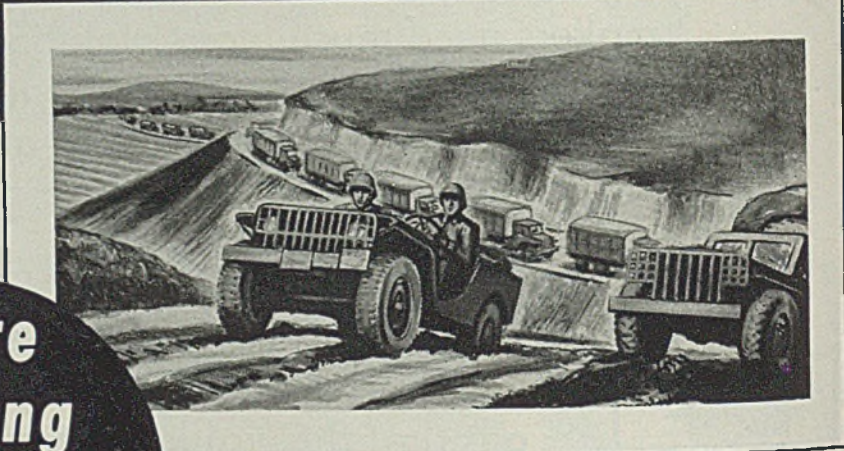


BROWN & SHARPE
CUTTERS



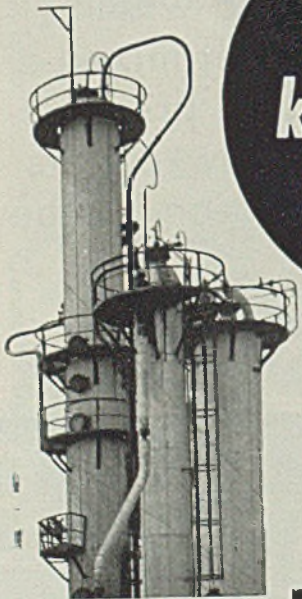
**Because
we're keeping
them
rolling**

**at
record-breaking
speed**



**We're
helping
keep them
rolling,
too!**

Though the greater part of our production is allocated to the requirements of the United States Navy! . . . we are producing more than ever before in our history . . . and we are able to supply substantial tonnages of needed steel plates for the oil refining and synthetic rubber industries, whose vital products are powering every phase of our Victory drive.



WORTH STEEL COMPANY
CLAYMONT, DELAWARE
MAKERS OF QUALITY
SHEARED STEEL PLATES—FLANGED & DISHED HEADS




Conserve Alloys And Get Cleaner Steel By Using The Right Deoxidizing Agents

WE MAKE a number of deoxidizers . . . available for war production . . . including ferrosilicon, ferromanganese, silico-manganese, calcium-silicon, zirconium alloys, calcium metal, and calcium-manganese-silicon. Each has particular applications where it is most effective. The proper use of these deoxidizers will produce cleaner steels with a smaller consumption of critical alloys.

For example, Calcium-Manganese-Silicon combines three powerful deoxidizing agents in one alloy, and is more effective as a scavenger and deoxidizer than separate alloys containing these elements. When it is used in the ladle, the fluid slag formed readily removes impurities, and leaves clean, sound steel. It improves the ductility of steel cast-

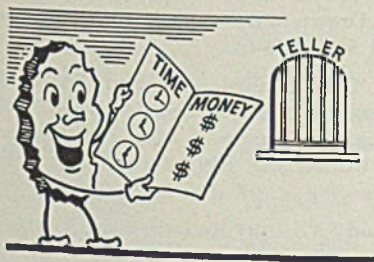
ings poured at high temperatures in green-sand molds, and can be used to replace part of the aluminum generally considered necessary in the making of these castings.

Our metallurgists are skilled in the use of ferro-alloys and alloying metals, and can give you practical, on-the-job help in the selection and use of the best deoxidizers for your job. Their skill is supplemented by an active metallurgical research program, and more than 35 years' experience in the production and use of quality ferro-alloys and alloying metals. There is no obligation for this service.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street  New York, N. Y.

Items of Interest about other "Electromet" Ferro-Alloys

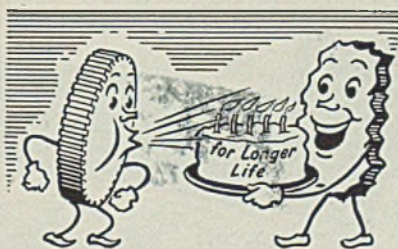
Low-Carbon Alloys Save Time and Money in Steel Production — Low-carbon alloys, such as low-carbon ferrochrome and ferromanganese, offer a number of advantages over the higher carbon grades.



Because these alloys contain less carbon, oxidation of the bath to lower the carbon content need not be so severe. As a result, metal loss is decreased. Refractory costs are lowered. Recovery of the alloying elements is appreciably higher. Valuable minutes of furnace time are saved. Furnace production is increased.

Vanadium Improves Steel Castings — The addition of a small amount of vanadium, usually not over 0.10 per cent, to steel castings refines grain, materially raises the yield-point without sacrificing ductility, and greatly increases resistance to shock and fatigue. This is especially useful in engine and railroad car castings.

Chromium Gives Longer Life to High-Manganese Steel Castings — The addition of 1 to 3 per cent chromium to 12 per cent manganese-steel castings increases their initial hardness, which is desirable for wear resistance under conditions where impact is not severe enough to work-harden plain manganese steel. The chromium-bearing high-manganese steels will wear much longer under such conditions.



Write for This Booklet — If you want more information about these and the many other "Electromet"



ferro-alloys and metals, their use, and the service that goes with their purchase, write for this 24-page booklet entitled "Electromet Products and Service."

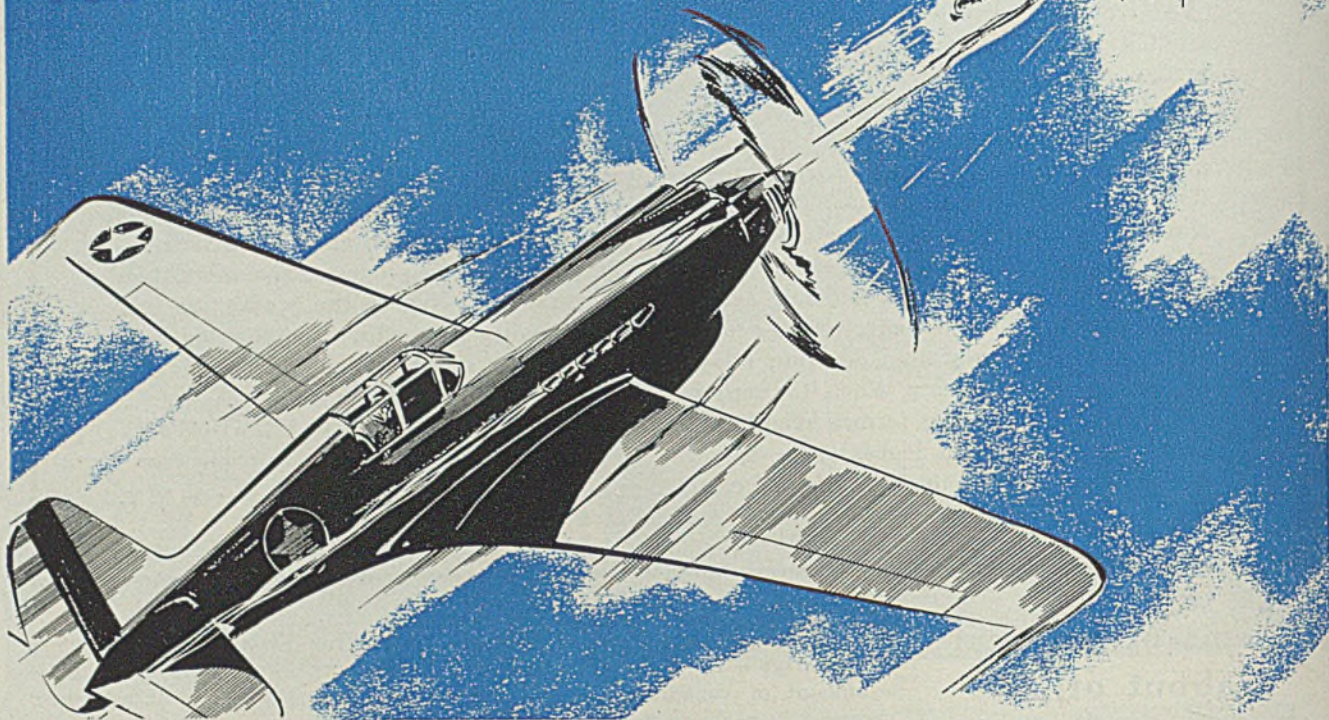
Electromet Trade-Mark Ferro-Alloys & Metals

Distributed through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario are distributors.



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Putting them together
or "tearing 'em apart" ...
YOU'VE GOT TO KNOW HOW!



PURDY looks at steel products from the point of view of the men who have to "put them together" in the manufacture of fighting equipment. When ordinary methods or standard procedures can't get jobs done, Purdy men are ready to help "tear 'em apart," analyze the problem from a production standpoint, and recommend materials and methods that *work*—and the complete PLANET line of Spring Steels, Tool Steels, Drill Rod and Cold Drawn Steels is here to help them.

HOW PURDY'S KNOW-HOW SOLVED ONE PROBLEM:

A manufacturer, unable to get shim steel to finish urgently needed dies, put in a call to Purdy. Purdy men suggested using PLANET Blue Tempered Spring

Steel as a substitute. It worked—and the dies went out *on time*! Whatever *your* Victory product, whatever its problem: in steel supply or application, or something demanding *extra* ingenuity in using steel—call on Purdy for quick service.

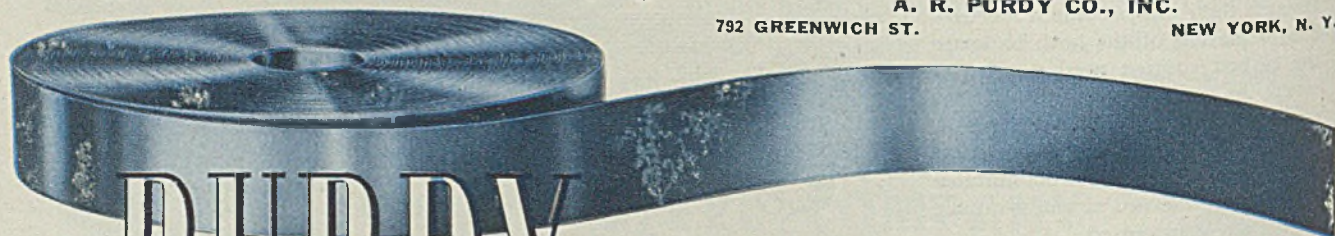
PLANET SPRING STEELS include:

ROUND HIGH CARBON: Polished Music Spring Wires • Hard Drawn and Coppered Drawn Wire • Black Annealed Spring Wire • Oil Tempered Spring Wire.

FLAT HIGH CARBON: Cold Rolled Annealed SAE 1095 Coils and Straight Lengths • Cold Rolled Annealed .70/.80 Carbon Coils and Straight Lengths • Blue Tempered and Polished Coils • Hot Rolled SAE 1095 Sheets • Hot Rolled SAE 1095 Sheets Annealed • Oil Tempered Flats.

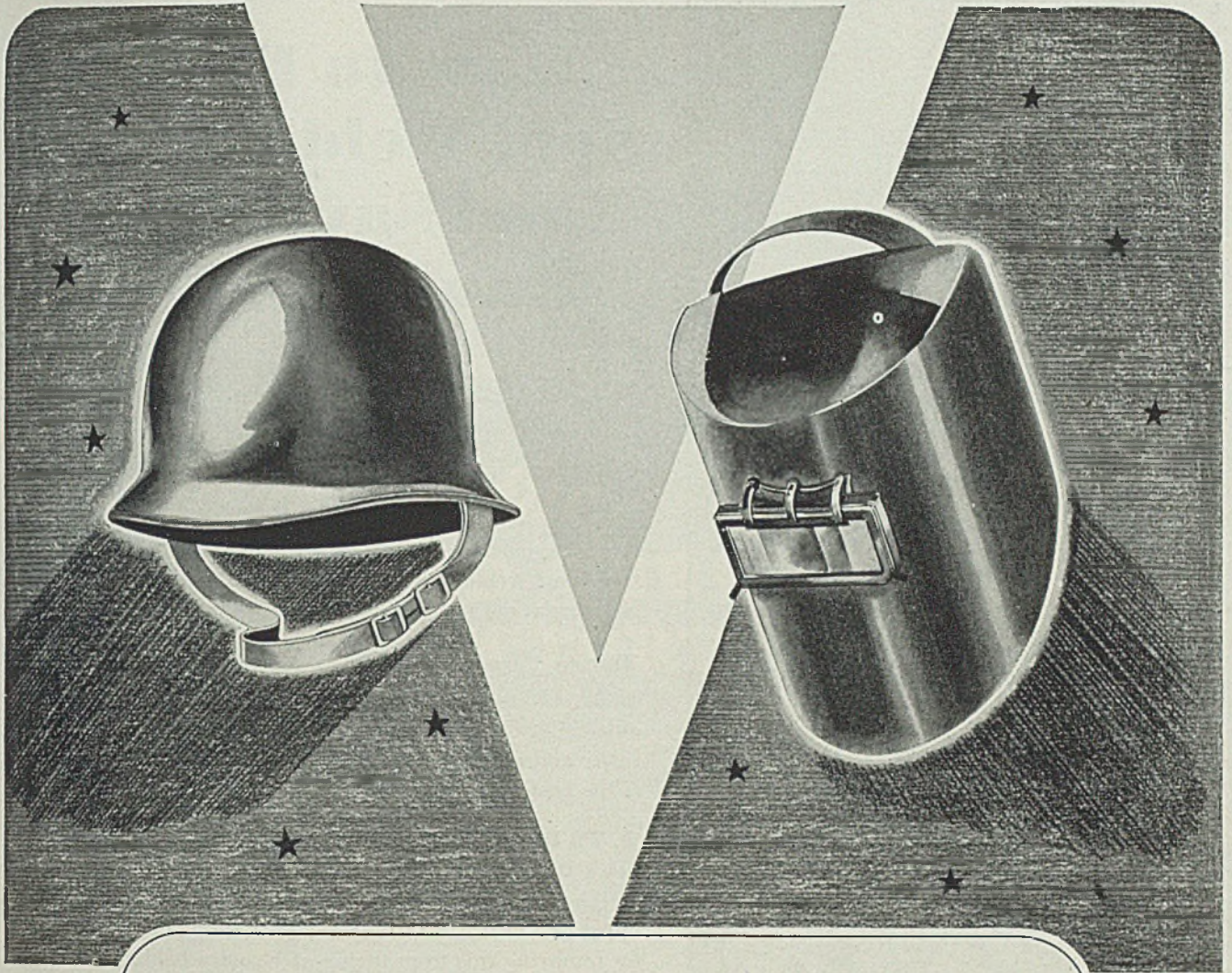
BAR STOCK: Hot Rolled SAE 1095 Rounds, Flats, Squares • Hot Rolled SAE 9250 (Silico-Manganese) Flats.

A. R. PURDY CO., INC.
792 GREENWICH ST. NEW YORK, N. Y.



PURDY

War steels PLUS *Know how*



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This Year!

Helmets are the style again. On the firing line and the production line two-fisted men favor this Victory headgear. To the many new wearers of welder's helmets we would like to say a word on Champion electrodes.

Whenever you use Champions you may be sure of welds which will pass the most rigid inspection. Welds done better and in less time—welds uniform and smooth. There is a size and length for every job—use the largest practical size thereby saving vital critical materials. Be sure and burn them down to shortest stub end.



Send for a copy of our new catalog.

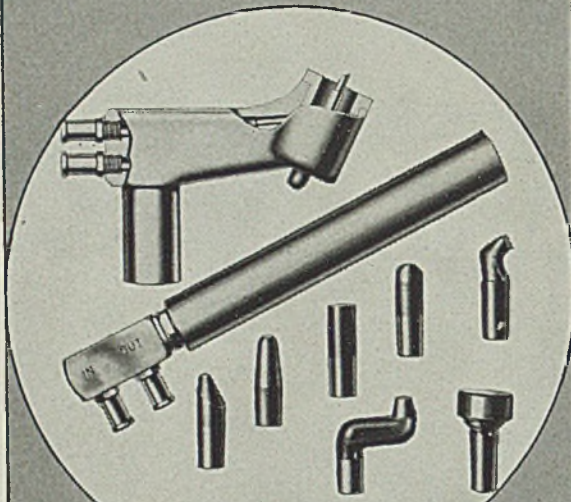
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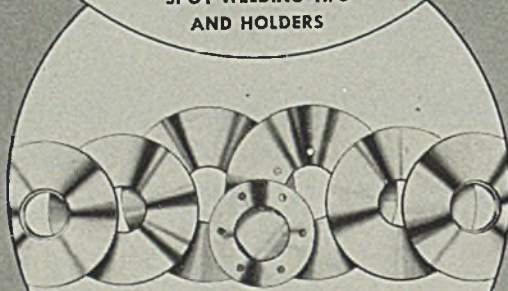
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MALLORY

STANDARDIZED
RESISTANCE WELDING
ELECTRODES



SPOT WELDING TIPS
AND HOLDERS



SEAM WELDING ROLLS



FLASH, BUTT, PROJECTION
WELDING DIES

**Speedier Production
Less Down Time
Better Welding
Lower Cost**

How to Dress Spot Welding Tips and Save Vital Raw Material



You'll save production time and conserve essential raw materials . . . do a better resistance welding job, too . . . by insisting that spot welding tips are dressed correctly in your plant. Here are some suggestions:

Three "Do's"

1. Machine Tips to Size on any small lathe having a suitable collet or quick-acting chuck. A day's supply of tips can easily and quickly be machined . . . and machining on a lathe is the best dressing practice.

2. To Dress Tips on the Machine . . . and thus avoid down time on a long production run . . . use the Mallory Tip Dresser illustrated above. This handy tool re-machines both upper and lower tips to the correct welding face, with no need for removing tips from their water-cooled holders. Or, if a flat tip is being used opposite a pointed or domed tip, the latter can be dressed by inserting a plate between the Tip Dresser and the flat tip.

3. Clean the Surface of electrodes at frequent intervals with a fine abrasive cloth. Use this cloth lightly and don't permit it to become contaminated with iron particles or other dirt that may "burn" the electrode.

A "Don't": In general, do *not* use an ordinary shop file to dress spot welding electrodes. Also, a clogged or dirty file will shorten electrode life by contaminating the electrode.

TECHNICAL DATA SPEEDS PRODUCTION! Selection of the best electrode materials, designs and cooling methods for spot, seam, flash or butt or projection welding . . . it's not easy . . . but the right answers in any specific application will certainly speed output. Mallory metallurgists and welding engineers can give you the right answers to your problems on resistance welding. They'll help you produce better welds, faster, at lower cost. Write today for specific data . . . and for your free copy of the useful 79-page MALLORY RESISTANCE WELDING DATA BOOK.



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**WINGED TUBES
OF VICTORY!**

A unique
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draw bench for
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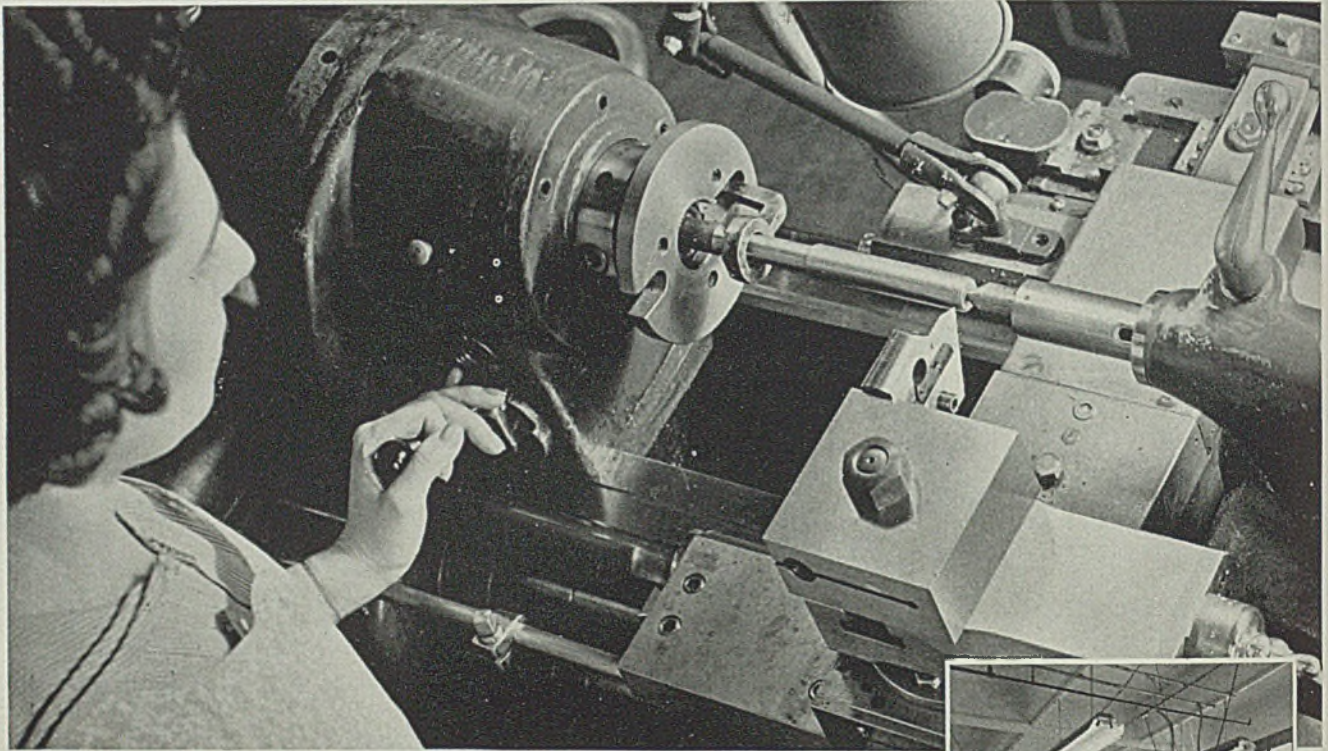
THE VAUGHN MACHINERY COMPANY

Cuyahoga Falls, Ohio, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT
Continuous or Single Hole for the Largest Bar
and Tubes for the Smallest Wire Ferrous
Non-Ferrous Materials or their Alloys.

New Operators

TRAINED QUICKLY FOR HIGH PRECISION WORK



Chasing thread gage laps is one of the most accurate operations in gage work, yet within a few weeks after installing their first machine in this department, The Taft-Peirce Manufacturing Company of Woonsocket, R. I., is operating its entire battery of 16 Monarch Sensitive Precision Lathes with previously untrained help. In spite of this seemingly short training period, production rate is high, accuracy well within required tolerances, and the number of rejects surprisingly low.

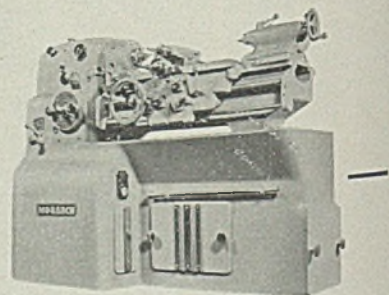
To maintain production, the first Monarchs delivered were manned by experienced workers. One by one,

new operators were carefully trained, and now have released these skilled men for other work.

This is one of many examples which prove the utility of Monarch Lathes. Simple and easy operation allows immediate production of many repetitive jobs by previously unskilled operators. Accuracy is so much a basic part of Monarch Lathe design that neither quality of work nor production rate suffers by such emergency measures.

Further—this is additional proof that even under present production pressure, there is no letdown in Monarch quality.

THE MONARCH MACHINE TOOL COMPANY . . . SIDNEY . OHIO



MONARCH



LATHES

COVER THE TURNING FIELD