STEEL

ESTABLISHED 1882

Contents

Volume 109—No. 7 **August 18, 1941**

PRODUCTION • PROCESSING • DISTRIBUTION • USE

HAVE YOU BEEN

Hollow-Milling THE *LONG WAY*

Here's what you save..

You get 4 chips at each pass instead of one. With a self opening head, you get clean finish and a shorter time cycle. Circular cutters give you many times more tool life and fewer stops for grinds. You sharpen a set of circular mills in the tool room, quickly check them for uniformity, then one simple adjustment brings them all into final position for all diameters—no fussing with individual tools for different diameters, radii or shoulders. This saves down-time and eliminates experimental scrap loss.

You can hollow mill or thread with the same head, simply by changing cutters and blocks—"Double Duty" tools.

If you've been doing a production job the "long way", ask us to show you what Namco Hollow Mills will save and earn.

NATIONAL ACME

170 EAST 131ST STREET • CLEVELAND, O.

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURE

HIGHLIGHTING THIS ISSUE OF STEEL

■ TELEPHONE companies and the mail and transportation services did a sharply increased volume of business last week as many steel consumers alarmed by the drastic OPM announcement of an all-out priority control for steel **(p. 40)**, tried to get assurances as to the future. Worries as to immediate needs seem unjustified; the full impact of the order will not be felt, perhaps, until after Oct. 15. For example, September and October production of automobiles will be at a high level; beyond that **(p. 35)** the outlook is hazy. . . . The new priority setup is an "honor" system, with steel producers working out preferential ratings with customers **(p. 21)**; in cases of disagreement priority "czars" will make quick decisions.

• • •

Business Expands

Priority ratings under this order may be given only to "defense orders," and the broad meaning of this term was described in the OPM announcement **(p. 42)**. As now set up the allocation for civilian purposes of steel left over after defense needs have been met come under the purview of Leon Henderson's OPACS which is studying the entire subject with a view to making an early announcement. . . . In the meantime business that comes under the head of "defense" continues to expand **(pp. 46 and 51)**. . . . More than 800 employes of one company were laid off last week **(p. 25)** for lack of material to build refrigerators. . . . Defense plants are to be so identified **(p. 32)** by means of "Arsenal of Democracy" signs.

• • •

More Ingot Capacity

OPM, after recommending an expansion of 6,500,000 tons in pig iron capacity, and a number of new steelmaking facilities, has received proposals **(p. 30)** for further increase in ingot capacity of more than 12,000,000 tons, with additional proposals to be received. Expansion of bessemer capacity is under study. Electric steel capacity will be further increased. More blast furnaces are to be air conditioned. . . . OPACS **(p. 33)** set a 12-cent price ceiling on copper but authorizes the Metals Reserve Co. to pay higher; has fixed tin prices **(p. 32)**. . . . E. L. Shaner, STEEL'S editor-in-chief, tells how we can get scrap without inflation if **(p. 52)** Mr. Henderson will say the word.

• • •

Chambering Machine Guns

Arthur F. Macconochie continues **(p. 58)** a discussion on principles employed in constructing big guns. . . . An excellent example of application of automotive high-production methods to manufacture of ordnance is the chambering **(p. 62)** of 0.50-caliber machine gun barrels. . . . An ingenious setup for shaping small intricate parts quickly by use of a hand torch **(p. 66)** is described. . . . In a new flanging method **(p. 72)**, a ball is forced through a hole broached in heavy stock. . . . How to cut wasted setup time by changing tool holders instead of tools is explained **(p. 81)** by J. R. Longwell. . . . Nellis Smith details **(p. 84)** a highly efficient redesign for a furnace melting low-temperature alloys.

• • •

Finishing Sprayed Metals

W. C. Reid tells **(p. 90)** how to obtain a good finish on sprayed metal surfaces, presenting much practical data from recent investigations. . . . With the present cry for greater production, details **(p. 97)** of how an English plant increased annealing furnace output 81 per cent are timely. . . . "Dry" lubricants for shell forging **(p. 64)** more than double output. . . . A new method of controlling moisture in blast furnace air **(p. 74)** has excellent record at end of first year. . . . E. W. P. Smith presents **(p. 86)** the second in his series on how to get the most from arc welding. . . . A power trimmer that throws bulk material distances up to 40 feet is feature **(p. 69)** of new bulk loading plant.

SPEED NATIONAL DEFENSE!

Release Freight Cars *More Quickly!*

ONE of the most important ways to speed America's National Defense Program is to use railroad car supply to the utmost.

Here is how you can help:

Load and unload cars as rapidly as possible.

Load to maximum capacity.

Order the right kind and quantity actually needed for loading.

Release cars during the first day of free time.

The railroads are efficiently performing a Herculean task. Freight trains are moving at higher speeds, cars are being maintained in excellent physical condition, and tens of thousands of new cars are being constructed.

Let us cooperate with the railroads—helping them furnish transportation that meets the requirements of America's Defense Program.

INLAND STEEL COMPANY, CHICAGO, ILLINOIS

OPACS Starts Broad Investigation of Steel Industry's Costs

Questionnaires sent to 225 companies as defense agency seeks data for possible future revision of price schedules . . . OPM iron and steel section reorganized to administer new mandatory controls

WASHINGTON

■ OFFICE of Price Administration and Civilian Supply last week sent questionnaires to 225 members of the steel industry asking detailed information on costs of their operations.

OPACS officials said they are anxious to obtain complete cost data from the industry so they will have the information available in case price schedules should be revised. It was denied, however, that any revisions are contemplated at this time.

OPACS Administrator Leon Henderson asked that the questionnaires be returned not later than Sept. 2. Producers not receiving them were asked to communicate with the price control agency.

Questions were limited, it was said, to data "that should be readily available from the records of the steel companies."

Questionnaires include five schedules: Consolidated profit and loss statement; purchases, production and sales; wages, salaries, manhours of employment and major wage and salary changes; consolidated balance sheet; historical data as to production, profits and other factors from 1936 through the first two quarters of this year.

Mr. Henderson said he hoped the steel producers would fill out the questionnaires "as part of the defense program." He promised that all information submitted will be for the use of defense agencies only and will not be published in any form that would reveal the identity of any individual producers.

Aim To Smooth Out Conflicting Rules

Iron and steel section of the Office of Production Management is being rapidly organized to administer mandatory control over all phases of the industry, and affiliated raw material industries concerned with defense.

It is expected that conflicting interpretations and opinions with respect to regulations imposed under various orders will be materially relieved when the organization gets into full operation. Most of the divisional authorities already are functioning.

This section has no control over nondefense requirements which now are being studied by the Office of Price Administration and Civilian Supply. Eventually, the civilian supply section, according to spokesmen, will work out a plan for allocating the tonnage of steel remaining after defense needs are met.

The iron and steel section of OPM falls under Subdivision A of the Production Division in charge of John D. Biggers. Subdivision A is directly in charge of Deputy Director W. L. Batt and includes four other sections, namely, aluminum and magnesium; chemicals; heat, light and power; paper and pulp.

The iron and steel section has as chief A. D. Whiteside. His direct assistant is Charles Halcomb who has the title of priority specialist and will have full power over determination of priority ratings and allocations, according to present indications.

Activities of the section are under three principal divisions covering raw materials, carbon steels and alloy steels.

R. C. Allen has been named assistant chief to head the division covering raw materials.

S. E. Hackett will serve in a similar capacity in charge of carbon steels.

No assistant chief has been named to head the alloy group but it is reported the work at present is being handled by H. Leroy Whitney, who is one of three executive consultants serving the section. The other consultants are Stanley B. Adams and George B. Waterhouse.

Mr. Allen's raw materials group has five subdivisions. Pig iron will be handled by William Kerber, eastern sales manager, Hanna Furnace Corp. Iron and steel scrap will be handled by L. J. Borinstein, president, Institute of Scrap Iron and Steel Inc. Coke comes under Ed-

ward Holley, formerly associated with Semet-Solvay. Don N. Watkins, president, Steel Publications Inc., has been placed in charge of fluxes and refractories. Mr. Allen will handle iron ore personally. R. H. Ridgeway and L. H. Fairley will serve as assistants and consultants.

The division of carbon steels under Mr. Hackett has 12 subdivisions as follows: Ingots and semifinished steel; structural shapes, plates and piling; sheets, strip and tin plate; hot and cold-rolled steel bars; shell steel, rails and accessories; forgings and armor plate; iron castings and cast iron pipe; tubular products; wire and wire products; steel castings and cold-finished bars.

Appointments have not been made covering all 12 subdivisions. Those already made include A. A. Wagner of Jones & Laughlin Steel Corp. on structurals, plates and piling; G. F. Hocker of Bethlehem Steel Co. on forgings and armor plate.

The alloy steel division has three subdivisions, (1) SAE steels, (2) stainless and alloy welding rods and (3) tool steels. Personnel will be named shortly.

In addition to the positions already outlined, there are those covering plant construction and economics and research. W. A. Hauck is staff expert on plants and has been active for some time studying capacity requirements.

In this connection, it is understood that pig iron capacity "required" has been expanded to about 10,000,000 tons from the 6,500,000-ton figure formerly mentioned. Steel capacity may run as high as 12,000,000 tons (See also page 30.)

Paul Homan is staff consultant on economics and research.

Speedup in the flow of steel to defense industries is expected by officials in the iron and steel section through operation of full priority control which becomes effective Sept. 1.

Particular significance is attached to the detail set forth in form PD-73 which classifies defense requirements into eight groups. In effect, the new priorities control setup institutes an honorary system permitting steel producers and their customers to work out preferential ratings between themselves, thus cutting red tape and delay, often running into weeks, which has been encountered in handling ratings through Washington.

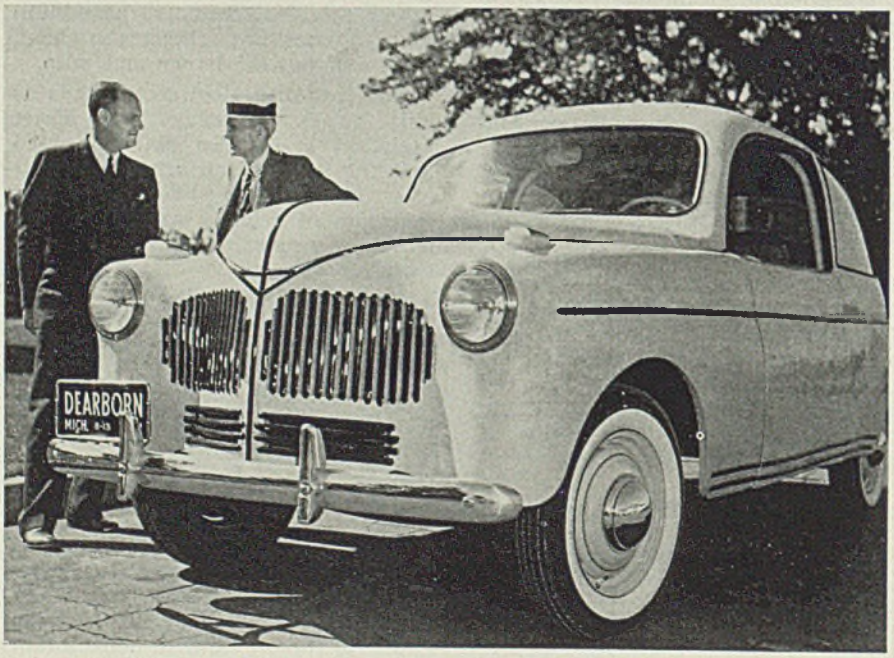
In cases where producers and consumers cannot agree, the matter of ratings must be referred to the iron and steel section which now falls under subdivision A of the division of production of OPM. Men in this section have been designated as referees to make quick decision on allocation.

These men are "czars" in the sense that they can act quickly.

In general, it is expected that much of the confusion over ratings will be eliminated by the new setup. Recently, mills with a large percentage of their capacity devoted to production of defense have found it almost impossible to determine preference and to schedule operations efficiently with orders carrying top ratings coming from several government agencies, often at the same time.

In filling out Form PD-73 which is shown on page 41, the Priorities Division urges that the proper group and products classifications be used. All steel covered by one statement is to be for only one group classification. This certified statement is sent to the steel producer with the consumer's order and not to the OPM. (See also pp. 40, 42, 43, 44.)

Ford Plastic Body Appears; Substitution "a Long Way Off"



■ Making a surprise public bow in Dearborn last Wednesday was Henry Ford's much-publicized experimental car with all-plastic body, shown here with Mr. Ford and R. A. Boyer, research chemist in charge of plastic development.

With conventional chassis, the car comprises 14 plastic panels, weighing 250 pounds, mounted on a welded steel tubular framework weighing another 250 pounds. Total weight of the car is about 2000 pounds, two-thirds the weight of the regular production car of the same size.

Plastic panels are 70 per cent fiber, 30 per cent resin binder, ¼-inch thick and molded under heat and 1500 pounds pressure. Strength of the plastic panels against direct impact is said to be ten times that of the thin-gage sheet steel used in conventional automobile bodies.

Ford engineers emphasize that the plastic body is still in an experimental stage and that any substitution of it for the present steel body is still "a long way off." Commenting on the development, Mr. Ford said:

"Plastic raw materials may cost a little more, but we anticipate a considerable saving as the result of fewer fabricating and finishing operations. For example, the relatively simple rear compartment door when made of steel requires no less than seven stamping operations, while only two are required for the same panel made of plastic."

Also, Shoe String Tips

Plastic shoe string tips will release about 500,000 pounds of metals, principally tin, to vital industries in 1941 alone, it is estimated by E. I. du Pont de Nemours & Co., Wilmington, Del.

More than half a billion laces of all types, from infants' shoes to cavalry leggings, will be plastic tipped in 1941. Sales of "Pyralin" cellulose nitrate and other plastics for tipping have skyrocketed.

One pound of plastic, it is stated, replaces more than three pounds of metal.

Inland Steel To Air Condition Blast Furnace

■ Inland Steel Co., Chicago, has ordered from Trane Co., La Crosse Wis., complete equipment to air condition one of its Indiana Harbor, Ind., blast furnaces. The unit, which can be utilized with either No. 1 or No. 2 stacks, will be used experimentally to determine whether furnace efficiency can be improved by control of air blast moisture. Six months will be required for delivery and installation of the equipment, after which an extensive program of research will be undertaken. Cost of the undertaking is estimated at $150,000.

Production of Birmingham, Ala., furnaces, has been increased about 7 per cent by air conditioning, but not much is known as to what may be accomplished in northern sections where humidity is considerably lower. Only other northern installation is at Aliquippa, No. 1, stack of Jones & Laughlin Steel Corp., Pittsburgh, completed early this year and with which favorable results have been reported.

OPM has been considering air conditioning of blast furnaces as a means for obtaining an early increase in the country's pig iron production, and just a few days ago sent out telegrams to steelmakers asking them to submit proposals for air-conditioning.

British Steel Orders Given A-4 Rating

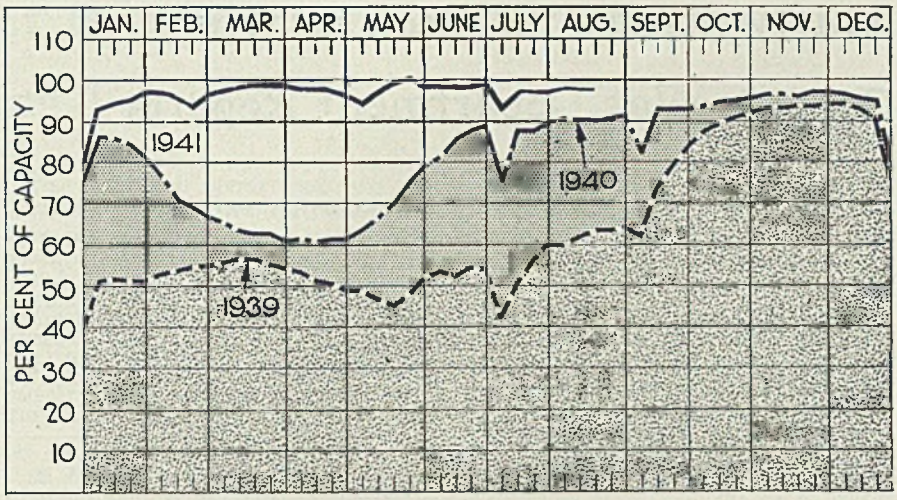
■ British steel requirements are reported taking an A-4 rating which is just below those applying on steel for the Army and Navy and the Maritime Commission.

The British also are getting top preference on pig iron and scrap under lease-lend provisions, it is reported. Pig iron requirements of the British are placed near the head of the list.

What amounts to actual allocations also are being effected on scrap, even though the material must come largely from the Central Eastern area where domestic mills are encountering acute shortages.

Sloss-Sheffield To Open Two Iron Mines

■ Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., plans to open two additional iron ore mines within 60 days, one at Russellville and one near Leighton, Ala. Production is estimated at 360,000 tons of iron ore annually for use in the company's four blast furnaces. Cost is estimated at $350,000.



PRODUCTION . . . . Steady

■ STEELWORKS operations last week continued at 98 per cent; two districts made small gains, three declined and seven were unchanged. A year ago the rate was 90 per cent; two years ago it was 63½ per cent.

Youngstown, O.—Production last week held at 98 per cent. Outlook is for the same rate this week. Pittsburgh Coke & Iron Co. suspended a blast furnace for 36 hours for repairs, but has resumed.

New England—Advanced 3 points to 90 per cent, only need for repairs preventing capacity operation.

Cincinnati — Declined 1½ points to 85½ per cent, due to repairs.

Detroit — Completion of open-hearth repairs last week lifted the rate 5 points to 94 per cent. Only two of 26 open hearths in this district are idle.

Chicago — Down ½-point to 100 per cent, because of repairs. Pig iron production continues at practical capacity, all 38 available stacks being active.

Birmingham, Ala. — Continued at 90 per cent, with 22 open hearths active.

St. Louis — Unchanged at 98 per cent, a rate likely to continue for some time unless scrap shortage interferes.

Cleveland — Receded 3 points to 89½ per cent as one interest took off furnaces for repair.

Pittsburgh — Held at 100 per cent of capacity.

Wheeling — Maintained production at 93 per cent for the fourth week.

Central eastern seaboard — Continued at 95½ per cent for the third week.

Buffalo — With all but four open hearths in service the rate remained at 90½ per cent for the third week.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Aug. 16	Change	Same week 1940	Same week 1939
Pittsburgh	100	None	80	56
Chicago	100	— 0.5	97.5	58
Eastern Pa.....	95.5	None	89	43
Youngstown ..	98	None	86	55
Wheeling	93	None	99	86
Cleveland	89.5	— 3	86	83.5
Buffalo	90.5	None	88.5	58
Birmingham ...	90	None	88	75
New England..	90	+ 3	80	70
Cincinnati	85.5	— 1.5	78	60
St. Louis.....	98	None	77.5	57
Detroit	94	+ 5	89	82
Average	98	None	90	63.5

Report OPACS May License Scrap Brokers

■ Reports were circulating in the scrap iron and steel trade in Pittsburgh last week that the government is considering licensing dealers and brokers as a means of controlling prices. While it was impossible to confirm the reports in official quarters, such a move would not surprise the industry, it was said.

Licensing would be by OPACS. Evasion of the OPACS price schedule and regulations governing the marketing of scrap would result in revocation of license.

■ Index of value of iron and steel inventories in June was 126.0 compared with 125.6 in May and 116.3 in June of last year, taking Dec. 31, 1938, at 100, according to the monthly business survey of the Department of Commerce.

Thirty Strikes in Week Slowing Output, War Department Reports

■ THIRTY strikes affecting production of defense materials for the Army were reported last week by the War Department. Total of workers out was 23,400.

Three strikes were considered particularly serious in their effect on warplane, machine tool and tank production: CIO-United Automobile Workers strike at the Allentown, Pa., plant of Mack Truck Co., involving 4000 engaged in manufacturing tank and antiaircraft gun parts; AFL International Association of Machinists strike at the Curtiss-Wright propeller plant, Caldwell, N. J., with more than 400 out and ended when the strikers voted Aug. 14 to return to work; and the CIO-UAW walkout at the Ampco Twist Drill Co., Jackson, Mich., working 100 per cent on defense orders and with 250 reported on strike.

Statistics compiled by the National Association of Manufacturers, New York, show 15,330,283 man-days of work lost through strikes in the first seven months this year. The accompanying table, compiled by the association, shows workers engaged in strikes and man-days of work lost.

STRIKES ON DEFENSE PROJECTS

	Number of Workers Involved	Man-days of Work Lost
January	48,904	357,000
February	26,281	301,579
March	68,144	649,213
April	127,399	1,071,380
May	110,993	685,770
June	68,287	757,047
July	51,803	536,611
Totals	501,811	4,358,600

STRIKES ON NONDEFENSE PROJECTS

	Number of Workers Involved	Man-days of Work Lost
January	46,027	336,000
February	21,690	468,742
March	28,064	576,935
April	434,874	8,324,261
May	157,082	1,523,817
June	80,470	1,841,176
July	109,489	2,259,352
Totals	877,696	15,330,283

Labor Board Reports CIO Has Majority in 17 Republic Plants

Steel Workers Organizing Committee (CIO) has a majority of members in 17 of Republic Steel Corp.'s plants according to a preliminary report by the National Labor Relations Board. The board states it checked SWOC membership rolls against the company's payrolls after Republic had agreed to recognize SWOC as bargaining agency in any plants where such a check indicated a majority of employes were union members.

The check showed 28,482 of 40,585 employes in the 17 plants were SWOC members in good standing. Nine other Republic plants were not included in the survey.

For the individual plants, the board listed the following total employment and SWOC membership:

Strip mill, Cleveland—5229 and 4105.
Upson Bolt & Nut division, Cleveland—1806 and 1437.
Steel & Tubes division, Cleveland—427 and 309.
Truscon Steel Co., Cleveland—390 and 300.
Steel plant, Youngstown, O.—8047 and 5148.
Steel plant, Warren, O.—5047 and 4109.
Steel plant, Niles, O.—589 and 511.
Culvert division, Canton, O.—69 and 37.
Union Drawn Steel division, Massillon, O.—497 and 395.
Ideal Foundry division, Newton Falls, O.—120 and 114.
Steel plant, Buffalo—2586 and 1890.
Steel works, South Chicago, Ill.—1866 and 1191.
Grand Crossing, Ill., works, 169 and 109.
Troy, N. Y., works—140 and 131.
Steel plants, Canton, O.—7721 and 5107.
Berger Mfg. division, Canton, O.—1081 and 800.
Steel plants, Massillon, O.—4801 and 2789.

The labor board issued a stipulated order in Washington under which Republic agreed to disestablish three independent employe labor organizations at its Chicago plant and to cease discouraging membership in SWOC. Order also provided for reinstatement of 400 workers with back pay.

SWOC Prepares for Drive On Unsigned Producers

SWOC leaders held a conference in Pittsburgh last week to outline a drive against remaining unsigned steel producers. International officers, with exception of Philip Murray, who is still confined to a hospital as a result of a heart attack, met with representatives of local lodges from plants of Republic Steel Corp., Cleveland, Inland Steel Co., Chicago, Youngstown Sheet & Tube Co., Youngstown, and Bethlehem Steel Corp., Wilmington, Del.

Cranemen Strike Against "Domination by the CIO"

A new type of strike was called in Pittsburgh last week when cranemen of the Pressed Steel Car Co. walked out, tying up the plant. Company had been down several days because of a strike called by CIO leaders asking recognition. When it promised to negotiate with the union, work was started again.

Cranemen then walked out because they "didn't want to be dominated by the CIO."

■ Inspirational posters, designed to encourage employes to speed up production of gages and instruments essential in defense industries, are posted on all billboards in the Manning, Maxwell & Moore Inc. plant, Bridgeport, Conn. Shown here are two of the series. Posters are drawn by company employes on tracing paper, reproduced in black and white in the blueprint department, and livened up with red and blue showcard ink

Navy Officials Inspect Bethlehem's Defense Manufacturing Facilities

BETHLEHEM, PA.

■ THE VAST scope of defense work being done by Bethlehem Steel Co. was indicated when Rear Admiral C. W. Woodward, United States Navy, representing the Federal Board of Civilian Protection, visited the plant here, Tuesday, Aug. 12.

In an inspection lasting almost four hours, the rear admiral and his party of naval officers, and representatives of the press, were conducted through the shops engaged in the production and processing of armor plate, guns, ship shafting, shells, forged airplane parts and other munitions.

They saw a 180-ton slab being forged in a 14,000-ton press. The press is one of perhaps no more than three of its size in this country.

In other departments armor plate of special thickness for turrets, and weighing 80 to 100 tons, was going through final operations. Water quenching of large forms of armor plate attracted considerable interest. All armor plate at Bethlehem is fully processed and machined, except for deck plate, which must undergo further fabrication at the ship yards.

In one shop were seen large blocks of steel, which were subsequently to be pierced and then forged into shafts and gun barrels several times their original length.

The shell and bomb shop proved to be one of the most interesting and spectacular. Here were projectiles in various sizes and shapes and in various stages of operation from heating and forging to treating and final machining.

At one stage the visitors traveled in a narrow space which seemed to be hemmed in on either side by forms of hot metal, glowing hot shells moving on conveyors to quenching baths or other destinations, or steel from heating furnaces being fed by other means to forming presses, from which would burst flames and clouds of black smoke.

♦

■ *News photographers had a field day at Bethlehem. At least one, however, was disappointed. Rushing up as a big overhead crane was moving away with an incandescent piece of steel, he yelled frantically to the craneman, high in his cab: "Hold it!"*

Those nearby declared it marked the peak of futility.

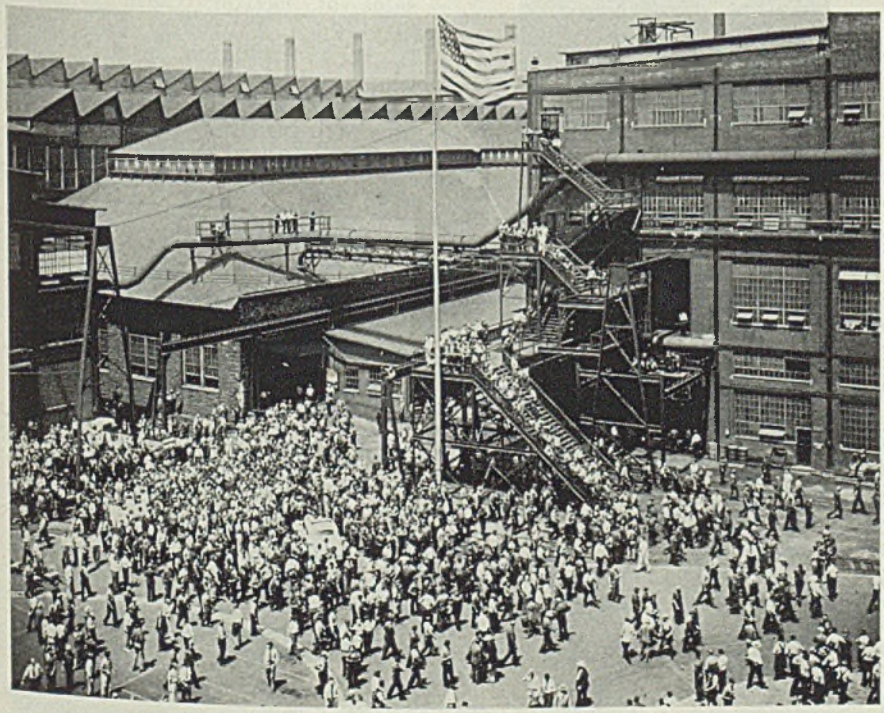
♦

At one part of the plant a large structure was under erection—an additional forging shop, costing $26,000,000, to be placed in operation in November.

Rear Admiral Woodward in one of his three addresses to workmen at different parts of the plant during the day, referred to shipwork Bethlehem is doing for the government.

Contracts for the construction of 76 ships of various types for the two-ocean navy have been awarded to Bethlehem. Included in this number are one battleship, four aircraft carriers (one-third of the total building); eight heavy cruisers (100 per cent of those building); eight light cruisers (20 per cent of those building); and the remainder destroyers (or 25 per cent of those building), with an over-all average for this one company of 35 per cent.

In addition 105 merchant vessels (potential naval auxiliaries) are under construction or on order in Bethlehem yards. Bethlehem's forging operations are being expanded to supply the armor plate shafting and gun forgings for all ships being built in Bethlehem yards.



■ One of several groups of workers assembling to hear address of Rear Admiral C. W. Woodward when he visited the Bethlehem Steel Co. plant, Bethlehem, Pa.

New Curtiss Plant Dedicated at Buffalo

■ Without any delay in production of the P-40 pursuit planes, officials of the United States, Great Britain and Canada dedicated the new $18,000,000 Curtiss-Wright Corp. plant at Buffalo airport last week. American defense officials predicted that this and other United States plants will be producing a total of 3000 planes monthly by next summer.

William S. Knudsen, OPM Director General, Robert P. Patterson, undersecretary of war, and Merrill Meigs, OPM aviation expert, joined Curtiss-Wright President Guy Vaughn and Vice President Burdette S. Wright and thousands of workers and citizens in watching the 2000th P-40 plane move off the assembly line.

Defense officials announced that the local Curtiss plants will be turning out 500 planes a month almost immediately.

GE Furloughs 800 Due To Materials Shortage

■ More than 800 employes in the refrigerator department of the Erie, Pa., works of General Electric Co., Schenectady, N. Y., were notified last week of a two weeks layoff until materials necessary for fabrication of the new model refrigerators are available. Should the required materials fail to arrive, the company stated, the layoff may be extended.

Some of the 800, it was reported, may be transferred to departments where gun mounts and navy turbines are being manufactured.

MEN of INDUSTRY

■ **D. G. BAXTER** has been appointed general superintendent in charge of Copperweld Steel Co.'s Warren, O., plant. A graduate of Ohio Northern University, Mr. Baxter had previously been associated with American Steel & Wire Co., Pittsburgh Crucible Steel Co., Republic Steel Corp., and National Tube Co.

♦

George Brouwer, former vice president, National Piston Ring Co., has been named general superintendent and production manager, Ramsey Mfg. Co., which has taken over the piston ring plant at Fruitport, Mich.

♦

R. S. Ernst has been appointed representative in Indiana, Wisconsin and part of Illinois for Hele-Shaw Pump Division, American Engineering Co., Philadelphia. His headquarters are at room 329, 844 Rush street, Chicago.

♦

William T. Dean, the past ten years superintendent of the 44-inch blooming and 36-inch slabbing mills, Gary works, Carnegie-Illinois Steel Corp., has resigned to become district manager in the Chicago area for the Bloom Engineering Co., Pittsburgh.

♦

George H. Criss has been appointed Pittsburgh district representative for the Baker Industrial Truck Division of Baker-Raulang Co., Cleveland. He succeeds the H. E. McCoy Co., and has represented the Baker company in that territory since Mr. McCoy's death last October. Prior to joining the McCoy company in 1919, Mr. Criss was associated with the Pittsburgh office of Westinghouse Electric & Mfg. Co. nine years.

♦

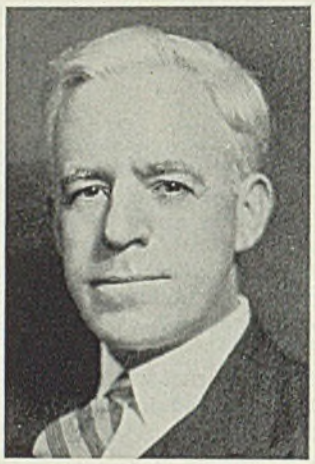
Charles F. Hammond, for 22 years chief metallurgist, Winchester Repeating Arms Co., New Haven, Conn., and more recently superintendent of the Cartridge division, has resigned to become assistant to the president, A. F. Holden Co., maker of heat treating baths and equipment, New Haven, Conn.

♦

William J. McIlvane has been named general manager of sales, Copperweld division, Copperweld Steel Co., Glassport, Pa. Formerly sales promotion manager, Mr. McIlvane succeeds **Robert J. Frank,** heretofore vice president in charge of sales, who continues as vice president and a director.

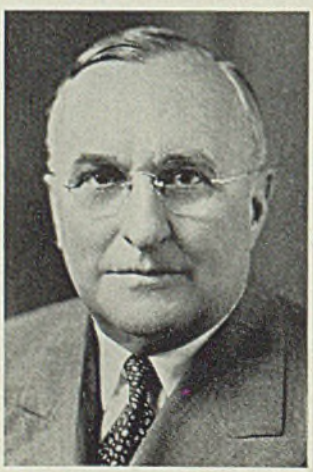
♦

Charles E. McIntyre has been appointed assistant manager of sales at Detroit, Carnegie-Illinois Steel Corp., Pittsburgh, to succeed **L. B. Worthington,** who has become manager of sales, bar, strip and semifinished materials division. Mr. McIntyre has been associated with the United States Steel Corp.



D. G. Baxter

William T. Dean



Jay L. Hench

Who has been elected president and treasurer of Mid-West Forging & Mfg. Co. and Hillside Fluor Spar Mines, Chicago, as noted in STEEL, Aug. 11, page 28

W. B. Marshall

Whose promotion to sales manager, Conveying and Engineering Products Division, Chain Belt Co., Milwaukee, was noted in STEEL, Aug. 11, page 28

B. E. Sivyer

Who has been appointed assistant sales manager, Chain Belt and Transmission Division, Chain Belt Co., as reported in STEEL, Aug. 11, page 29

subsidiary during his entire business career. After six years with the warehouse division of the former Carnegie Steel Co. at Cleveland, he joined the Cleveland sales office in 1917, became a salesman in 1924, and assistant manager in 1939. He has been in charge of the Buffalo sales office since January, 1940.

♦

C. E. Wright, who has been engaged in iron and steel trade journalism more than 20 years, the past five years as managing editor of *The Iron Age,* has become vice president, Charles Dreifus Co., brokers in iron and steel scrap, Philadelphia and Pittsburgh. Mr. Wright had been associated with *The Iron Age* since 1917 except for an interval of three years from 1933 to 1936 when he was identified with the New York sales office of Republic Steel Corp., Cleveland.

T. W. Lippert has been named managing editor of *The Iron Age,* succeeding Mr. Wright. He joined the organization in 1932 as associate editor, later becoming technical editor.

J. A. Rowan has become news and markets editor. He has been associated with the publication since 1937.

Donald R. James, Cleveland editorial representative of *The Iron Age,* will be transferred to the New York office Sept. 1. He formerly was associated with the Penton Publishing Co. at Cleveland and Pittsburgh.

♦

Lincoln R. Scafe, former general manager, Fisher Body division of General Motors Corp. at Cleveland, has been appointed general manager, Glenn L. Martin-Nebraska Co. He had been an executive of General Motors 19 years and will now divide his time between temporary offices of the Martin-Nebraska Co.

C. E. Wright

at Baltimore and Omaha, Nebr. The Nebraska company now has a $166,000,000 contract for assembly of Martin B-26 bombers, 60 per cent of the sub-assembly work on which will be done by Chrysler Corp., the Goodyear Tire & Rubber Co., and Hudson Motor Car Co.

♦

Howard J. Mullin, since 1938 assistant to manager of sales at Kansas City, Mo., Carnegie-Illinois Steel Corp., has been transferred to Detroit as assistant to manager of sales. Following graduation from Dartmouth college in 1927, Mr. Mullin joined the former Illinois Steel Co. He served as a salesman at Chicago and Milwaukee before going to Kansas City.

♦

T. H. McSheehy, Chicago district sales manager, and hardware products sales manager, Wickwire Spencer Steel Co., New York, has been named Pacific coast sales manager of all products, with headquarters at the company's San Francisco offices, 101 Townsend street.

William M. Smith, with Wickwire Spencer since 1924, in various sales capacities in the East and Middle West, has become Midwest district sales manager of all products, with headquarters at the company's Chicago offices, 221 North LaSalle street.

Percy Jenkins, formerly New England district sales manager, has been transferred to New York as sales manager, hardware products department, the headquarters of this department having been moved from Chicago to New York.

Charles R. Stephens, heretofore Pacific coast sales manager, returns to the East to become New England district sales manager, with headquarters in Worcester, Mass.

♦

Dr. Monroe J. Bahnsen has been named assistant director of the Ferro laboratories, Ferro Enamel Corp., Cleveland. Previously employed in the laboratories of United States Gypsum Co. and Grasselli Chemical Co., he joined the porcelain enamel research staff of Ferro Enamel in 1934.

♦

N. M. Barnett has been placed in charge of the Detroit branch office recently opened by Bailey Meter Co., Cleveland. He is assisted by **R. F. Hanson** and **T. R. Cowan.** The company has also assigned the following engineers to field duty: **L. L. Melick,** New York; **J. F. Triolo,** Philadelphia; **G. M. Wallace,** San Francisco; **B. F. Elias,** Cincinnati; and **D. E. Smith,** Buffalo.

♦

Charles R. Pollock has been placed in charge of sales and service at Detroit for Mahr Mfg. Co., division of Diamond Iron Works Inc., Minneapolis, with headquarters at 7450 Melville avenue at Green. The district formerly handled by **Gerald S. Duff** is now in charge of **Joseph Sodoma** at 7 Girard place, Maplewood, N. J., while the Colorado, Utah, Oklahoma, Nebraska and Wyoming territory is in charge of **Edward C. Swan,** with headquarters at 2217 East Twenty-fourth avenue, Denver.

T. H. McSheehy

William M. Smith

Percy Jenkins

C. R. Stephens

From Cork to Shells—Emergency Brings Manufacturing Transitions

■ WHEN declaration of a national emergency 15 months ago caught the United States virtually without a munitions or ordnance industry, hundreds of companies normally manufacturing purely civilian products began to rearrange their plants to make defense materials.

The rapidity with which the transition was made was astounding to all who appreciate the difficulties involved. And today men who a year ago were making pencils are producing precision gages; truck drivers are operating lathes; workers who formerly made animal traps now fashion army cots; automobile workers are building tanks, shells, planes and other defense materials.

Plants throughout the country have made similar transformations, both because the emergency demands war materials and because materials which normally would be used for civilian manufacture no longer are available for this type of work. To avert dislocations of labor and plant facilities, it has been necessary to radically change products and manufacturing methods.

One interesting example of a company now filling defense orders of a nature greatly different from its normal products is that of Armstrong Cork Co., Lancaster, Pa. Two of the largest of this concern's 17 plants are located in Pittsburgh and Lancaster. In ordinary times a wide variety of cork products is manufactured in the Pittsburgh plant. At Lancaster, usual products are linoleum and felt base floor coverings.

But the emergency has changed all that. Two production lines at Pittsburgh and one at Lancaster are filling War Department orders for more than seven hundred and fifty thousand 75-millimeter and 3-inch shells. Last week the company announced it had received a contract from the Army for six hundred thousand 105-millimeter chemical shells, which will be produced at the Lancaster floor division plant. Company also is preparing to manufacture one million 37-millimeter brass shell casings in its Lancaster closure plant; the same plant is making metal parts for percussion fuze detonators.

Time Important Factor

Two major problems faced Armstrong when it was awarded an educational order for 75-millimeter shells. First, it was necessary to secure a number of precision machine tools used in making shells. Secondly, men who had been truck drivers, linoleum inspectors and paint mixers had to be taught the skills needed to operate centering, knurling and tapping machines, nosing and drilling presses, and turning lathes which are found on the production line.

Time was an important factor in obtaining machine tools. On several occasions production delays were threatened when parts needed for these machines could not be quickly obtained. However, for many years Armstrong has built in its own shop a large part of the special machinery used in its factories. As a result, these difficulties were overcome by calling on trained machinists who could design and make the necessary parts. Men in this machine shop are now working on various subcontracts for defense equipment parts.

Training policies which have been in effect for several decades made it possible for Armstrong to have the manpower needed for expanding defense activities. Each year, senior students at many colleges and engineering schools are interviewed. Applicants who are accepted are put through a planned training program that may last from nine months to a year and a half. All supervisors return to the home office every three years for additional training. Consequently, it was possible to take men from various manufacturing divisions to co-ordinate Armstrong defense work. In addition, it provided supervisors who could teach men how to operate the machines used in producing munitions.

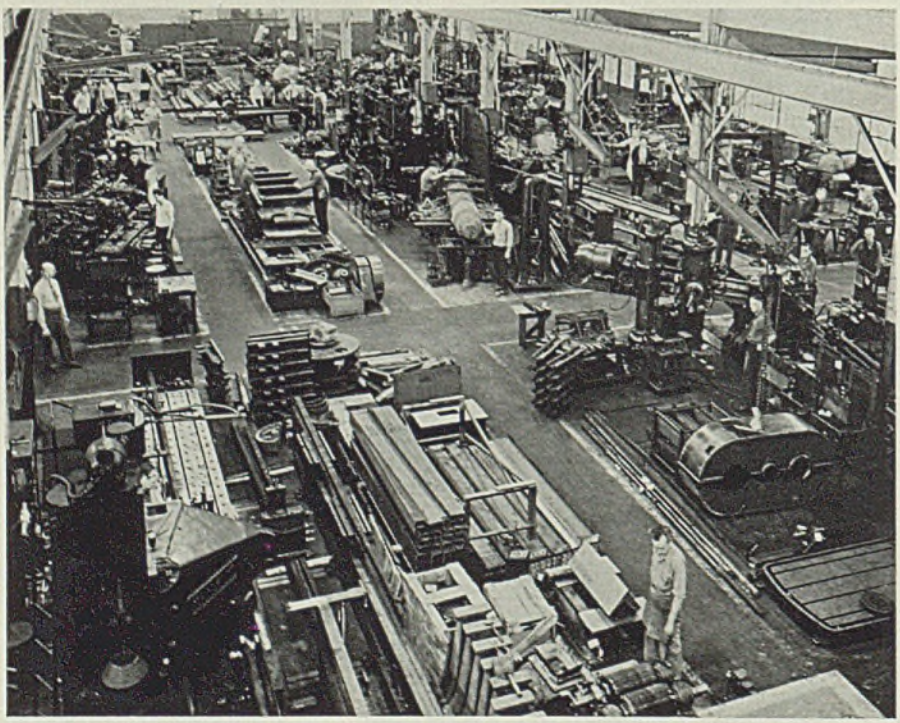
As soon as equipment had been installed in the shell shop in Lancaster, a number of men were called from their regular duties for training in shell manufacturing. For the most part, this group had had no previous precision tool experience. Each man, under the eye of a supervisor, operated each machine in the production line until he had learned that operation thoroughly. Then he was assigned to a specific job.

Success of this training is best reflected in the fact that on the company's educational order, 99.51 per cent of shells turned out were perfect, an exceptionally high record.

Received Shell Orders

Armstrong next received three regular contracts for shells. One of these is being filled in Lancaster and the other two in Pittsburgh. In the latter case, it was necessary to train corkworkers to operate precision tools. To accomplish this, a number of men left their jobs in Pittsburgh and reported to the shell shop in Lancaster. In this group were three veteran employes who have been with the company for more than 40 years. These men, after training, returned to Pittsburgh to help set up production lines and to teach other men.

As with numerous other com-



■ One of the reasons Armstrong Cork Co. was able to turn from manufacturing cork products to making heavy shells for the War Department is its large machine shop, shown above

panies, many Armstrong products which are vital to defense industries have increased tremendously in demand. These include such items as corks and rubber gaskets and washers for airplane, tractor, automotive and naval diesel engines, insulating fire brick for steel plants, corkboard insulation for food preservation, cork pipe covering for industrial applications in munition and chemical plants, and insulation board for cantonment buildings.

Directing this company's defense work is a new munitions division, created to produce goods needed by the government outside of the regular line of products. Prior to the formation of this division, a war activities committee had made a complete survey of production facilities, placing this information at the disposal of the government. A program was devised to help prevent major dislocations in the company's normal business in the event of possible future curtailment. Methods were studied for the development of additional defense goods which could be turned out with manufacturing machinery which the company already possessed.

As a result of this careful planning, Armstrong is now in a position to make a greater contribution to the national defense program by expanding its defense activities as the day of all-out effort draws near. At the same time, the management is discharging its responsibilities to both employes and stockholders by preparing for any possible disruption of normal manufacturing operations.

Steel Substituted for Aluminum Aircraft Parts

■ Successful substitution of carbon steel for aluminum or alloy steels in certain aircraft parts was announced last week by Crosley Corp., Cincinnati, which has just been awarded two additional contracts by the Air Corps totaling $1,200,000.

Instead of the aluminum die castings and chrome molybdenum forgings formerly used, Crosley is substituting steel drawings and punchings, processed by hydrogen brazing. Result is a slight saving in weight as compared with materials formerly used, and the conservation of a considerable tonnage of aluminum.

The process was developed during experiments for the manufacture of refrigerator cabinets and adapted to aircraft parts.

Aluminum Ware Industry Studies Readjustments

■ Readjustment of the aluminum ware industry to aid the defense program and to relieve the sudden unemployment forced by curtailment of aluminum for civilian uses, was the subject of a meeting held at the Federal Reserve Bank at Cleveland last week. Sponsored by the OPM Labor Division and Defense Contract Service, this meeting was devoted first and foremost to consideration of direct defense work, subcontracts and educational orders as means of utilizing as soon as possible as many as possible of the 16,000 workers and the manufacturing facilities of the aluminum ware industry's 26 plants. These plants are located mainly in Ohio and in Wisconsin.

At present, fully half these workers—together with numerous others involved in sales and distribution activities—have been thrown out of employment because of rationing of the metal supply.

Government officials attending included W. O. Lichtner, chief engineering consultant, Labor Division, OPM, and Peter R. Nehemkis Jr., special assistant, Defense Contract Service. They brought word from Sidney Hillman, associate director general of OPM, that while active efforts already are being made to re-train idle aluminum ware workers for service in other industries, it is far more important to explore every possibility of switching the man and machine power of this industry directly over to defense work—thus disrupting the industry to a minimum degree and getting maximum benefit of its potentialities for defense production.

TVA Will Manage Alcoa Power Plants

■ Tennessee Valley Authority will operate the five-dam hydroelectric system of the Aluminum Co. of America on the Little Tennessee river under terms of a contract signed last week. TVA will not assume ownership, but will direct and control operations and integrate the plants with the government system.

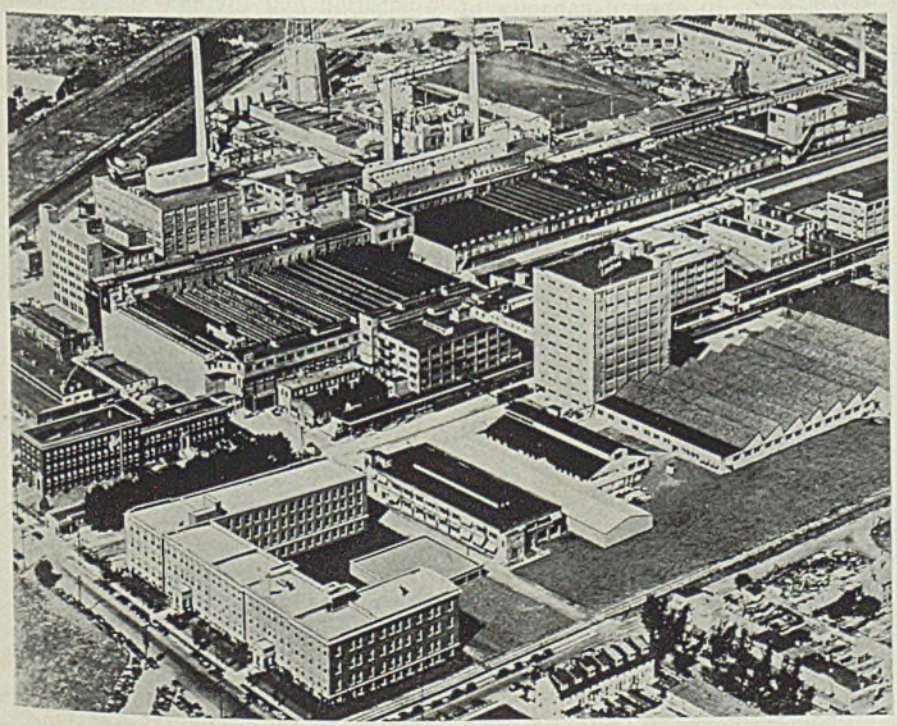
Contract also provides for acquisition by TVA of the Fontana dam site owned by the company. When Congress provides funds, TVA will construct a dam 450 feet high which will require 3,000,000 cubic yards of concrete, three times as much as used in the Norris dam. Cost of project, which has been approved by OPM, will be $50,000,000.

$62,000,000 Magnesium Plant Awarded by DPC

■ Basic Refractories Inc., Cleveland, and unnamed English associates last week were granted a contract by Defense Plant Corp. to construct a $62,000,000 magnesium producing plant near Las Vegas, Nev. When completed the plant will have capacity to produce 112,000,000 pounds of magnesium annually and will be the largest plant in the United States, if not in the world.

Power facilities of Boulder dam will be used to supply the 200,000 kilowatts of electricity necessary.

Magnesium production in 1940 in the United States amounted to 12,500,000 pounds. The government plans to increase total production to 400,000,000 pounds next year.



■ General view of Armstrong Cork Co.'s home office and floor division factory at Lancaster, Pa., now devoted to munitions

Windows of WASHINGTON

12,000,000-ton expansion in steel ingot capacity now proposed in response to OPM request . . . Increase in bessemer facilities also expected . . . Additional electric furnaces for alloy steel sought . . . Blast furnace air conditioning planned to increase iron output . . . Tin, copper price ceiling established by OPACS . . . New priorities compliance section organized

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ PROPOSALS for an increase of more than 12,000,000 tons in steel industry's annual ingot capacity have been received by Office of Production Management in response to its recent request that producing companies submit expansion plans.

This was disclosed last week at a meeting of Steel Defense Industry Advisory Committee with officials of the OPM and other interested government departments.

In addition to the expansion proposals already received, several companies are just now preparing programs.

Further, additional proposals to expand Bessemer steel capacity are expected and the OPM will ask makers of alloy steels shortly to submit further alloy steel expansion programs.

Expansion of Bessemer capacity has been proposed as a means of maintaining and increasing steel production despite a shortage of scrap iron and steel. Steel made in Bessemer converters requires very little scrap.

Additional proposals to install electric furnaces for the production of alloy steel will be requested because the expansion programs submitted thus far do not include sufficient facilities of this type to meet all prospective requirements, especially those for aircraft, military vehicles and other phases of the defense program.

The committee was informed that OPM is currently preparing a recommendation for construction of an emergency fleet of ore boats to operate on the Great Lakes.

Expansion steps already recommended by OPM, summarized:

1. Armor plate and heavy forging facilities at the Duquesne and Homestead, Pa., plants of the Carnegie-Illinois Steel Corp to speed up the naval building program.

2. An initial expansion of approximately 6,500,000 tons in annual pig iron capacity.

3. Installation of a 780,000-ton high speed plate mill at the Sparrows Point, Md., plant of the Bethlehem Steel Co.

A report on the other pending expansion proposals, including recommendations as to what action should be taken regarding them, will be prepared shortly. It is expected to be completed within two weeks.

See Need for Doubling Alloy Steel Finishing Capacity

Capacity for finishing aircraft and other alloy steels probably will have to be doubled to meet requirements of the defense and lend-lease programs, it was indicated last Tuesday at an informal meeting of government officials with steel and iron company executives.

The group discussed various phases of the program being developed by the Office of Production Management to expand capacity of the steel industry generally.

There was general agreement that expansion of facilities for finishing aircraft tubing and other alloy steel required by the Army and Navy should be undertaken as quickly as possible. Another group of steel men interested particularly in this problem will confer with interested government officials this week in an effort to get this program under way in the near future.

Air conditioning of blast furnaces as a means of increasing pig iron production quickly, and thus helping to relieve the existing shortage of pig iron, was another subject discussed. It is expected that blast furnaces in the Birmingham, Ala., area will be air conditioned rather generally, atmospheric conditions in that section making such a step clearly advisable. Air conditioning equipment also may be installed at some blast furnaces at the Sparrows Point, Md., plant of the Bethlehem Steel Co.; Inland Steel Co.'s plant at Chicago; Jones & Laughlin Steel Corp.'s plants in Pittsburgh area, and possibly at other mills in that region. These installations would be experimental, to throw further light on the advisability of air conditioning in the areas mentioned. Jones & Laughlin has had a favorable experience with initial installations already made.

The meeting was told that air conditioning, by reducing and controlling the moisture content of air blown through the blast furnaces, has increased pig iron production of some furnaces in the Birmingham area an average per year of 7 per cent or more. Experience with scattered existing installations in the North has varied widely, it was said, and additional experimentation is desirable there.

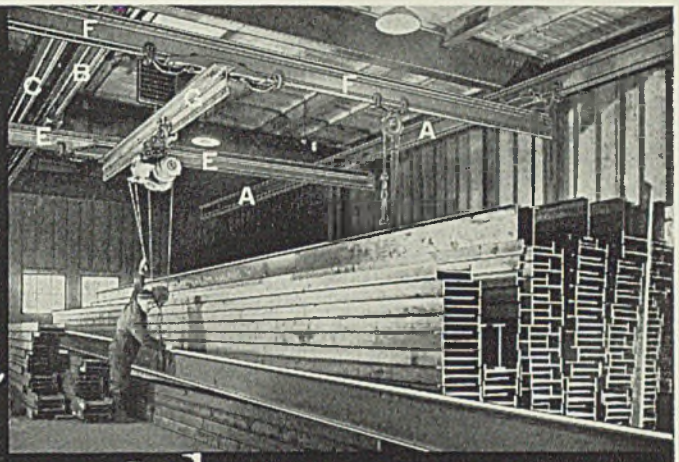
In addition to representatives of OPM's Steel Branch, the Army and Navy and the Office of Price Administration and Civilian Supply, those present included: Quincy Bent, vice president, Bethlehem Steel Co.; H. A. Berg, president, Woodward Iron Co., Woodward, Ala.; W. B. Gillies, vice president, Youngstown Sheet & Tube Co.; J. E. Lose, vice president, Carnegie-Illinois Steel Corp.; F. B. Lounsberry, vice president, Allegheny Ludlum Steel Corp., Watervliet, N. Y.; G. E. Rose, president, Wisconsin Steel Co.; Wilfred Sykes, president, Inland Steel Co.; C. M. White, vice president, Republic Steel Corp.; and William S. Haring, vice president, Alan Wood Steel Co., Conshohocken, Pa.

Priorities Division Establishes New Compliance and Field Section

Creation of a new Compliance and Field Section within Division of Priorities, to consolidate and co-ordinate the program and activities of the Compliance Section, the Priorities Field Service, and Inventory Control, has just been announced by E. R. Stettinius Jr., director of priorities.

The new control section will be

New AMERICAN MONORAIL Criss-Cross System AIDS PRODUCTION



Criss-cross or 3-level American Mono-Rail System stores steel taken direct from gondolas. (Letters on equipment correspond with those on layout below.)

Overhead MonoRail serves the punch (and all units) efficiently . . . fully covers the area . . . permits passing of loads . . . moves them easily.

THIS newly developed MonoRail System of rails, cross rails and bridges is a most efficient and economical means of overhead handling in small plants.

With this system you can place the load exactly where you want it—in storage, fabrication or shipment.

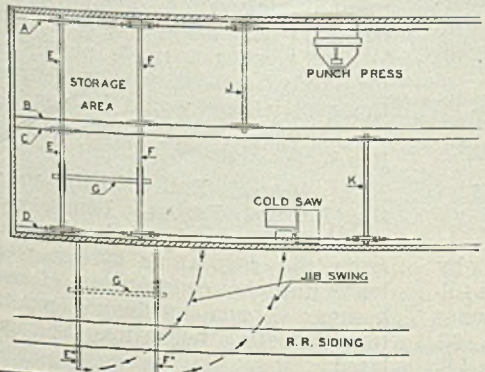
By eliminating floor congestion American MonoRail increases plant capacity. By providing superior mechanized methods for lifting and carrying, it increases the productivity of labor. Skilled labor is not required in its use. Operation and maintenance, a minimum. In many plants this low cost, flexible handling system has soon repaid its cost.

Just what saving you can realize can be soon determined by an American MonoRail engineer. Write us about your problem.

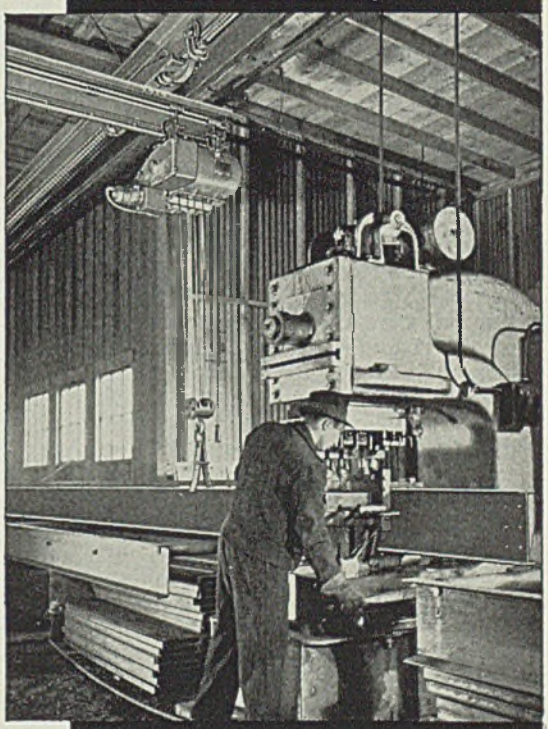
Ask for free copy of "Blue Book" illustrating numerous installations.

THE AMERICAN MONORAIL CO.

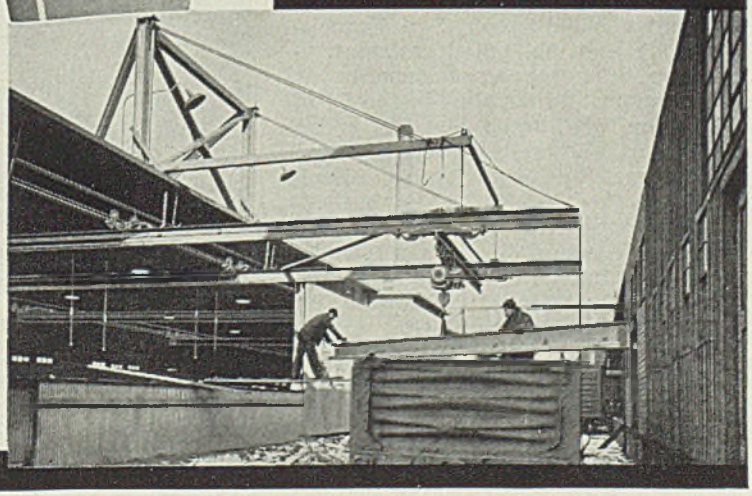
13102 Athens Avenue **Cleveland, Ohio**



Layout of shop showing 3-level MonoRail System.



In unloading or loading parallel jibs (E" and F" on layout) are swung out from building interlocking with tracks (inside) carrying MonoRail bridge equipped with electric hoist . . . unloads and stores without rehandling.



headed by L. J. Martin, Assistant Deputy Director, and will combine and handle all the functions hitherto performed separately by the operation units named.

Working with Mr. Martin as senior consultant will be E. C. Laird Jr. J. H. Ward will be assistant to Mr. Martin. L. Edward Scriven will direct operations of the Compliance Unit and the Field Service organization. Mr. Ward, Mr. Laird and Mr. Scriven are Assistant Deputy Directors.

Mason Manghum will head an Industrial Contact and Education Unit of the new section.

During the early operations of the Priorities Division, the agencies which are now being consolidated were started independently as the need for each arose. The Priorities Field Service, for example, was set up to make available in all parts of the country advice and assistance to business men and producers who wanted help in operating under priorities regulations.

This section of the Priorities Division has developed rapidly and of 36 field offices contemplated, 16 are already in operation.

The Compliance Section was set up to review cases of noncompliance with priorities orders. The Industrial Contact and Education unit of the Compliance Section was an integral part of the noncompliance work. Its purpose was to work in close co-operation with industrial groups through educational means, to prevent the necessity for punitive action in noncompliance cases.

Under the direction of Mr. Scriven, who will continue to direct activities in field offices, the following offices have already been opened: Boston, New York, Philadelphia, Atlanta, St. Louis, Kansas City (Branch of St. Louis), Chicago, Cincinnati, Cleveland, Denver, San Francisco, Pittsburgh, Dallas, Detroit, Los Angeles, Seattle.

More Assistants Appointed to OPM, Other Defense Agencies

James MacPherson, San Francisco, has been appointed assistant director of purchases in charge of equipment and supplies in the OPM Division of Purchases. He is on leave of absence as secretary and treasurer, California-Arabia Standard Oil Co.

Lawrence Cramer, New York, former governor of the Virgin Islands, has been named executive secretary of the President's Committee on Fair Employment Practice.

Cyrus McCormick, Santa Fe, N. Mex., grandson of the inventor of the reaper, has been named price executive in the automobile and truck section, price division, OPACS.

H. B. Hayden, special assistant to the Chief of the Air Corps, has been appointed by OPM to serve as that agency's representative in handling lend-lease matters.

"Arsenals of Democracy" Signs for Defense Plants

Designs and specifications for three signs to identify defense plants as parts of the "arsenal of democracy" were sent to prime defense contractors last week by William S. Knudsen, OPM Director General. The signs, in three colors and 4 x 6 feet in size, may be constructed and displayed by any firm devoting 50 per cent or more of its facilities to defense

production. Prime contractors have been requested to extend permission to subcontractors.

"I feel sure every defense worker—whether in management or labor—will feel a closer relationship with the defense effort through the display of this identification," Mr. Knudsen wrote. "I am sure also that everyone will feel more keenly the tremendous responsibility of being a part of the arsenal of democracy."

Metals Reserve Co. Buys Tin From Netherlands East Indies

Metals Reserve Co. has concluded an agreement with the Banka and Billiton tin interests of the Netherlands East Indies whereby Metals Reserve Co. will acquire tin concentrates containing 20,000 tons of fine tin from these producers. The concentrates will be shipped from the Netherlands East Indies to the smelter now in course of construction for Metals Reserve Co. at Texas City, Tex., and will there be converted into fine tin.

The smelter at Texas City will be completed this coming winter.

Ceiling Prices on Tin Fixed by OPACS, Effective Aug. 16

Tin prices have been fixed by OPACS, effective Aug. 16, on the following basis in lots of 5 gross tons:

A—99.8 per cent or higher, 52 cents; B—99.75 to 99.79 per cent, inclusive, 51.62½c; C—Cornish refined, 51.62½c; D—99 to 99.74 per cent, inclusive, 51.12½c; and E—below 99 per cent, 51 cents for tin content.

In lots of less than five gross tons the following differentials apply: 2240 to 11,199 pounds inclusive, add one cent per pound; 1000 to 2223 add 1½ cents; 500 to 999 pounds add 2½ cents; under 500 pounds add 3 cents.

Donald H. Wallace, who has been with OPACS, and assisted Leon Henderson in the National Defense Advisory Committee last year, is in overall charge on tin. John D. Sumner, who joined the OPACS staff in May as economic assistant to Dr. Wallace, is in direct charge of administration of the tin price schedule.

Arsenals, Tank Builders Assigned High Preference Rating

Two preference rating orders were issued last week by E. R. Stettinius Jr., director of priorities, OPM, on behalf of three government arsenals and eleven manufacturing companies engaged in 100 per cent defense work, assigning preference ratings A-1-D to medium tank requirements and A-1-F to deliveries for light tank production.

The orders were said to have been necessitated by a greatly accelerated production schedule, doubling previous estimates of tanks to be ready by 1942. It was stated that these preference ratings may be extended by prime contractors to suppliers and subcontractors.

Consumer Credit Restricted To Conserve Critical Materials

Program for restricting credit for the purchase of "consumers' durable goods," such as automobiles, washing machines, refrigerators, ironers, vacuum cleaners and many other articles requiring metals needed in defense materials, was outlined last week by the President.

The aim is to conserve critical materials and also to curb inflationary tendencies.

Restrictions will apply to installment buying and also to small personal loans. Details of the regulations were not made public immediately, but it was announced the restrictions would be administered by the Federal Reserve Board.

Marriner S. Eccles, chairman of the Federal Reserve Board, said the only items definitely excluded from the regulatory system were loans for the construction of new homes. Loans to finance repairs to an existing house may be regulated.

Mr. Eccles also said that, at least at first, no regulations would be

placed on the financing of productive tools, particularly farm implements.

Statisticians find it difficult to estimate the amount of credit business affected. At present, there is about $10,000,000,000 of consumer credit outstanding. About $5,000,000,000 of this represents debts on merchandise bought on the installment plan and about half of this is owed on automobiles alone. Another $2,000,000,000 represents small personal loans of the type to be regulated.

12-Cent Ceiling Price for Copper Established by OPACS

Ceiling price of 12 cents a pound for copper was established last week by OPACS "to equalize the price to all consumers." The price schedule (No. 15) applies to copper of electrolytic grade in the shape of wire bars or ingot bars delivered in carload lots at Connecticut Valley points. A top price of 11¾ cents a pound was set for casting copper made by fire refining to a standard of 99.5 per cent pure, including silver as copper. Premiums ranging from ¾ to 2 cents a pound are allowed for less-than-carload lots sold by others than refiners or producers.

Because the 12-cent ceiling might act to jeopardize a small part of current output of domestic copper costing more than 12 cents to produce, OPACS Administrator Henderson recommended the Metals Reserve Co. purchase such high-cost copper at prices in excess of 12 cents. The Metals Reserve Co. is exempt from conformance with the price order.

The plan recommended by Mr. Henderson is designed to maintain the current production of high-cost companies now operating.

Schedule provides that on and after Aug. 12, regardless of any prior contract or commitment, no sales of copper (except to Metals Reserve Co.) shall be completed at more than the ceiling price. However, a person who bought copper in carload lots between July 1 and Aug. 12 for resale in less-than-carload lots at prices not more than ½-cent a pound above the ceiling price may be permitted by OPACS, upon application, to complete such sales at prices not more than ½-cent a pound over the maximum l-c-l prices established by the schedule.

Permission also may be sought from OPACS to carry out contracts entered into prior to Aug. 12, and calling for delivery after that date of copper at prices higher than the maximum prices.

In such cases, however, permission will be granted only (a) where a firm commitment is involved at a price not more than ½-cent over the maximum prices and where such commitment is carried out prior to Dec. 31, 1941; or (b) if necessary to protect dealer against loss where the contract or commitment was entered into prior to Aug. 12, and where the copper, or purchase contract for copper to fulfill such a contract, was acquired prior to April 25.

Zinc, Copper Defense Industry Advisory Committee Appointed

Appointment of a Copper and Zinc Defense Industry Advisory Committee was announced last week by Bureau of Clearance of Defense Industry Advisory Committees, OPM.

The committee is composed of 35, representing five principal divisions of the industry. John A. Church, of the Division of Priorities, was designated Government Presiding Officer. Membership follows:

E. W. Furst, general manager, Grasselli Chemical Department, E. I. DuPont de Nemours & Co., Wilmington, Del.

E. C. Hegeler, president, Hegeler Zinc Co., Danville, Ill.

F. E. Chesney, purchasing agent, American Steel & Wire Co., Cleveland.

D. A. Beam, Penn Galvanizing Co., Philadelphia.

Charles Pack, president, Doehler Die Casting Co., New York.

S. B. Coolidge Jr., manager of auxiliaries, Sherwin-Williams Co., Cleveland.

John A. Coe Jr., vice president, American Brass Co., Waterbury, Conn.

J. A. Doucett, vice president, Revere Copper & Brass Co. Inc., New York.

William M. Goss, vice president, Scovill Mfg. Co., Waterbury, Conn.

B. N. Zimmer, vice president, American Metal Co. Ltd., New York.

F. L. Riggin, president, Mueller Brass Co., Port Huron, Mich.

J. P. Lally, president, C. G. Hussey & Co., Pittsburgh.

H. L. Randall, president, Riverside Metal Co., Riverside, N. J.

Robert E. Dwyer, vice president, Anaconda Copper Mining Co., New York.

C. T. Ulrich, vice president, Kennecott Copper Corp., New York.

James F. McClelland, vice president, Phelps Dodge Corp., New York.

A. J. McNab, Magma Copper Co., New York.

Kenneth C. Brownell, vice president, American Smelting & Refining Co., New York.

A. E. Petermann, vice president, Calumet & Hecla Consolidated Copper Corp., Calumet, Mich.

Wylie Brown, president, Phelps Dodge Copper Products Corp., New York.

Marshall L. Havey, vice president, New Jersey Zinc Co., New York.

Irwin H. Cornell, vice president, St. Joseph Lead Co., New York.

B. Elkan, president, International Minerals & Metal Corp., New York.

Howard I. Young, president, American Zinc, Lead & Smelting Co., St. Louis.

L. S. Thomas, president, General Smelting Co., Philadelphia.

W. E. Sprackling, vice president, Anaconda Wire & Cable Co., New York.

George W. Potter, vice president, Eagle-Picher Lead Co., Cincinnati.

D. R. G. Palmer, president, General Cable Corp., New York.

Everett Morse, president, Simplex Wire & Cable Co., Cambridge, Mass.

F. C. Jones, president, Okonite Co., Passaic, N. J.

H. L. Erlicher, vice president, General Electric Co., Schenectady, N. Y.

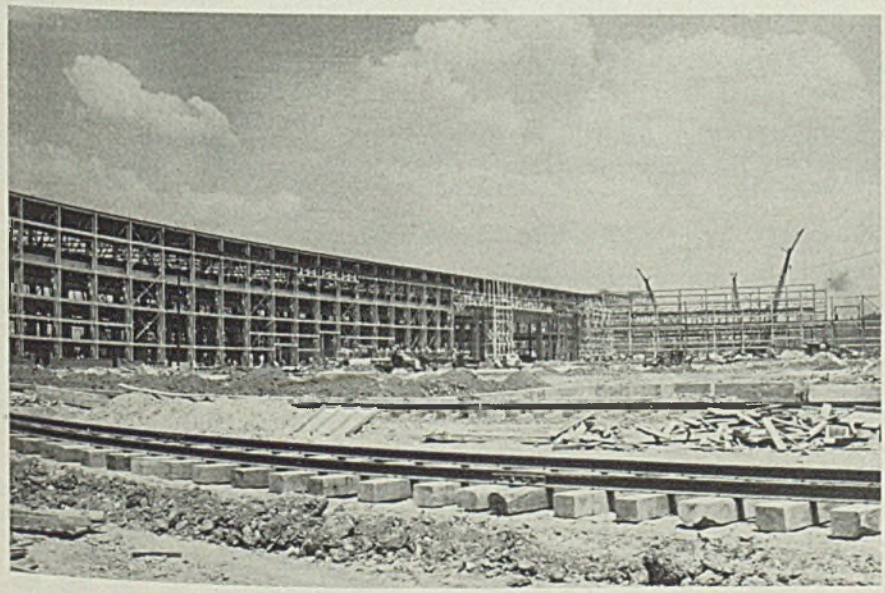
C. A. Scott, executive vice president, Rome Cable Co., Rome, N. Y.

Ernest V. Gent, American Zinc Institute, Washington.

R. L. Coe, president, Kennecott Wire & Cable Co., New York.

R. R. Eckert, secretary, United States Copper Association, New York.

Aluminum Rolling Mill To Cover 55 Acres



Completion of the North plant of the Aluminum Co. of America at Alcoa, Tenn., will bring 55 acres under roof and, according to the company, will make it the largest aluminum sheet rolling mill in the world. Mill is designed for the processing of airplane metal and was prompted by the rapidly expanding plane building program. Company in recent months has obtained additional TVA power to supplement its own facilities. Work on the project is being rushed and the plant is expected to be in operation within a few months

Mirrors of MOTORDOM

Car builders are previewing defense efforts rather than new models, although the latter are appearing in increasing numbers as six plants start production . . . More equipment being released for defense work, emphasizing problem of unemployment which production curtailment will bring . . . Change to iron pistons is general, although two smaller producers are still obtaining aluminum . . . More decorative trim used to alter body lines

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

■ LIKE the flowers that bloom in the spring, the 1942 models are slowly unfolding their petals for inspection prior to public announcements next month. Hudson and Willys have unveiled their new stuff and last week Plymouth showed a few new cars to the press and to dealers at a meeting Wednesday. Studebaker will christen the '42s Aug. 27. Others will come in rapid succession in the weeks just ahead.

Over all the displays of new car merchandise there hangs a pall of lassitude, a noticeable diminution of enthusiasm over a new product which ordinarily receives a terrific sendoff. Concentration on defense is the obvious answer.

Chrysler, for example, this year, is scheduling an all-day celebration Aug. 26, to be called "Assembly Line of Defense". While the invitations indicate "some new automobiles and trucks will be available for your inspection", the emphasis will be entirely on what the corporation is doing in the way of producing defense equipment for the army and navy. Following breakfast, guests will be conducted on a tour of various Chrysler plants to inspect such projects as the tank arsenal in full operation, fabrication of parts for the Martin medium bomber and the Bofors 40-millimeter rapid-fire anti-aircraft gun. Dodge army trucks will be put through their paces and an informal dinner in the evening will conclude the ceremonies.

Steel Situation Confusing

Unquestionably the defense load on the automobile industry is building up rapidly, but at least a good start will be made on 1942 models, and it is a fair bet that September and October production of cars will be at a high level. Slapping of full priorities on all forms of steel should not hinder the motor companies until along about November, if then. At the moment the situation on steel is so confused that it is impossible to make any clear-cut forecast on whether automotive steel will be available. Probably it will be, but a strict enforcement of the priority regulations could shut off supply of some auto steel and thus interrupt assemblies.

Not in a good many years has the outlook for motor car production been so hazy and uncertain as it is right now. There is the matter of sudden shortages developing in materials which were thought likely to be available in needed quantity — stainless steel, copper, pig iron—or a sudden pre-empting of facilities and equipment scheduled for work on auto parts production.

Already there are many examples of the latter. Chrysler has taken off 400 of its machine tools for gun work. Chevrolet has shut down its motor and axle plants in Buffalo and is adapting every possible tool there to airplane motor production. Graham here in Detroit has dropped out of the motor car business and is now active on defense parts, utilizing 200 rebuilt automotive machine tools. Eight large forging machines for the new Oldsmobile forging plant in Lansing, Mich., arrived just in time to be turned over to shell work, and some new steam hammers in the same plant will be used in shaping heavy forgings needed in bomber landing gears. Willys in Toledo, O., has acquired 20 new forge hammers for its forge shop, with capacity for 40,000 pounds of aluminum forgings daily.

But with all this transfer of men and equipment to defense, careful surveys have indicated that the men displaced from their jobs by probable curtailment of car production cannot be absorbed. If curtailment went no further than the motor car companies themselves the problem would not be so serious, but the dislocations will extend all the way back through the metalworking and supply industries, many of which are begging for defense work.

Price a Small Item in Defense Production

Some tall tales are being carried back from Washington about industrial concerns here who are participating in defense work, either as subcontractors or as direct suppliers to the War Department. They are cited to dispel the belief that no one is going to make any money out of the gigantic defense program, and while they may not be typical, at least they are believed to be authentic.

One concerns the representative of a company which had several contracts pending with defense authorities in the Capitol and who made a trip there to clinch the deals. He returned with only one contract and explained to a friend that the reason he did not get the others was that he only had $1000 in cash with him in Washington!

Another concerns the legal counsel for a manufacturer who told a friend that the company he was representing was selling an item to the War Department for $5000 each, and the net cost of the product was $50 —a neat 10,000 per cent markup!

The third deals with a subcontractor supplying certain types of shell dies used by the thousands in arsenals, cartridge plants, etc. The dies are sold to the War Department through a broker. One die carried a unit price of $5.50, which was increased by the broker to $11.30!

Foundries Get Windfalls In Iron Piston Work

With the exception of Hudson and Packard, it appears that most 1942 models formerly using aluminum

pistons will change over immediately to cast iron, some tin plated and some treated with the Parker Lubrite process. Hudson and Packard, for the present, seem assured of getting aluminum pistons, but are ready to change to cast iron on short notice.

Buick will supply its own and Olds requirements, according to present indications. A plant of Campbell, Wyant & Cannon Foundry Co. at South Haven, Mich., will supply a portion of the Chrysler requirements, as well as some of the smaller producers. Wilson Foundry & Machine Co. at Pontiac will produce about 12,000 pistons a day for Chrysler, and may contribute on some other accounts.

Promise Innovations

Hudson and Studebaker will offer transmission innovations for 1942, as indicated here previously. The Hudson equipment is known as the Drive-Master and with it the clutch is entirely eliminated, except as a safety precaution when starting the motor. The innovation is adaptable to all types of drivers, with a three-way switch permitting gears to be shifted (1) automatically, (2) semi-automatically or (3) manually. With the full automatic control, the clutch is operated by one power cylinder using engine vacuum and the gears are shifted by another; shifting is actuated by a mechanical governor and controls.

From the name Turbo-matic applied to the optional Studebaker clutch and transmission, it would appear to be similar to what Mercury and Lincoln Zephyr will have available on new models—that is, a combination of fluid coupling, automatic clutch and overdrive transmission.

Packard's Vacumotive drive, Chrysler's Fluid drive, with Simplimatic transmission, and the Olds-Cadillac Hydramatic drive complete the list of automatic and semiautomatic transmissions on passenger cars. That they are popular is evident from the fact that in the 1941 model year around 90 per cent of Chrysler and De Soto cars were so equipped at extra cost. Olds ran around 50 per cent and Cadillac 30 per cent.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,058
Feb.	317,520	422,225	509,326
March	389,499	440,232	533,849
April	354,266	452,433	489,854
May	313,248	412,492	545,333
June	324,253	362,566	546,274
6 mos.	2,055,748	2,539,440	3,148,694
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
July 19	109,912	53,020
July 26	105,635	34,822
Aug. 2	62,146	17,373
Aug. 9	41,795	12,635
Aug. 16	46,750	20,475

†Comparable week.

Sales Up 100 Per Cent in Year

July sales of General Motors cars and trucks in the United States and Canada, including export shipments, totaled 224,517, more than twice the total for July a year ago which was 110,659. Factory sales for all the industry are estimated at 456,100 units, comparing with 520,521 in June, and 231,703 in July, 1940.

From these figures it is apparent the car buying public has loaded up on new cars as it has never done before, indicating the threats of substitutions, shortages and surtaxes have had telling effect. Even in the face of such tremendous buying, the motor car industry does not feel that the market for 1942 models has been robbed unduly. The belief is expressed in official circles that the rising trend of national income and the new jobs being created for thousands in defense plants will cushion the drop in buying resulting from advance sales this year.

Another factor must be given weight now which was not generally discussed earlier this year when outlook for the coming year was being weighed. That is the loss of jobs by thousands of workmen in consumer goods industries which are being and will be forced to suspend operations because of materials shortages and priorities.

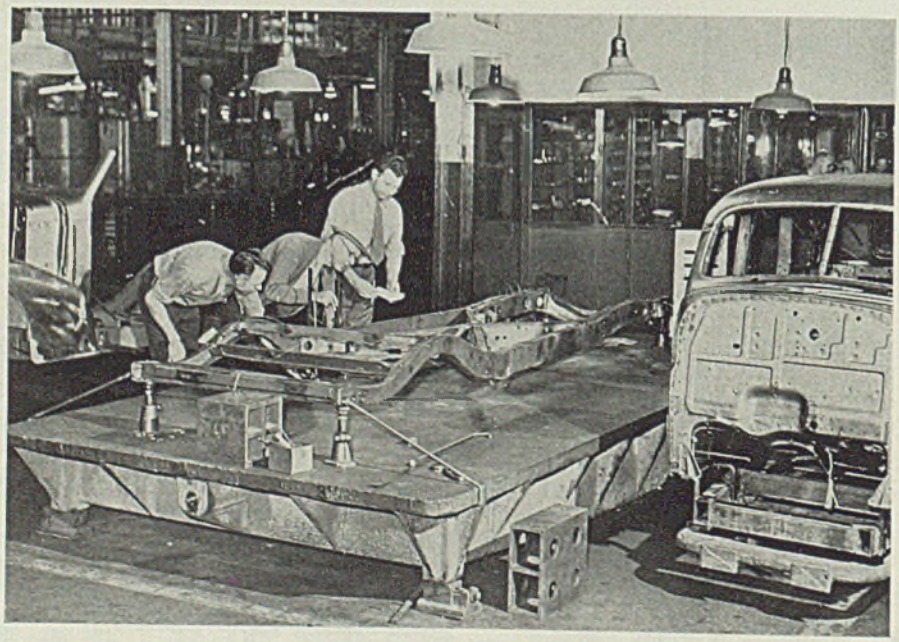
Take into consideration also the likelihood of 15 per cent higher prices, which have been mentioned by leaders in the industry, along with the doubling of federal excise taxes, and the result is that the $900 car for 1941 may have a tag of around $1100 for 1942.

All signs do point, however, to an exceptionally good used car market in the year ahead.

Normally the used car turnover per new car sold averages somewhere between two and three, but in the next 12 months this figure probably will double anyway.

Trim Just "Bright Metal"

Decorative trim on new models in many cases will be called simply bright metal—nothing more. This is to permit several "outs" for manufacturers in the event sudden shifts have to be made from plated steel to stainless steel or vice versa. From present indications the amount of such trim in use will increase appreciably, although expectations were just the reverse. The answer is simply that in the absence of major changes in body and fender contours, the easiest and most effective way to change the appearance of a car is to add some more bright metal molding, redesign a radiator grille and expand decorative ornaments.



■ This 8 x 18-foot steel plate is used as a mechanical trouble shooter by Pontiac engineers and production experts. Accurate to 0.005-inch over its entire length and width, it helps to detect production errors long before they could be found under old cut and try methods. Full-sized chassis, bodies and even completed cars are checked on the huge surface against engineering blue prints

HYDROMATICS DON'T GUESS

There is a cold certainty in the speed and accuracy with which Hydromatic multiple spot welders convert sheet metal stampings into complete assemblies. Day in, and day out, in mass production, one assembly job off a Hydromatic looks and measures up exactly like any other. That's why—where real speed counts, where accuracy demands elimination of the human element—you will find more and more Hydromatics on the job.

For "mass" production, furthermore, these machines will stack up against any other method of assembly as to cost of equipment and operation. And you don't have to wait six months or a year to get them either. Progressive's new plant and expanded design facilities are designed to keep up with any anticipated resistance welding machine requirements by industry—for defense or reconstruction.

ILLUSTRATED ABOVE

Cases for transporting loaded 25-lb. shell being assembly welded on a Progressive Hydromatic at the rate of 180 an hour. There are some 24 spot-welds per case. Assembly must be rugged and accurate to meet dimensional specifications, hold shell securely and permit stacking of the loaded cases.

BRANCH OFFICES

CLEVELAND
Frank Stockton

DAYTON
Frank Mackniesh

MILWAUKEE
K. W. Stroffregen

PHILADELPHIA
D. J. Riddell

PITTSBURGH
Frank Stockton

ST. LOUIS
Art Lewis

DISTRIBUTORS

BUFFALO
R. C. Neal Co.
76 Pearl St.

LOS ANGELES
Ducommon Metals & Supply Co.
4890 S. Alameda

MONTREAL
Rudel Machinery Co., Ltd.
614 St. James St. W.

ROCHESTER
R. C. Neal Co.
46 Andrews St.

SAN FRANCISCO
Ducommon Metals & Supply Co.

SYRACUSE, N. Y.
R. C. Neal Co.
569 S. Clinton

TORONTO
Rudel Machinery Co.
137 Wellington St. W.

WINDSOR
Rudel Machinery Co.
908 Security Bldg.

PROGRESSIVE WELDER CO.

3050 East Outer Drive, Detroit, U.S.A.

WING TIPS

Looking to postwar future of aviation industry, builders discount possibility of converting military planes to commercial purposes, presaging new activity in production of peacetime air fleet . . . Stainless steel is metal of the future in airplane design . . . Novel techniques developed for blanking, forming and machining aluminum members . . . High-speed router an important tool

■ SOME obvious questions to toss at airplane builders in the present day of mushrooming production are: After all this military spree, what? Will the United States become a nation committed to mass air transport, both of passengers and of freight? Is there going to be any profit in building planes once the war emergency passes? Can they foresee a generation of air-minded travelers, such as the present motor car-minded generation?

These are long-range posers and the reticence of officials to pass any snap judgments can be excused. After all, the heat is on now to get out military planes. The government purse-strings are opened wide, both for plant and product. Backlogs are increasing rather than decreasing. Why worry about the aftermath when there is so much production worry at hand now?

Nevertheless, the progressive plane builders, when they can catch a spare minute, are looking ahead. They have sales departments, advertising departments, public relations departments which after all would be meaningless accessories if all that were necessary was to keep rolling out the planes for the Army, Navy and Britain. So apparently they are looking to the future and are taking precautions to be in on the ground floor of private and commercial aviation on a large scale—if and when.

One thing fairly certain is that the great mass of bombers, pursuits and fighters now being turned out for military purposes is not going to be converted to commercial purposes when the war is over. Such a conversion was a fairly simple matter in the last war, and commercial aviation probably owed its greatest stimulus to the then oversupply of military planes. Today's planes are too specialized ever to be of much service commercially. A narrow little pursuit ship, with eight machine guns, a cannon and a 2000-horsepower engine taking up most of the available space outside of the small pilot's compartment, cannot offer much in the way of value for a commercial or even a private operator. Even the modern bombers are not suited to conversion to cargo ships.

So the military air fleet probably will have to stay as such and when the occasion arises the airplane builders can turn to redesigning their product and assembly lines to ships which will have more utility for commercial operations and recreational flights. And what a whale of a job that is going to be! Of course, there will be a nice cushion of profit to spend on such redesigning and retooling, but will the mass market be there?

Lack of Stiffness Only Deficiency of Stainless

Numerous engineers and designers associated with the aircraft industry are of the opinion that stainless steel holds important possibilities in the future of airplane construction, by virtue of both its corrosion-resisting qualities and its ease of welding. A deficiency at present is its lack of stiffness in the light gages used for aircraft, but this will be overcome. W. B. Stout, of Dearborn, Mich., is doing some pioneering work in adapting thin-gage stainless to aircraft and his experiments are being watched with interest. There have been some planes built of stainless, notably by Fleetwings Inc., Bristol, Pa., but by and large this is the day of aluminum and aluminum alloys in aircraft.

Magnesium, with two-thirds the specific weight of aluminum, likewise is an important aircraft metal, but there have been some unfavorable instances of application of magnesium sheet in the experience of at least one large builder, to the end that this producer has abandoned magnesium altogether for the moment. In this instance, magnesium alloy sheet was installed in a test plane and after a few flights the metal appeared to disintegrate and crumble to pieces, apparently the result of fatigue failure developing from steady vibrations.

To anyone seeking basic information on the use of aluminum in aircraft as well as information on forming aluminum, two new handbooks just issued by the Aluminum Co. of America, Pittsburgh, are highly recommended. The one dealing with usage of aluminum in aircraft presents 103 pages of illustrated, tabular and descriptive information; the other dealing with forming methods has 53 pages of the latest information on this subject.

Techniques of working aluminum are of interest because of their contrast with accepted methods of handling ferrous metals and also because of the types of equipment involved. The comment herein presented is based on experiences of Bell Aircraft Corp., Buffalo, as summarized by this company's tool design engineer, Arthur A. Schwartz.

Rubber-Steel Dies Widely Used in Forming Shapes

One of the oldest aircraft techniques is that of the drop hammer—air, hydraulic or rope operated. Bell, for example, has 5 air hammers, one hydraulic and one rope drop. The latter is considered the easiest to control although it is tiring on the operator. Zinc dies and lead punches usually are used in such hammers.

The zinc die is cast in a plaster model, fashioned from cross sectional steel templates prepared by the lofting department. A hard zinc alloy is used, a number of proprietary analyses being available, some companies preferring one, some another, desired qualities being ease of remelting and low melting losses.

The lead punch is formed by pouring the molten metal into the zinc die. When the punch and die set is completed, the punch is mounted on the ram of the hammer and die on the anvil. The plywood spacers—possibly a dozen for a medium-sized deep drawn shape—with the outline of the die cut in their centers are placed over the die and the flat aluminum stock. The hammer drops and the punch descends through the plywood sheets to the point where the end of the punch makes a slight impression in the stock. Then, layer by layer, the plywood is removed, and the punch strikes the metal after each draw ring is removed. Finally, after all the rings have been removed, a last blow is given and the punch goes clear into the die, setting the part to its final shape.

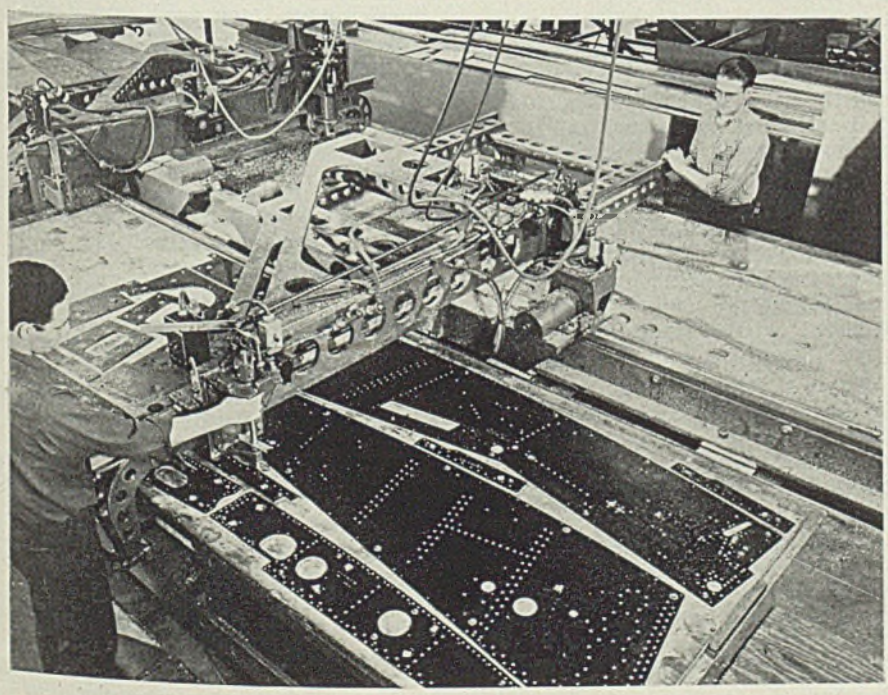
The soft lead of the punch may be worked slightly out of shape by the successive impacts, but it corrects itself by being forced into the harder zinc die, so that the formed part is shaped accurately.

Aluminum shapes with shallower draws are formed in 95 per cent of the cases in presses where the upper die is rubber and the lower is a steel form block. Form blocks are cut out of boiler plate, used by the carload in the aircraft industry in thicknesses up to 4 inches. Rubber, of course, conforms to the shape of the form block, distributing pressure uniformly over the entire area of the block. Where side pressures are desired it is the practice to "build a fence" around the edge of the form block, that is to weld or bolt a piece of steel in such a way that as the rubber bears against it the pressure is directed sidewise against the piece in the press. In a 2500-ton press it is possible to obtain as much as 1100 pounds per square inch side pressure thus.

Other ingenious arrangements have been developed, such as forming a large number of parts in a single operation, by nesting the form blocks on a gang plate, keeping them ¾-inch apart and at least 1½ inches from the edge of the plate so the descending rubber pad will exert uniform pressure.

Another system recently perfected at the Bell plants is to build up blanking dies and punches out of a combination of boiler plate and cyanide hardened chrome-molybdenum steel. The punch is sawed out of a chrome-moly plate, drilled where holes are required in the piece and then welded to a boiler plate backing. The die is made similarly except that the hard steel is cut out to receive the punch and steel pins are set in the boiler plate backing to match the holes in the punch. Danly die sets are used to align the punch and die units in the press. This method is one of the quickest ways yet devised to blank out aluminum parts in a wide range of shapes. It is inexpensive, flexible and ideally suited to blanking where more than 100 pieces are involved. Wood or masonite dies also are used for blanking and forming where runs are under 100 pieces.

Bell engineers point out that aluminum alloy 24ST, the most commonly used metal for fuselage and wing parts, takes twice the power to blank and form that sheet steel in the same gage would require. This is said to be due to the lower elongation of the alloy, plus the fact that, in shop parlance, aluminum is one-quarter cut and three-quarters torn, while steel is half cut and half torn.



Sheet steel templates in the foreground, through stylus on cross arm, control path of high-speed routing tool outlining stacks of dural sheets on adjoining table

Driller-Router Operates From Separate Templates

By far the most interesting tool used in aircraft forming work is the router, or as developed by Bell, the combination driller and router. The router, used widely in woodworking and the printing industry, has been refined considerably for aircraft use. It is a vertical spindle milling cutter operating at a terrific rate of speed—26,000 r.p.m.—and tracing the outline of a stack of sheets which have been bolted to a work table. Metal cut off by the whirling router tool is removed so fast that the chips are thrown back against themselves and pack into a mass of what appears to be solidified molten metal but is not. The force behind the removed chips is of such magnitude that the small pieces are actually conglomerated into a hard mass.

Experiments are now going forward with routers having speed up to 40,000 r.p.m. and it is believed they will accomplish even more than the slower tools.

Two examples will show what can be accomplished by the routing method. A piece of ¼-inch dural sheet must be cut to a size 6 feet long and 2 inches wide, and 220 holes drilled in it with a No. 40 drill. Using a shop template this piece can be routed out in 2 minutes and drilled in 8 minutes. This compares with 6 hours which would be required to shape the same piece by sawing, pin routing and stack drilling.

Another example is an instrument panel blank 28 inches wide, 14 inches deep at one side and 10 inches deep at the other. In the panel must be drilled 22 holes to receive instruments. An early method was to saw out the ⅛-inch sheet, then form in the drop hammer, drill the hole centers and then cut them out by milling, which took 7½ hours. The method now is to rout the blank from a shop template, form the shape in the drop hammer and then rout out the 22 holes from a template, all of which requires a mere 17 minutes.

Thin sheets, such as 0.025-inch

(*Please turn to Page* 76)

Producers, Consumers See Benefits and Problems in Full Steel Priorities

■ FULL priority control over steel in all forms, ordered by the OPM Priorities Division, last week was viewed by steel producers with varied reactions.

Some believed the new regulations would have a disruptive effect on mill melting and rolling schedules. Hitherto it has been possible to bulk together orders for certain sizes and types of steel, whether for defense or not. Now, if it becomes necessary to shunt aside all nondefense orders and proceed first with the rolling of defense steel only, the problem of scheduling will be vastly complicated beyond the already hectic condition.

Other suppliers expect the mandatory controls to have a salutary effect on a situation that has become confused. While all steel companies have been putting defense orders first as far as possible, it has been difficult to draw a line between defense and nondefense orders in some cases. Sometimes, it has been embarrassing to appease old and regular customers engaged in purely nondefense business.

Imposition of full priorities should simplify this situation as it provides the seller with clear-cut authority for rejecting nondefense business.

Reaction of steel consumers working on civilian products was one of consternation. It appears probable they will be able to obtain very little steel during the remainder of the year. This may result in widespread dislocations in employment and civilian production.

Buyers were besieging the mills almost frantically last week, seeking to learn the prospects of obtaining deliveries and in some cases asking for shipments before the deadline falls Sept. 1, when all purchase orders must be accompanied by a special form (PD-73) setting forth the purposes for which the material ordered will be used.

Consumers with high priority ratings were pleased with the extension of the control. They believe their problem of supply will be simplified and deliveries made more promptly.

Both consumers and producers believe the effectiveness of the new system will depend in large measure on how the regulations are administered. Excessive red tape may result in costly delays. And, as one producer points out, the problem of efficient scheduling of heats and rollings is not one that can be solved by arbitrary rulings from Washington.

General Preference Order M-21, bringing all iron and steel products under priority control, was issued by Priorities Director E. R. Stettinius Jr., "so that defense needs can be put uncompromisingly ahead of nondefense needs." The order includes alloy steels although a separate order will be issued soon, giving details of regulations applying to alloys.

For complete official text of Form PD-73 see page 41.

For complete official text of Order M-21 see page 42.

Previously iron and steel products had been placed on the priorities critical list and also have been subject to inventory control and to the terms of the General Steel Preference Delivery Order No. 1, designed to expedite delivery of defense steel. Since these products now are fully covered by specific priority regulations, they are being removed from the inventory control order and General Steel Preference Delivery Order No. 1 has been revoked.

Basic provision of the new order is that all defense orders must be filled ahead of nondefense orders. In connection with this, it is stipulated that defense orders must be accepted by steel companies, subject to certain exceptions, even if this acceptance means the deferment of nondefense orders or orders bearing lower ratings already on the books.

Other basic provisions of the order are:

1. Steel as defined in the order means "all carbon and alloy steel castings, ingots, blooms, slabs, billets, forgings, and all other semifinished and finished rolled or drawn carbon and alloy steels."

2. Defense orders include contracts or orders for the Army or Navy, for certain other government agencies, for Great Britain or any other lend-lease country, or any order to which a preference rating of A-10 or higher is assigned.

3. Defense orders which do not bear a higher rating are assigned a preference rating of A-10.

4. Order contains a six-point formula providing for the acceptance of defense orders.

5. A producer must file monthly reports with the Division of Priorities, summarizing by group and by product classification, orders received and shipments made during the month, and unfilled orders as of the last day of the month.

6. If defense orders are rejected or delivery is delayed, unreasonably, the customer may bring this to the attention of the Priorities Division for appropriate action.

7. After the satisfaction of all defense orders, deliveries under nondefense orders may be made.

8. Terms of the order apply to intracompany deliveries.

9. It is provided that "no person shall be held liable for damages or penalties for any default under any contract, commitment, or purchase order which results directly or indirectly from his compliance with the terms of this order."

10. Order contains provisions designed to prevent the building up of excess inventories.

11. Beginning Sept. 1, purchase orders for steel must be accompanied by a special form (PD-73) obtainable from steel producing companies setting forth the purposes for which the ordered material will be used.

12. The Director of Priorities may issue special directions to producers, requiring them to make deliveries of steel in fulfillment of special defense needs. The director may require producers to modify or adjust production schedules. The director may also allocate purchase orders to particular producers.

PD-73 (This Form may be Reproduced)

OFFICE OF PRODUCTION MANAGEMENT
Iron and Steel Branch Washington, D. C.

CUSTOMER'S STATEMENT TO PRODUCER CLASSIFYING PURCHASE ORDER OR CONTRACT FOR STEEL

This Statement must be attached to every order or contract placed with a Producer for carbon and alloy steel castings, ingots, blooms, slabs, billets, forgings and all other semi-finishel and finished rolled or drawn carbon and alloy steels, as covered in Order M-21, issued August 9, 1941 by the Director of Priorities.

All steel covered by this Statement is to be for only one "Group Classification" as defined in the "Instructions for Form PD-73".

To ....
Name of Producer Address

From ....
Name of Customer Address

Type of business.....

Order No..... covers material in "Group".....
(Give Group Title)

Date..... Is order for stock? Yes ☐ No ☐ Group letter....

Shipping date(s) required.....

Completion date of contract for which material is required.....

Ultimate use (as detailed as possible).....

Insert in Column (No. 1) each product included in this order according to "Product Classification" as defined in the "Instructions for Form PD-73", and insert in Column (No. 2) **CORRESPONDING TONNAGE FOR EACH PRODUCT.** If alloy steel, insert "a" after number.

(No. 1) Products	(No. 2) Net Tons	(No. 1) Products	(No. 2) Net Tons	(No. 1) Products	(No. 2) Net Tons	Total-Col. No. 2
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	(Net Tons)
.....	.....	.....	.....	.....	.....	

CERTIFICATE

The undersigned hereby certifies to the Producer and to the Division of Priorities Office of Production Management, that:

(1) he executed the foregoing statement on behalf of and by authority of the above-named customer;

(2) the customer has not placed an order for steel in any form with any source of supply which will duplicate the requirements of the order to which this statement is attached;

(3) the facts stated herein are, to the best of his knowledge and belief, true and correct;

....
(Date) (Signature of Authorized Official) (Title)

(Section 35 of the Criminal Code, 18 U.S.C. 80, makes it a criminal offense to make a false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.)

The Producer shall preserve this statement for not less than two years for audit and inspection by Office of Production Management.

PRODUCT CLASSIFICATION

Place in Column (No. 1) code number(s) listed below to identify Product(s) covered by order.

(1) Ingots, Blooms, Billets, Slabs, Tube Rounds and Sheet and Tin Bars	(6) Tie Plates and Track Accessories Including Track Spikes	(11) Pipe and Tubes	(16) Sheets and Strip Hot Rolled	(21) Wheels and Axles
(2) Structural Shapes and Piling	(7) Hot Rolled Bars Carbon, Including Hoops and Bands	(12) Wire Rods	(17) Sheets and Strip Cold Reduced	(22) Forgings Armor Plate and Ordnance
(3) Plates (Universal & Sheared)	(8) Hot Rolled Bars Concrete Reinforcing	(13) Wire and Wire Products Including Fence Posts	(18) Sheets and Strip Galvanized	(23) Forgings All Other
(4) Rails Over 60 lbs.	(9) Hot Rolled Bars Alloy	(14) Black Plate	(19) Sheets and Strip All Other	(24) Steel Castings
(5) Rails All Other	(10) Cold Finished Bars (Carbon & Alloy)	(15) Tin & Terne Plate (Hot Rolled and Cold Reduced)	(20) Tool Steel Bars	(25) Skelp
				(26) All Other

Form PD-73

■ Reproduced at left is Form PD-73 which steel buyers must file with their suppliers with purchase orders, to comply with the new priority regulations. At left below is the product classication and code numbers printed on the reverse side of the form, with directions for filling in the form, as follows:

INSTRUCTIONS FOR FORM PD-73

In filling out Form PD-73, use the proper Group and Product(s) Classifications listed below. All steel covered by one statement is to be for only one group classification. (NOTE. The certified statement is sent to the steel producer with your order and not to the Office of Production Management).

GROUP CLASSFICATION

(The letters used to designate the following groups are not to be construed as preference ratings).

Group A. Army-Navy
Contracts, commitments, or purchase orders for products to be delivered to or for the account of the Army or Navy of the United States. (Include in this group PD-3 Preference Rating Certificates and direct Army or Navy Contracts.)

Group B. Maritime-U. S. Agencies
Contracts, commitments, or purchase orders for products to be delivered to or for the account of the United States Maritime Commission, the Panama Canal, the Coast and Geodetic Survey, the Coast Guard, the Civil Aeronautics Authority, the National Advisory Commission for Aeronautics, the Office of Scientific Research and Development. (Include in this group PD-4 Preference Rating Certificates and direct contracts from the various Government Agencies herein listed.)

Group C. Lend-Lease
Contracts, commitments, or purchase orders for products to be delivered to or for the account of the Government of Great Britain and the government of any other country whose defense the President deems vital to the United States. (Include in this group orders placed by the Procurement Division, United States Treasury, which bear the symbol "DA" on the order form.)

Group D. Priorities Division
Contracts, commitments, or purchase orders to which the Director of Priorities assigns a preference rating of A-10 or higher. (Include in this group all PD-2 Preference Rating Certificates or blanket ratings issued by the Priorities Division and all other Defense Orders as defined in General Preference Order M-21 which are not included under Groups A, B, C, E, and F.)

Group E. Other Export
Contracts, commitments, or purchase orders for products to be exported from the United States and not included under Group C, above. (Include in this group all orders for export which are not in Group C.)

Group F. Warehouses
Contracts, commitments, or purchase orders for delivery to warehouses for resale from their stock. (Include in this group, **and in no other**, all sales to warehouses.)

Group G. OPACS
Contracts, commitments, or purchase orders for products covered by any Civilian Allocation Program which may be determined by the Office of Price Administration and Civilian Supply. (Include in this group only "B" ratings).

Group H. All other
Contracts, commitments, or purchase orders for products not included in Groups A to G, above. (Include in this group all orders which cannot be specifically identified as being in Group A to G, inclusive.)

Text of Order M-21, Placing Steel Under Full Priority

TO ALL PRODUCERS AND PURCHASERS OF STEEL:

Gentlemen:

The Director of Priorities of the Office of Production Management is today filing for publication in the Federal Register General Preference Order M-21, which places all producers of steel under a mandatory priority system, and which imposes various obligations on other persons in the steel industry. A copy of this Order is attached.

Within the past few months there has arisen a condition within the steel industry which has seriously hampered the delivery of steel products in the amounts, and at the time, necessary for defense purposes, and which makes it essential that steps be taken to insure from now on that our defense program shall not be delayed because of failures to obtain steel at the proper time. With the demand for steel for all purposes increasing, and with total demand for immediate delivery being now greater than the ability of the steel industry to produce and deliver to the satisfaction of all customers, it is necessary that action be taken to insure deliveries for defense above all other deliveries. This Order is designed to accomplish this result.

Among the more important provisions of the Order are the following:

(1) Defense Orders are defined and preferential treatment of them is required.

(2) Accumulation of inventories beyond current needs is prohibited.

(3) A customer must file with each purchase order to a producer a Form (PD-73), which summarizes the contents of the purchase order by group and by product classification.

(4) A producer must file monthly reports with the Division of Priorities, summarizing by group and by product classification, orders received and shipments made during the month, and unfilled orders as of the last day of the month.

(5) The Director of Priorities is given broad power to direct deliveries, and the placing of purchase orders.

For your information, attention is called to the following provision of the Act of Congress approved May 31, 1941 (Public No. 89, 77th Congress): "No person, firm, or corporation shall be held liable for damages or penalties for any default under any contract or order which shall result directly or indirectly from his compliance with any rule, regulation, or order issued under this section."

You will be notified from time to time of rulings and interpretations applying to this Order. Any questions which may arise in connection with your compliance with the terms of this Order should be addressed to:

Mr. A. D. Whiteside
Chief, Iron and Steel Branch
Office of Production Management
Social Security Building
Washington, D. C.

This letter does not purport to be a complete summary of General Preference Order M-21, and you must read the Order carefully in its entirety so that you may fully understand its provisions and their effect upon your business and your relations with your customers.

Very truly yours,
E. R. Stettinius, Jr.
Director of Priorities

TITLE 32—NATIONAL DEFENSE
CHAPTER IX—OFFICE OF PRODUCTION MANAGEMENT
Subchapter B—PRIORITIES DIVISION
PART 962 — STEEL GENERAL PREFERENCE ORDER M-21 TO CONSERVE THE SUPPLY AND DIRECT THE DISTRIBUTION OF STEEL

WHEREAS, the national defense requirements have created a shortage of steel, as hereinafter defined, for defense, for private account, and for export and it is necessary, in the public interest and to promote the defense of the United States, to conserve the supply and direct the distribution thereof;

NOW, THEREFORE, IT IS HEREBY ORDERED THAT:

962.1 GENERAL PREFERENCE ORDER **(a) Definitions.** For the purposes of this Order:

(1) "Steel" means all carbon and alloy steel castings, ingots, blooms, slabs, billets, forgings, and all other semifinished and finished rolled or drawn carbon and alloy steels.

(2) "Person" means any individual, partnership, association, corporation, or other form of enterprise.

(3) "Producer" means any person who produces steel, as herein defined.

(4) "Defense Order" means:

(i) Any contract or order for material or equipment to be delivered to, or for the account of:

1. The Army or Navy of the United States, the United States Maritime Commission, the Panama Canal, the Coast and Geodetic Survey, the Coast Guard, the Civil Aeronautics Authority, the National Advisory Commission for Aeronautics, the Office of Scientific Research and Development.

(2) The Government of Great Britain and the government of any other country whose defense the President deems vital to the defense of the United States under the Act of March 11, 1941, entitled "An Act to Promote the Defense of the United States."

(ii) Any other contract or order to which the Director of Priorities assigns a preference rating of A-10 or higher.

(iii) Any contract or order placed or offered by any person for the delivery of any material or equipment needed by him to fulfill his contracts or orders on hand, which material or equipment is required for the fulfillment of any contracts or orders included under (i) and (ii), above.

(b) Directions as to Deliveries. Deliveries of steel by any producer or any other person shall be made only in accordance with the following directions:

(1) A-10 Assigned to Certain Defense Orders. Deliveries under all Defense Orders to which a preference rating of A-10 or higher has not been specifically assigned are hereby assigned a preference rating of A-10.

(2) Sequence of Preference Ratings. Preference ratings in order of precedence are AA, A-1-a, A-1-b, etc., . . . A-1-j; A-2, A-3, etc., . . . A-10, etc., AA being the highest rating presently assigned.

(3) Doubtful Cases. Whenever there is doubt as to the preference rating applicable to any delivery, or as to whether a particular order is a Defense Order, the matter is to be referred to the Division of Priorities for determination, with a statement of all pertinent facts.

(4) Sequence of Deliveries.

(i) Every delivery under a Defense Order shall be made in preference to deliveries under other orders whenever, and to the extent, necessary to fulfill the delivery schedule provided in the Preference Rating Certificate covering such delivery, or in the contract, commitment, or purchase order if no Certificate has been issued. Deliveries bearing no preference rating or lower preference ratings shall be deferred to the extent necessary to assure these deliveries bearing higher preference ratings, even though such deferment may cause defaults under existing contracts, commitments, or purchase orders. Each person who

has Defense Orders on hand must so schedule his production and deliveries that deliveries under Defense Orders will be made on the dates required, giving precedence in case of unavoidable delay to deliveries bearing the higher preference ratings.

(ii) The sequence of deliveries bearing the same preference rating shall be governed by the delivery dates specified in the respective Preference Rating Certificates assigned thereto, or if the ratings were assigned by order or direction of the Director of Priorities, but no Certificates were issued, then by the dates specified in the contracts, commitments, or purchase orders. In any case where preference ratings and delivery dates are the same, and it is impossible to make all deliveries on schedule, the matter is to be referred to the Division of Priorities for determination.

(5) Delivery Schedules. No earlier delivery date shall be specified in any Defense Order than required by the production or delivery schedules of the person placing the Defense Order. No preference rating will be assigned to any contract, commitment, or purchase order specifying delivery dates earlier or quantities greater than required by the production or delivery schedules of the person placing the contract, commitment, or purchase order.

(6) Use of Material Obtained Under Allocation or Preference Rating. Any person who obtains a delivery of steel under an order or specific direction of the Director of Priorities, or a delivery of such material bearing a preference rating, must use such material, or an equivalent amount thereof, for the purpose specified in connection with the issuance of the order, direction, or rating.

(7) Acceptance of Defense Orders. Defense Orders for steel, whether or not accompanied by a Preference Rating Certificate, must be accepted and fulfilled in preference to any other contracts, commitments, or purchase orders for such material, subject to the following provisions:

(i) Defense Orders shall be accepted even if acceptance will render impossible, or result in deferment of:

(A) Deliveries under non-defense orders previously accepted; or

(B) Deliveries under Defense Orders previously accepted bearing lower preference ratings, unless rejection is specifically permitted by the Director of Priorities.

(ii) Defense Orders need not be accepted:

(A) If delivery on schedule thereunder would be impossible by reason of the requirements of Defense Orders previously accepted bearing higher or equal preference ratings, unless acceptance is specifically directed by the Director of Priorities; or

(B) If the steel ordered is not of the kind usually produced or capable of being produced by the person to whom the Defense Order is offered; or

(C) If the person seeking to place the Defense Order is unwilling or unable to meet regularly established prices and terms of sale, but there shall be no discrimination against Defense Orders in establishing such prices or terms of sale; or

(D) If such Defense Orders specify deliveries within twenty-one days, and if compliance with such delivery dates would require the termination or alteration before completion of a specific production schedule already commenced, but this provision shall not authorize rejection when such schedule can be terminated or altered without substantial loss to the producer.

(8) Rejected Orders and Deferred Deliveries. When a Defense Order for steel has been rejected or delivery thereunder has been unreasonably or improperly deferred in violation of this Order, the person seeking to place such order or obtain such delivery may file with the Division of Priorities a verified report in the form to be prescribed by the Division of Priorities, setting forth the facts in connection with the rejection or deferment. When the facts set forth justify such action, the Director of Priorities will thereupon direct the person against whom complaint is made to submit a sworn statement, setting forth the circumstances concerning the alleged rejection or deferment. Thereafter, such action will be taken by the Director of Priorities as he deems appropriate.

(9) Civilian Deliveries. Subject to the limitations and restrictions contained in this Order and after satisfaction of all Defense Orders, deliveries under any other contracts, commitments, or purchase orders may be made.

(10) Intra-Company Deliveries. The prohibitions or restrictions contained in this Order shall, in the absence of a contrary direction, apply not only to deliveries to other persons, including affiliates and subsidiaries, but also to deliveries from one branch, division, or section of a single business enterprise to another branch, division, or section of the same or any other business enterprise owned or controlled by the same person.

(11) Effect of Order Damages. The prohibitions or restrictions contained in this Order shall, in the absence of a contrary direction apply to all deliveries made after the effective date of this Order, including deliveries under contracts, commitments, or purchase orders accepted either prior to or subsequent to such effective date. No person shall be held liable for damages or penalties for any default under any contract, commitments, or purchase order which results directly or indirectly from his compliance with the terms of this Order.

(12) Inventory Restriction. Unless specifically authorized by the Director of Priorities, no person shall, after the effective date of this Order, knowingly make delivery of steel, and no person shall accept delivery thereof, in an amount, quantity, or number which will increase for any current month the inventory of such steel of the person accepting delivery, in the same or other forms, in excess of the amount, quantity, or number necessary to meet required deliveries of the products of the person accepting delivery, on the basis of his current method and rate of operation.

(13) Special Instructions.

(i) Beginning September 1, 1941, no producer of steel shall make, and no person shall accept delivery of steel from a producer unless and until such person shall have filed with the producer at the time of placing his purchase order or contract, a statement on Form PD-73, hereto attached, or in such other form as may from time to time be prescribed by the Division of Priorities, setting forth the purposes for which the material ordered will be used. In the case of orders or contracts placed prior to September 1, 1941 such statement shall be filed before October 15, 1941.

(ii) The Director of Priorities may from time to time issue specific directions to producers requiring them to make deliveries of steel during specified periods in fulfillment of contracts, commitments, or purchase orders for particular purposes or to particular persons. Such directions will be made primarily to insure satisfaction of all defense requirements of the United States, both direct and indirect, and they may be made, in the discretion of the Director of Priorities, without regard to any preference ratings assigned to particular contracts, commitments, or purchase orders. When necessary to assure fulfillment of such directions, the Director may also require any producer to modify or adjust particular production schedules. The Director may also require a person seeking to place a purchase order for steel to place the same with a particular producer.

(iii) For the month of August, 1941, and for each month thereafter, each producer shall make at the time requested by the Director of Priorities, a report in the form to be prescribed by the Director, which shall set forth all records

of the orders received and shipments made during such month, and the unfilled orders as of the last day of such month in group and product classifications according to the instructions of the Director, together with such other information as the Director shall from time to time require.

(14) Any allocations made or any preference ratings or other directions issued by the Director of Priorities with respect to the residual supply of steel after the satisfaction of all defense requirements, direct or indirect, shall be in accordance with such Program as the Office of Price Administration and Civilian Supply may determine.

(c) Records. All persons affected by this Order shall keep and preserve for a period of not less than two years accurate and complete records of their inventories of steel, and of the details of all transactions in such material. Such records shall include the dates of all contracts, commitments, or purchase orders accepted, the delivery dates specified in such contracts, commitments, or purchase orders, and in any Preference Rating Certificates accompanying them, the dates of actual deliveries thereunder, description of the material covered by such contracts, commitments, or purchase orders, description of deliveries by classes, types, quantities, weights, and values, the parties involved in each transaction, the preference ratings, if any, assigned to deliveries under such contracts, commitments, or purchase orders, details of all Defense Orders either accepted or offered and rejected, and other pertinent information.

(d) Audit and Inspection. All records required to be kept by this Order shall, upon request, be submitted to audit and inspection by duly authorized representatives of the Office of Production Management.

(e) Reports. All persons affected by this Order shall execute and file with the Office of Production Management such reports and questionnaires as said Office shall from time to time request. No reports or questionnaires are to be filed by any person until forms therefor are prescribed by the Office of Production Management.

(f) False Statements. Any person who wilfully falsifies any records which he is required to keep by the terms of this Order or by the Director of Priorities, or who otherwise wilfully furnishes false information to the Director of Priorities or to the Office of Production Management, and any person who obtains a delivery or a preference rating for a delivery by means of a material and wilful misstatement, may be prohibited by the Director of Priorities from making or obtaining further deliveries of steel. The Director of Priorities may also take any other action deemed appropriate, including the making of a recommendation for prosecution under Section 35 of the Criminal Code (18 U. S. C. 80).

(g) Appeal. Any person affected by this Order who considers that compliance herewith would work an exceptional and unreasonable hardship upon him, may appeal to the Division of Priorities by addressing a letter to the Division of Priorities, Office of Production Management, Social Security Building, Washington, D. C., setting forth the pertinent facts and the reasons such person considers that he is entitled to relief. The Director of Priorities may thereupon take such action as he deems appropriate.

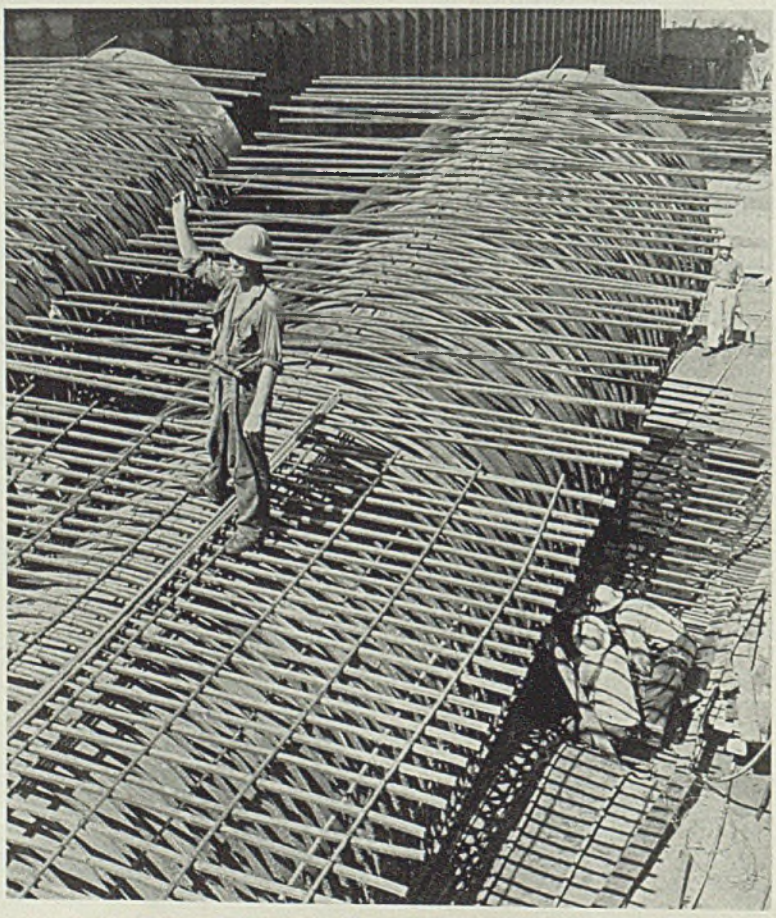
(h) Notification of Customers. Any person who is prohibited from or restricted in, making deliveries of steel by the provisions of this Order shall, as soon as practicable, notify each of his regular customers of the requirements of this Order but the failure to give such notice shall not excuse any customer from the obligation of complying with the terms of this Order.

(i) Revocation of General Steel Preference Delivery Order. General Steel Preference Delivery Order issued May 29, 1941, as amended, is hereby revoked, effective as of the effective date of this Order.

(j) Effective Dates. This Order shall take effect on the 9th day of August, 1941, and, unless sooner terminated by direction of the Director of Priorities, shall expire on the 30th day of November, 1941. (O.P.M. Reg. 3, Mar. 7, 1941, 6 F.R. 1596; E.O. 8629, Jan. 7, 1941, 6 F.R. 191; sec 2(a), Public No. 671, 76th Congress, Sec 9, Public No. 783, 76th Congress.)

Issued this 9th day of August, 1941.

E. R. Stettinius, Jr.
Director of Priorities



■ A network of steel bars encircles and crosses the river outlet pipes in Friant dam, California, to reinforce concrete to be poured around these conduits. Four such outlets, 9 feet 2 inches in diameter, are installed in the dam to regulate release of water from Friant reservoir into the San Joaquin river. The dam is being built and will be operated by the United States Bureau of Reclamation. NEA photo

July Gear Sales Index Down One Point to 298

■ Industrial gear sales in July were down fractionally from the peak level in June, but were 111 per cent greater than in July, 1940, according to the American Gear Manufacturers Association, Wilkinsburg, Pa. Sales in the first seven months this year were 123 per cent above the corresponding period last year.

Comparative index figure of sales in July was 298, down one point from 299 in June, and compared with 141 in July of 1940. Index figure in May was 273; in April, 292; and 288 in March. The index is based on 1928 as 100.

Compilation applies only to industrial gears, the association reports.

Heavy Steel Barrel Output Up 43 Per Cent

■ Production of heavy type steel barrels and drums amounted to 8,227,642 during the first six months of this year, compared with 5,772,050 during the first half of 1940, the Census Bureau reports.

Shipments totaled 8,240,897 in the first six months of 1941, compared with 5,787,784 during the corresponding 1940 period.

Unfilled orders at the end of June called for 1,213,920 barrels. Of this total 488,995 barrels were for delivery within 30 days and 724,925 beyond 30 days.

Production of light type steel barrels and drums during the first six months of this year amounted to 1,760,745, compared with 1,370,415 during the first half of 1940. Shipments during the first half of 1941 totaled 1,762,788, compared with 1,370,684 in the first half of 1940.

U. S. Steel's Shipments Ease Moderately in July

■ United States Steel Corp.'s shipments of finished steel in July were 1,666,667 net tons, a decrease of 1970 tons from 1,668,637 tons in June. This was the highest for July in the history of the company. Shipments were 28.5 per cent larger than in July, 1940.

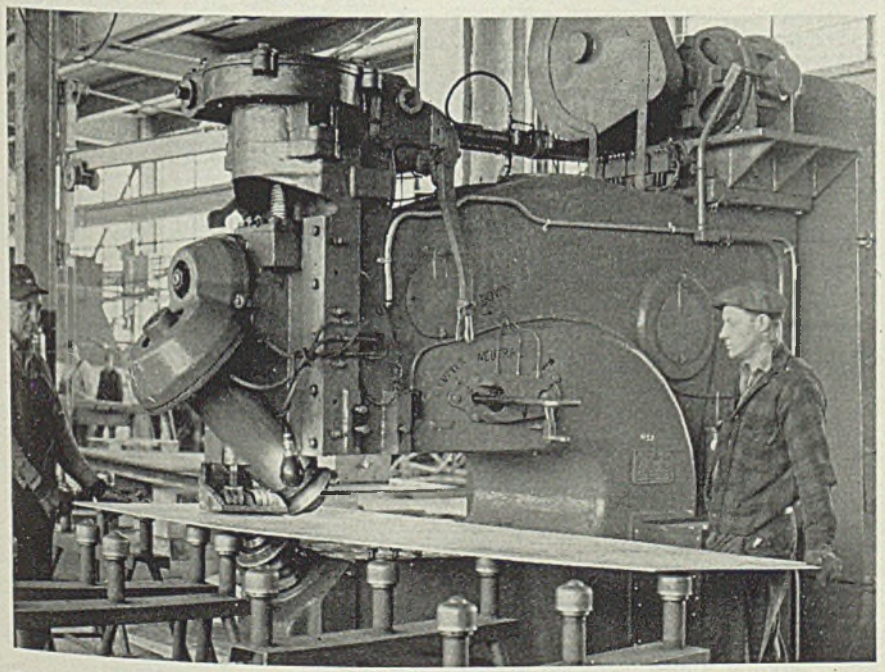
For seven months this year the total was 11,719,544 tons, 54.5 per cent over 7,585,285 tons in the corresponding period last year. This also is a record.

(Inter-company shipments not included)
Net Tons

	1941	1940	1939	1938
Jan.	1,682,454	1,145,592	870,866	570,264
Feb.	1,548,451	1,009,256	747,427	522,395
March	1,720,366	931,905	845,108	627,047
April	1,687,674	907,904	771,752	550,551
May	1,745,295	1,084,057	795,689	509,811
June	1,668,637	1,209,684	807,562	524,994
July	1,666,667	1,296,887	745,364	484,611
Aug.		1,455,604	885,636	615,521
Sept.		1,392,838	1,086,683	635,645
Oct.		1,572,408	1,345,855	730,312
Nov.		1,425,352	1,406,205	749,328
Dec.		1,544,623	1,443,969	765,868
Total, by Mos.		14,976,110	11,752,116	7,286,347
Adjustment			*44,865	†29,159
Total			11,707,251	7,315,506

†Increase. *Decrease.

Trimming Plates for "Battle Wagons"



■ Metals, ranging from sheet metal for airplane wings to 1-inch mild steel plates for naval vessels are cut on rotary shears similar to this Quickwork-Whiting Corp. shear shown above cutting steel plates in an eastern shipyard for national defense

Steel Office Furniture Orders Gain Sharply

■ Value of new orders received for steel office furniture during the first six months of this year was more than double the figure for the first half of 1940, according to the Census Bureau.

New orders received during the first half of this year, less cancellations, amounted to $27,096,011, compared with $13,237,331 during the first six months of 1940. Shipments during the first half of this year were valued at $22,744,436, compared with $13,222,382 during the corresponding 1940 period.

At the end of June $7,334,550 unfilled orders were reported.

Steel shelving shipments during the first half of this year were valued at $6,025,664, compared with $3,117,197 during the corresponding 1940 period. New orders were also up with a total value of $7,216,909, less cancellations.

Consumers' Slab Zinc Stocks Increased in June

■ Consumers' stocks of slab zinc rose from 56,489 short tons on May 31 to 60,087 tons on June 30, an increase of 6 per cent, according to the Bureau of Mines. This rise marks the end of a period of stock decline which was continuous from September, 1940. The decline in total consumers' stocks for May was 5 per cent which followed a drop of 8 per cent in April.

Inventories held by all classes of users increased in June. Those at brass mills took the lead with a rise of 15 per cent over stock totals on May 31 followed by zinc rolling mills and oxide plants, die casters, and galvanizers, with increases of 11, 2 and 1 per cent respectively.

Stocks of regular high grade and intermediate increased 28 per cent and those of special high grade 2 per cent, but inventories of brass special, selected, and prime western declined 2 per cent.

U.S. Manganese Output Up Slightly in June

■ Domestic production of manganese ore containing 35 per cent or more of manganese (natural) during June was 3100 long tons, shipments were 3000 tons, and producers' stocks at the end of the month 1300 tons, according to the Bureau of Mines.

In May production was 2600 tons, shipments 2900 tons, and producers' stocks at the end of the month 1500 tons. Figures for each month are predicated upon reports from producers that accounted for 84 per cent of the total in 1940.

Army Reports $145,849,679 National Defense Contracts Placed in Week

■ DEFENSE awards reported last week by War Department totaled $145,849,679, with contracts widely distributed among various branches of the army. Air Corps, Quartermaster Corps and Engineers' Corps placed numerous contracts, most of which were relatively large. Many Ordnance Department awards, however, were small, for precision instruments and similar items.

Preliminary preparation for possible greatly increased need for cantonments and munitions manufacturing facilities is being made. Numerous tentative contracts have been awarded for architectural-engineering services, subject to fulfillment at the government's option or when funds will be available. The contractors, meanwhile, are to make preparatory surveys, that the initial planning stage might be completed when and if need for the added facilities arises.

Contracts reported by the War Department last week included:

Beech Aircraft Corp., Wichita, Kans., airplanes and spare parts, $12,610,125.

Ehret-Day Co., Asbury Park, N. J., $1,270,000 for construction of the initial part of an anti-aircraft detection and photographic laboratory at Ft. Monmouth, New Jersey.

Ericsson, Henry, Co., Chicago, $4,884,029 for design and construction of a central ordnance regulating station, Momence, Ill., with Nimmons, Carr & Wright, Chicago, receiving the architect-engineer contract. New station will include warehouses, magazines, roads, 25 miles of railroads, miscellaneous buildings and all necessary utilities and appurtenances.

Friedman, Harry B., Ft. Worth, Tex., $1,627,490 for a quartermaster depot near Ft. Worth. Contract includes construction of 496,800 square feet of warehouse area, shops, garages, gas and oil storage, sentry block, checkers' office, two miles of fencing and all necessary utilities.

General Tire Engineering Co., Jackson, Miss., subsidiary of General Tire & Rubber Co., Akron, O., $11,970,202 for services in connection with construction of the Mississippi Ordnance plant, Flora, Miss. Contractor is to provide management services during construction, including supervision of subcontracts for architect-engineer services and construction and the procurement of personnel. At government's option, contractor will also train key personnel for and operate a bag loading plant. Industrial buildings, dormitories, guard and fire fighting facilities are to be constructed at the plant which is to load charges for 105 mm. howitzers and 155 mm. guns.

Rife, A. J., Construction Co., Dallas, Tex., replacement training center at Camp Barkeley, Texas, to cost about $2,036,972. Center to include approximately 170 cantonment-type buildings with utilities.

Weitz Co. Inc., and J. S. McLaughlin & Sons, both of Des Moines, Iowa; and Central Engineering Co. and Priester Construction Co., both of Davenport, Iowa, construction of a small arms ammunition plant at Des Moines at estimated cost of $17,679,597. Plant will be operated by United States Rubber Co. and will manufacture .30 and .50 caliber ammunition of ball, armor-piercing and tracer type.

Vultee Aircraft Inc., Downey, Calif., airplanes and spare parts, $14,518,707.60.

Ordnance Department Awards

Abel, Robert, Inc., Boston, pouring car and hoists for casting machines, electric hoists, $16,507.

Adirondack Foundries & Steel Co. Inc., Watervliet, N. Y., steel castings, $2995.29.

American Brake Shoe & Foundry Co., American Forge Division, Chicago, steel forgings, $638,600.

American Broach & Machine Co., Ann Arbor, Mich., machines, $63,760.

American Locomotive Co., Latrobe, Pa., springs, $3942.

Automatic Machine Products Co., Attleboro, Mass., percussion primers, $621,756.

Auto Specialties Mfg. Co., St. Joseph, Mich., shell, $595,000.

Axelson Mfg. Co., Los Angeles, motor lathe, $6671.70.

Barber-Colman Co., Rockford, Ill., milling cutters, $2110.80.

Barker Tool Die & Gauge Co., Detroit, gages, $5966.

Barlow & Seelig Co., Ripon, Wis., shells, $339,765.

Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., starting cranks, parts for tanks, $34,461.50.

Borg-Warner Corp., Rockford Drilling Machine Division, Rockford, Ill., assemblies for tanks, $13,496.14.

Brown-Lipe Gear Co., General Drop Forge Division, Buffalo, steel forgings, $2269.14.

Brown & Sharpe Mfg. Co., Providence, R. I., turning blades, $2304.

Budd Wheel Co., Detroit, discs for use with truck tires, $4648.20.

Burgess Co. Inc., Beaver Falls, Pa., shot, $910,000.

Cambridge Screw Co., Cambridge, Mass., percussion primers, $270,987.50.

Carnegie-Illinois Steel Corp., Chicago, steel, $7641.34.

Chicago Steel Foundry Co., Chicago, castings, $3321.70.

Crosby Co., Buffalo, magazines, $420,000.

Cross Gear & Machine Co., Detroit, chambering machine, $7148.

Crucible Steel Co. of America, Harrison, N. J., alloy steel tube forgings, $8645.

Cummins Engine Co., Columbus, Ind., engine for tank, $3901.

Disston, Henry, & Sons Inc., Philadelphia, rings for presses, $3148.32.

Eaglesfield, R. D., Indianapolis, shell, $80,000.

Engineering & Research Corp., Riverdale, Md., machines, $36,465.

Ex-Cell-O Corp., Detroit, machines, $483,025.

Fedders Mfg. Co., Buffalo, cartridge clips, $155,244.

Felton, S. A., & Son Co., Manchester, N. H., wire brushes, $6615.

Finkl, A., & Sons Co., Chicago, alloy steel forgings, $1700.

Firth-Sterling Steel Co., McKeesport, Pa., tools for drill machine, $1845.

Framanco Co., Boston, shells, $545,670.

Frey, Russell R., Glendale, Calif., milling machines, $1870.

Fuller Mfg. Co., United Drop Forge Division, West Allis, Wis., drop forgings, $15,977.

General Motors Corp., Delco Brake Division, Dayton, O., housings for shell, $69,320.

Gillette Safety Razor Co., Boston, percussion primers, $47,350.

Gisholt Machine Co., Madison, Wis., equipment for turret lathes, $550,400.

Globe-Union Inc., Milwaukee, fuzes, $720,000.

Goepfert & Buck, New York, tacks, boxes, lock steel washers, $5666.

Grand Rapids Brass Co., Grand Rapids, Mich., bomb fuzes, $54,534.

Great Lakes Steel Corp., Ecorse, Detroit, Mich., rails, steel, $8410.80.

Hanssen's, Louis, Sons, Davenport, Iowa, nuts and screws, $6803.10.

Hardinge Bros., Elmira, N. Y., lathes and milling machines, $15,081.50.

Harrisburg Steel Corp., Harrisburg, Pa., demolition bombs, including fin and assembly, $1,402,300.

Herschede Hall Clock Co., Cincinnati, housings for shells, $45,890.

Hinckley, George W., Co. Inc., New York, switch ties, $4193.

Hobart Bros. Co., Troy, O., generating units, $601,049.38.

International Harvester Co., Chicago, packing stop for containers, $738,394.63.

Jones & Lamson Machine Co., Springfield, Vt., grinding and measuring machines, $36,270.80.

Jones & Laughlin Steel Corp., Pittsburgh, carbon steel, $5890.40.

Kelly, John P., Philadelphia, bronze castings, $38,861.25.

King-Seeley Corp., Ann Arbor, Mich., fin assemblies, $553,932.80.

Kohler Co., Kohler, Wis., fuzes, $135,000.

Lamson Sessions Co., Cleveland, bolts, nuts, pins, and screws, $2985.85.

LaSalle Steel Co., Chicago, steel, $2791.20.

Lehigh Foundries Inc., Easton, Pa., grenade bodies, $22,080.

Lincoln Park Tool & Gage Co., Lincoln Park, Mich., gages, $2113.60.

Lodge & Shipley Machine Tool Co., Cincinnati, lathes, $10,478.

Mantle & Co., New York, milling machine, $2530.

Maxson, W. L., Corp., New York, drives for fuze setter, $2300.

McCord Radiator & Mfg. Co., Detroit, liners and suspensions, helmet body assemblies, $3,215,370.

Midvale Co., Nicetown, Philadelphia, alloy steel forgings, armor plates, tube forgings, $314,243.68.

Modern-Bond Corp., Wilmington, Del., adjustable base blocks, $1815.

Monarch Machine Tool Co., Sidney, O., lathes, $8598.

Moore Machinery Co., Berkeley, Calif., machine tools, $18,348.25.

Morey Machinery Co. Inc., New York, profilers, $19,207.

Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, Conn., gages, $3740.

Noblitt-Sparks Inc., Greenwood, Ind., burster casings with metal parts, $677,396.

O'Brien Machinery Co., Philadelphia, machines, $6120.87.

Oil Well Supply Co., Oil City, Pa., shell, $243,250.

O'Keefe & Merritt Co., Los Angeles, fin assemblies, $14,200.

Oliver Farm Equipment Co., Chicago, shells, $648,050.

Peco Mfg. Corp., Philadelphia, eyebolts, plugs, $64,500.

Pennsylvania Forge Corp., Philadelphia, forgings, $969,629.40.

Precision Castings Co., Fayetteville, N. Y., die casting stock, $4392.

Quality Tool & Die Co., Indianapolis, gages, $7560.

Republic Steel Corp., Union Drawn Steel Division, Massillon, O., steel bars, $123,612.17.

Robertshaw Thermostat Co., Youngwood, Pa., boosters, $895,923.

Rolock Inc., Southport, Conn., grabs, $11,040.

Rotary Electric Steel Co., Detroit, chromium molybdenum, $13,932.

Savage Arms Corp., Utica, N. Y., machine guns, $14,334,470.07.

Sedgley, R. F., Inc., Philadelphia, pistols,

$10,486.
Sinko Tool & Mfg. Co., Chicago, gages, $2160.
Smith, A. O., Corp., Milwaukee, bomb bodies, $3,224,000.
Smith, H. A., Machinery Co., Syracuse, N. Y., grinders, $16,802.
Sowers Mfg. Co., Buffalo, steam jacketed kettles, $1757.
Standard Steel Spring Co., Blood Bros. Machine Co. Division, Allegan, Mich., flexible joints, $2261.60.
Standard Tube Co., Detroit, shells, $1,098,000.
Stewart-Warner Corp., Chicago, fuzes, $4,525,389.80.
Struthers-Wells-Titusville Corp., Titusville, Pa., forgings, $596,953.
Taft-Peirce Mfg. Co., Woonsocket, R. I., gages, $4600.
Timken-Detroit Axle Co., Detroit, forgings, $66,631.35; Wisconsin Axle Division, Oshkosh, Wis., tank parts, $30,621.03.
Tools & Gages Inc., Cleveland, gages, $3608.
Tri-Metal Products Corp., Conshohocken, Pa., manganese bronze castings, $12,906.16.
Troy Tool & Gage Co., Detroit, gages, $3148.
Universal Crusher Co., Cedar Rapids, Iowa, cradle assemblies, $54,826.
U. S. Metals Refining Co., Carteret, N. J., solder, $1537.50.
Van Norman Machine Tool Co., Springfield, Mass., milling machines, $744,100.
Vinco Corp., Detroit, gages, $3870.75.
Ward LaFrance Truck Corp., Elmira Heights, N. Y., spare parts for trucks, $85,363.91.
Warner Electric Brake Mfg. Co., Beloit, Wis., electric brakes and drums, $26,231.69.
Westinghouse Air Brake Co., Wilmerding, Pa., boosters, $544,000.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., switchgear for control of tie lines and transformer banks, $45,910.
Wicaco Machine Corp., Philadelphia, machine and collets, $6478.
Wood, John, Mfg. Co. Inc., Muskegon, Mich., springs and miscellaneous parts, $43,649.41.
Zimmerman Steel Co., Bettendorf, Iowa, steel castings, $71,487.45.

Signal Corps Awards

Cardwell, Allen D., Mfg. Corp., Brooklyn, N. Y., frequency meter sets and parts, $213,429.64.
Hallicrafters Co., Chicago, radio receivers and spare parts, $8099.96.
Leich Electric Co., Genoa, Ill., switchboard, $30,562.50.
Oak Mfg. Co., Chicago, vibrators, $64,405.
Philco Corp., Philadelphia, radio receivers and parts, $433,870.
RCA Mfg. Co. Inc., Camden, N. J., transmitters with parts and attachments, tube testers and parts, $129,173.52.

Coast Artillery Corps Awards

Graybar Electric Co., Norfolk, Va., electric panel instruments, $967.90.
Lord Mfg. Co., Erie, Pa., mounting, monel plate, $2406.

Quartermaster Corps Awards

Ahlberg, O., & Sons Inc., Cranston, R. I., water supply and sewage system connections to seven buildings at station hospital, Camp Edwards, Massachusetts, $9300.
American Chain & Cable Co., Page Steel & Wire Division, Indianapolis, fencing and illumination of critical areas, Ft. Benjamin Harrison, Indiana, $10,040.
American Chain Link Fence Co., Medford, Mass., fencing critical areas at Forts Revere, Ruckman, Strong and Point Allerton (Harbor Defenses of Boston,) $16,194.
Aqua Systems, New York, gasoline storage facilities for airfield, Ft. Dix, New Jersey, $42,522.
Arkansas Foundry Co., Little Rock, Ark., fencing and illumination of critical areas, Camp Joseph T. Robinson, Arkansas, $79,908.
Autocar Co., Ardmore, Pa., spare parts for trucks, $85,745.54.
Baker Iron Co., Minneapolis, fencing of critical areas, Ft. Snelling, Minnesota, $10,438.
Bragger, A. P., Construction Co., Warwick, R. I., additions in water supply and new single pneumatic water system, Ft. Wetherill, Rhode Island, $9850.
Burge Fence & Iron Co., Kansas City, Mo., fencing and illumination of critical areas, Ft. Leavenworth, Kansas, $7710.
Burgess, Richard, Trenton, N. J., incinerator superstructure, Ft. Dix, New Jersey, $6747.
Butcher, Roy M., San Jose, Calif., street lighting system, Ft. Ord, California, $17,105.
Chell & Anderson, Chicago, ordnance repair shop and boiler house, Ft. Sheridan, Illinois, $68,980.
Central Engineering & Construction Co., Indianapolis, railroad spur to serve Billings general hospital, Ft. Benjamin Harrison, Indiana, $14,450.
Deckert & McDowell, Chicago, railroad track, Savanna ordnance depot, proving ground, Illinois, $196,611.
Eager, Philip J., Inc., Long Branch, N. J., heating facilities in hospital buildings, Ft. Hancock, New Jersey, $7725.
Edens-Marson Co., Lebanon, Ind., aerial electrical distribution for street lighting systems, Ft. Benjamin Harrison, Indiana, $23,059.63.
Electric Construction Co., Little Rock, Ark., electric lines, Camp Joseph T. Robinson, Arkansas, $18,071.
Ellis, Edward H., Inc., Westville, N. J., portable steel igloo type magazines and roads and drainage thereto, Ft. Dix, New Jersey, $45,865.
Equitable Equipment Co. Inc., New Orleans, cargo vessels and tugs, barges, $688,600.
Fargo Motor Co., Detroit, trucks, $418,366.80.
Fay, Edward, & Son, Philadelphia, combination garage, roundhouse, firehouse and guardhouse, Delaware ordnance depot, New Jersey, $123,700.
Ford Motor Co., Dearborn, Mich., engines, $88,033.30.
General Motors Corp., Detroit, trucks and parts, $2,750,824.16.
Goerig, A. J., Seattle, railroad spurs, Ft. Lewis, Washington, $93,000.
Great Eastern Construction Co. Inc., New York, standard ordnance warehouse and inflammable storage building, Ft. Monmouth, New Jeresey, $9500.
Highway Trailer Co., Edgerton, Wis., semitrailers, $86,948.19.
Holmes Electric Co., Fayetteville, N. C., fence lighting system for critical areas, Ft. Bragg, North Carolina, $18,830.
International Harvester Co., Chicago, parts for trucks, $172,219.87.
Kansas City Wire & Iron Works, Kansas City, Mo., fencing in critical areas, quartermaster depot, Kansas City, Mo., $5496.
Loving, T. A., & Co., Goldsboro, N. C., standard ordnance shop and boiler house, Ft. Bragg, North Carolina, $79,200.
Mack Mfg. Co., Long Island City, N. Y., trucks, truck assemblies. $681,819.
Marhoefer, E. H., Jr. Co., Chicago, water treatment plant, Ft. Knox, Kentucky, $178,858.
Marra & Son Construction Co. Inc., Indianapolis, water softening plant, pump houses, water tower foundations, water and sewer systems. Ft. Benjamin Harrison, Indiana, $86,780.90.
McQueen, Thomas, Forest Park, Ill., reinforced concrete bridge, Ft. Sheridan, Illinois, $53,100.
Morgan, J. E., & Sons, El Paso, Tex., neuropsychiatric ward, William Beaumont general hospital, El Paso, Tex., $318,882.
Mowat, A. F., Construction Co., Seattle, two theaters, sanitary sewage system, water supply line and electrical service facilities, at Ft. Lewis, Washington $104,794.
O'Driscoll & Grove Inc., New York, standard ordnance shop, boiler house, ordnance warehouses, and water and sanitary sewer systems, electric distribution systems and road and surface drainage, Ft. Dix, New Jersey, $109,748.
Olson Construction Co., Dobson & Robinson, Peter Kiewit Sons Co., Ogden, Utah, shell loading plant, fuse loading plant and primer loading plant, Ogden ordnance depot, Ogden, Utah, $2,305,000.
Osgood Co., Marion, O., cranes and spare parts, $14,201.
Ottinger Bros. Construction Co., Oklahoma City, Okla., five ordnance buildings, utilities and appurtenances, Ft. Sill, Oklahoma, $81,080.73.
Packard Motor Car Co., Detroit, sedan cars, $19,196.
Paine Construction Corp., Brooklyn, N. Y., extensions and additions to existing water and sewer systems, Ft. Hamilton, New York, $85,000.
Prentice, G. E., Mfg. Co., New Britain, Conn., buckles and clips, $14,565.
Rappoli, Edmund J., Co. Inc., Cambridge, Mass., warehouse, Watertown arsenal, Watertown, Mass., $787,000.
Ryan Plumbing Co., Davenport, Iowa, central steam plant, Savanna ordnance depot, Illinois, $29,000.
Scherer, L. P., Redlands, Calif., 10-ton incinerator, Camp Haan, California, $25,762.
Security Fence Co., Providence, R. I., fencing of critical areas, Forts Adams, Wetherill, Getty, and Kearney, Rhode Island, $26,767.94.
Snell, William E., Vineland, N. J., utilities, Delaware ordnance depot, Pedricktown, N. J., $4494.
Soule & Walters, Elma, Wash., water supply line and additions to water purification system, Ft. Lewis, Washington, $22,557.
Studebaker Corp., South Bend, Ind., chassis, $40.778.40.
T. L. G. Construction Co., Seattle, alterations of and extensions to water distribution system, Ft. Lewis, Washington, $40,700.
Turner McCoy Plumbing & Heating Co., Little Rock, Ark., plumbing at Camp Joseph T. Robinson, Arkansas, $71,071.
Watson, M. W., Topeka, Kans., fencing and illumination of critical areas, Ft. Riley, Kansas, $59,224; installation of 1513 tie rods on 357 existing buildings, Ft. Riley, $9305.
Welso Construction Co., Chicago, incinerator, Ft. Sheridan, Illinois, $25,845.
Western Construction Co., Seattle, warehouse, including utilities, Seattle Quartermaster depot, Washington, $1,525,450.
Whitmeyer, George A., & Sons Co., Ogden, Utah, warehouses, including utilities, Utah general depot, Ogden, $516,990.
Winter-Weiss Co., Denver, semitrailers, $90,675.
Yellow Truck & Coach Mfg. Co., Pontiac, Mich., trucks, $302,065.04.
Zanni, Domenick, Reading, Mass., water supply line, Boston Harbor, Mass., $15,360.

Corps of Engineers Awards

Alban Tractor Co., Moline, Ill., disk plows, tractor plows, $16,374.72.
Allis-Chalmers Mfg. Co., Milwaukee, loader, $26,157.25.
American Bridge Co., Ambridge, Pa., machine gun emplacements, $3232.
American Steel & Wire Co., Cleveland, wire, $22,279.40; chain link fence, services of contractor's representative and use of special tools, MacDill field. Florida, $21,073.
Anaconda Wire & Cable Co., New York, cable and wire, $73,657.20.
Aqua Systems Inc., New York, fueling system, Candler field, Atlanta, Ga., $39,333.
Atkins, E. C., & Co., Indianapolis, saws,

$8452.30.

Austin-Western Road Machinery Co., Aurora, Ill., road roller, $4537.

Baker-Raulang Co., Baker Industrial Truck Division, Cleveland, electric truck, $5611.

Barber-Greene Co., Aurora, Ill., ditcher, $31,073.

Bruning, Charles, Co., New York, drafting tools, $8277.50.

Buell, B. B., & Co., Seattle, kitchen ranges, McChord field, Washington, and Snohomish county airport, Everett, Wash., $14,907.

Carnegie-Illinois Steel Corp., Pittsburgh, landing mat, $276,000.

Central Conveyor & Mfg. Co., St. Louis, electric stacking conveyors, $3460.

Chicago, Rock Island & Pacific Railway Co., Chicago, railroad cars, $38,500.

Circle Wire & Cable Corp., Maspeth, L. I., N. Y., copper wire, $73,200.

Commercial Shearing & Stamping Co., Youngstown, O., outboard motor brackets, $15,590.40.

Consolidated Supply Co., Portland, Oreg., miscellaneous equipment, lavatories, drinking fountains, $6101.59.

Crown Iron Works Co., Minneapolis, ponton bridges, screw posts, wire reels, $232,280.

Dietzgen, Eugene, Co. Inc., Chicago, levels, planetables, and alidades, $15,615.

Distell, W. J., Los Angeles, ordnance buildings, and appurtenant facilities, Muroc bombing range, Muroc Lake, California, $307,450.75.

Dohrmann Hotel Supply Co., San Francisco, coffee urns and battery; steam jacketed kettles, and roasting kettles, various air corps stations, California, $25,861.41.

Electric Industrial Equipment & Supply Corp., Baltimore, shades and switches, $10,894.

Elwell-Parker Electric Co., Cleveland, electric trucks, $11,180.

Flotation Systems Inc., Los Angeles, gasoline fueling system, Las Vegas airport, Las Vegas, Nev., $92,345.

Fryer, D. E., & Co., Seattle, industrial type metal partitions, $2850.

General American Transportation Corp., Sharon, Pa., railroad cars, $146,234.73.

General Electric Supply Corp., Bridgeport, Conn., copper wire, $127,160.

Gurley, W. & L. E., Troy, N. Y., level rods, $6040.

Haffner-Thrall Car Co., Chicago, railroad cars, $33,110.

Hawthorne Sheet Metal Works, Portland, Oreg., range hood assembly, Pendleton air corps cantonment, Oregon, $3299.06.

Heinemann Electric Co., Trenton, N. J., switches and fuses, $7090.

Jeffrey Mfg. Co., Columbus, O., portable electric conveyors, $2100.

Jones & Laughlin Steel Corp., Aliquippa, Pa., wire, $77,482.

Jorss, A. F., Iron Works Inc., Washington, transportation auxiliaries, $33,031.53.

Keuffel & Esser Co., Hoboken, N. J., scales and triangles, $19,442.20.

Keystone Steel & Wire Co., Peoria, Ill., wire, $31,084.

Klein, M., & Sons, Chicago, lineman's climbers, $7478.40.

Kraueter & Co. Inc., Newark, N. J., pliers, $22,140.

LaCrosse Trailer & Equipment Co., LaCrosse, Wis., trailers, $28,624.

Langdon-Faulkner Co. Inc., Seattle, steel boilers, $6011.

LeBlond, R. K., Machine Tool Co., Cincinnati, lathes, $15,392.80.

Leschen, A., & Sons Rope Co., St. Louis, wire rope, slings and clips, $28,132.95.

LeTourneau, R. G., Inc., Peoria, Ill., LeTourneau carryalls, $39,655.

Lite Mfg. Co., Newark, N. J., water tanks, $39,162.

Lo Presti, A. C., San Francisco, water softening plant, March field, Riverside county, California, $6157.

Maclane Hardware Co., New York, tools, $16,086.

Magor Car Corp., New York, shovels, $10,500.

Maine Steel Inc., South Portland, Me., anchors, $22,489.50.

Martin, J. O. & C. U., San Francisco, burners, boilers and tanks, $7309.90.

Mercury Mfg. Co., Chicago, towing trucks, $8470.

Midway Electric Supply Co. Inc., New York, fuses, sockets and switches, $17,819.

Mora, Gerald, Contractor, Houston, Tex., airport fence and all other incidental work, Waco municipal airport, McLennan county, Texas, $4970.50.

Murlin Mfg. Co., Philadelphia, cast bronze lighting fixtures, Westover field, Chicopee Falls, Mass., $3060.

Muth, George F., Inc., Hoboken, N. J., field sets—instruments, $58,995.

New England Sales Corp., Providence, R. I., refrigerators, Westover field, Chicopee Falls, Mass., $2737.

Northwestern Motor Co., Eau Claire, Wis., work cars, $3640.

Northwest Steel Rolling Mills Inc., Seattle, dowel bars and tie bars, Sunset field, Spokane, Wash., $4353.08.

Outboard, Marine & Mfg. Co., Johnson Motors Division, Waukegan, Ill., outboard motors, $34,708.07.

Post, Frederick, Co., Chicago, level rods, $20,160.

Stanley Works, Stanley Tools Division, Newark, N. J., rules and swages, $3242.65.

Upson-Walton Co., McLane, Pa., boat hooks and ponton oars, $23,768.40.

Washington Springs Works Inc., Washington, bail pump, $16,975.

West Bend Equipment Corp., West Bend, Wis., elevators, $2050.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., street lighting control equipment, Washington national airport, Gravelly Point, D. C., $4473.

Whitcomb Locomotive Co., Rochelle, Ill., diesel electric locomotive, $24,860.

Wood, Gar, Industries Inc. Detroit, motor fueling equipment, $4680.

Wood Roadmixer Co., North Hollywood, Calif., roadmixers, $51,814.

Yale & Towne Mfg. Co., Automatic Transportation Co. Division, Chicago, electric trucks, $10,506.

Air Corps Awards

Aviation Mfg. Corp., Lycoming Division, Williamsport, Pa., aeronautical engines, $16,945,430.04.

Clark Equipment Co., Clark Tructractor Division, Battle Creek, Mich., tractors and spare parts, $1,568,116.50.

Crosley Corp., Cincinnati, shackle assemblies, $729,995.20.

General Motors Corp., Delco Products Division, Dayton, O., landing gear assemblies, $1,174,250.

Jack & Heintz Inc., Cleveland, airplane starter assemblies, $1,925,000.

Oneida Ltd., Oneida, N. Y., bomb shackle assemblies, $546,158.80.

Sparks-Withington Co., Jackson, Mich., hoist assemblies, $718,648.20.

The Week in Canada; Highlights of Orders, Expansions

TORONTO, ONT.

■ Canada's aircraft industry, now producing planes at the rate of 40 per week, is in process of expansion expected to more than double this rate within the next few months. Most major aircraft factories in the Dominion are erecting large plant additions or are preparing to start construction immediately.

New aircraft contracts totaling $25,000,000 were reported last week by C. D. Howe, minister of munitions and supply. This increases order backlog on aircraft to more than $60,000,000.

Canadian Car & Foundry Co. Ltd., Montreal, Que., was awarded a contract for 400 Hurricane fighting planes, this order to be followed by production of single-engine Harvards for advanced training at the rate of 80 per month. Hurricanes are to be manufactured at the company's Ft. William, Ont., plant. Noorduyn Aviation Ltd., Montreal, has received an order for 500 additional Harvards.

F. T. Smye, Hamilton, Ont., has been appointed assistant to the director general of aircraft production. Mr. Smye has been attached to the New York and Washington liaison offices of the munitions and supply department.

F. B. Kilbourn, vice president and general manager, Canada Cement Co., Montreal, has been appointed Canadian steel controller to succeed H. D. Scully. Mr. Scully has served as steel controller since June, 1940, in addition to his duties as commissioner of customs. He will retain the latter position.

Contracts placed in the period July 23-29 totaled 7370, with $37,326,430 aggregate value. Awards included:

Metals: International Nickel Co. of Canada Ltd., Toronto, $163,296; Atlas Steels Ltd., Welland, Ont., $51,436; Anaconda American Brass Ltd., New Toronto, Ont., $5386; Aluminum Co. of Canada Ltd., Montreal, Que., $25,150; F. Bacon Co. Ltd., Montreal, $18,031; Consolidated Mining & Smelting Co. of Canada Ltd., Montreal, $20,153.

Ordnance: Air Ministry, England, $135,000; John Meed & Son, Bristol, N. B., $2,253,300; Hull Iron & Steel Works Ltd., Hull, Que., $9485; Canadian Westinghouse Co. Ltd., Hamilton, Ont., $706,212; Dominion Foundries & Forgings Ltd., Hamilton, $1,113,642.

Munitions: War Office, England, $5000; International Flare Signal Co., Waterloo, Que., $59,894; Engineering Products of Canada Ltd., Montreal, $342,134; Robert Mitchell Co. Ltd., Montreal, $23,375; Dominion Arsenals, Ottawa, $21,100; Renfrew Electric & Refrigeration Co. Ltd., Renfrew, Ont., $10,368; Anaconda American Brass Ltd., New Toronto, $59,000; Continental Can Co. of Canada Ltd., New Toronto, $6125; S. F. Bowser Co. Ltd., Toronto, $25,326; W. E. Dillon Co. Ltd., Toronto, $45,755; Fairgrieve & Son Ltd., Toronto, $28,491; International Metal Industries Ltd., Toronto, $323,622; Massey-Harris Co. Ltd., Toronto, $123,984; Sterling Aluminum Co., Toronto, $13,706; McKinnon Industries Ltd., St. Catharines, Ont., $332,143; T. W. Hand Fireworks Co. Ltd., Cooksville, Ont., $75,252; Zephyr

Looms & Textiles Ltd., Guelph, Ont., $9583; Babcock-Wilcox & Goldie McCulloch Ltd., Galt, Ont., $279,245; Ingersoll-Machine & Tool Co. Ltd., Ingersoll, Ont., $255,744; Pressure Castings of Canada Ltd., Weston, Ont., $44,138; Beatty Bros. Ltd., Fergus, Ont., $44,731; Manitoba Bridge & Iron Works Ltd., Winnipeg, Man., $24,467; Alberta Foundry & Machine Works Ltd., Medicine Hat, Alta., $342,900.

Shipbuilding: Halifax Shipyards Ltd., Halifax, N. S., $7123; Thompson Bros. Machinery Co. Ltd., Liverpool, N. S., $77,007; John H. LeBlanc, Weymouth, N. S., $95,600; S. H. Perry Ltd., Ft. William, Ont., $6700; F. Jeune & Bros. Ltd., Victoria, B. C., $5268; Victoria Machinery Depot Ltd., Victoria, B. C., $101,526; Yarrows Ltd., Victoria, B. C., $15,724.

Dockyard supplies: Canadian Power Boat Co. Ltd., Montreal $16,368; Renfrew Electric & Refrigerator Co. Ltd., Renfrew, $13,500; Dominion Chain Co. Ltd., Niagara Falls, Ont., $27,232.

Land transport: Canadian Ingersoll-Rand Co. Ltd., Montreal, $163,703; Canadian Traction Co., Ottawa, $48,250; General Motors Products of Canada Ltd., Oshawa, Ont., $16,981; Ford Motor Co. of Canada Ltd., Windsor, Ont., $475,269; Kelsey Wheel Co. Ltd., Windsor, $6207.

Aircraft: Air Ministry, England, $16,200; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $243,242; Fairchild Aircraft Ltd., Longueuil, $8882; Aviation Electric Ltd., Montreal, $31,061; Canadian Car & Foundry Co. Ltd., Montreal, $7288; Canadian Vickers Ltd., Montreal, $28,260; Cunningham & Wells Ltd., Montreal, $15,000; Walter Kidde & Co. Ltd., Montreal, $23,625; Noorduyn Avia-

(*Please turn to Page* 126)

Roosevelt Suspends 8-Hour Day Regulation

■ President Roosevelt by executive decree last week suspended the 8-hour day law as affecting mechanics and laborers employed by the War Department on construction necessary to defense. Included in this category are workers on air fields, group housing, fortifications and similar projects. The President explained he issued the decree because of the necessity of completing all projects as soon as possible.

Federal Funds for More Plant Expansions

■ More lease agreements with companies for expansion of facilities, certified necessary for national defense by the War Department, were reported completed last week by the Defense Plant Corp. Title to facilities purchased and constructed under these additional lease agreements will be retained by the corporation. Agreements were reported completed with the following:

Aeronautical Products Inc., Detroit, $36,908 for additional plant facilities used in manufacture of aircraft parts.

Crowley, Henry L., & Co., West Orange, N. J., $245,000 for establishment of an additional plant at West Orange, and for acquisition of machinery and equipment for this plant plus facilities for existing unit for manufacture of ceramic parts.

Detroit Tap & Tool Co., Hamtranck, Mich., $175,000 for additional machinery and equipment to be used in its existing plant for gage manufacture.

Elastic Stop Nut Corp., Union, N. J., $608,736 for additional machinery and equipment to be used in production of self-locking nuts.

General Motors Corp., Buick Motor Division, Chicago and Flint, Mich., $10,267,043 for expansion by additional construction at the Melrose Center, Ill., plant, and by acquisition and installation of additional machinery and equipment in both this plant and that at Flint, Mich., to increase the company's facilities for fabrication of aeronautical engines and spare parts; Fisher Body Division, Detroit and Muncie, Ind., $894,001 for additional machinery and equipment for use in manufacturing parts and accessories for aircraft.

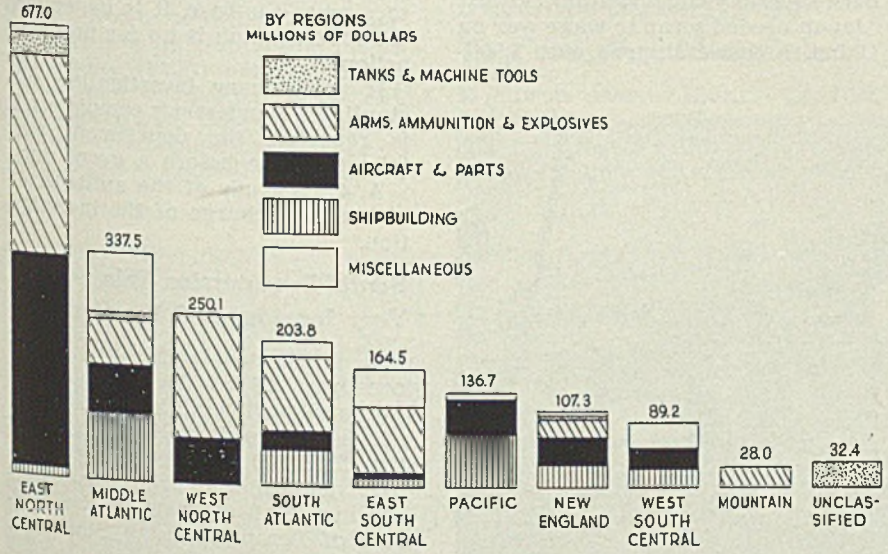
Huck Mfg. Corp., Detroit, $84,490 for additional machinery and equipment for fabrication of aircraft rivets.

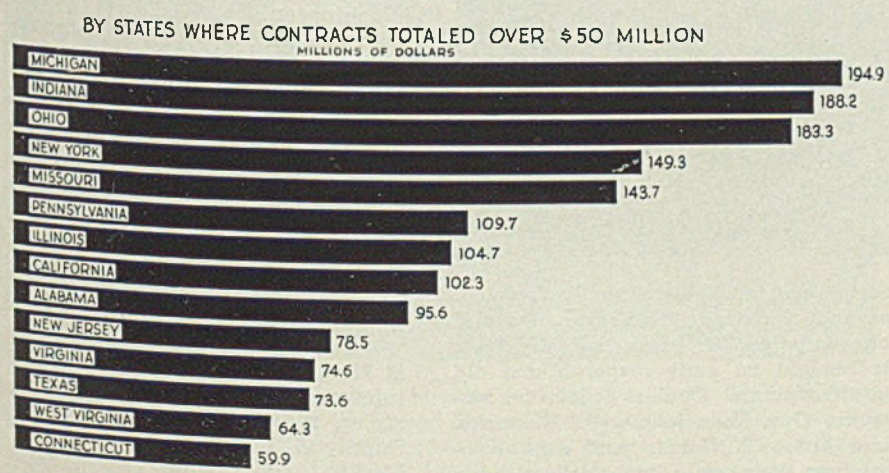
Hudson Motor Car Co., Detroit, $166,886 for additional machinery and equipment for manufacture of aircraft parts.

Lees-Bradner Co., Cleveland, $19,033 for added plant facilities for manufacture of thread millers and other machine tools.

New Britain Machine Co., New Britain, Conn., $650,000 for additional plant facilities at New Britain and Berlin, Conn., for manufacture of automatic screw machines.

Pipe Machinery Co., Cleveland, $200,000 for machinery and equipment for manufacture of gages.





Government-Financed Defense Facilities

■ Government commitments for defense plant and facilities, as shown in this chart prepared by National Industrial Conference Board Inc., New York, included more than 400 projects in the year ended June 30, with estimated aggregate value of $2,026,000,000. Commitments comprised awards made for facilities by the Army, Navy, Defense Plant Corp., Reconstruction Finance Corp. and the Maritime Commission. Data, however, does not include Navy contracts awarded subsequent to June 2.

East North Central area, especially Michigan, Indiana and Ohio, received one-third of all government-financed plants. The four central regions jointly have received almost 60 per cent of the national total.

Private investment in defense facilities, excluded from the chart, totaled $770,000,000 by May 31. Government, private and British-financed plant expansion has already cost more than $3,250,000,000.

Steel Producers Appeal to Public For Scrap To Keep Plants Operating

■ LUKENS STEEL CO., Coatesville, Pa., is running full-page advertisements in Coatesville and surrounding cities in an effort to obtain scrap. The ads set forth the pressing need for scrap to keep the steel plant in operation and 4500 employes at work. The company says:

"Unless the present supply of scrap from dealers is increased or supplemented, it is merely a matter of weeks before Lukens is forced to shut down steelmaking furnaces because scrap reserves will have been used up.

"That means less steel made, less steel rolled, less steel for the Navy, the Army and National Defense.

"You can help avoid it. Will you?

"Look around you today, tomorrow, every day. Look for unused, unnecessary iron and steel scrap in your home, in your place of business, on farms, in factories.

"Report it! Drop a line to Lukens Steel Co., Coatesville, Pa. Or telephone Lukens at Coatesville 800 and say: 'I want to report some scrap'.

"But don't expect to get rich on your sales of scrap. It is heavy, bulky, but the Government has set 'ceiling' prices for it to prevent a runaway market under present conditions".

"If you can do so, by all means bring your iron and steel scrap to any Coatesville scrap dealer. He will pay you the 'ceiling' price for your scrap, established by OPACS, Washington, D. C.—a government agency.

"After the dealer has sorted and prepared the scrap, Lukens will buy it from him, also at 'ceiling' prices established by the same government agency."

"Brush Every Corner" for Scrap, Verity Urges Armco Employes

Warning that the company will have to curtail steelmaking operations within a month unless more scrap iron becomes available, Calvin Verity, executive vice president and general manager, American Rolling Mill Co., Middletown, O., last week appealed to Armco workers to cooperate in a scrap collection campaign.

"The roots of this crisis reach back several years," said Mr. Verity. "Japan needed scrap to wage war on China. America shipped over 9,000,000 tons of it across the Pacific to Japan. Other nations made heavy demands for scrap. They got it. In all, approximately 19,500,000 tons of scrap have been sent outside the United States since January, 1934. . .

"Now there just isn't as much scrap iron available as our defense program requires . . . .

"That 19,500,000 tons is abroad instead of in American yards is unfortunate. But we will not sit back and let this calamity engulf us. The American free enterprise system has struggled out from under handicaps before. It must do so again. And immediately . . .

"We must brush every corner, explore every possible method of obtaining scrap. We will find scrap iron and make it into bread and butter for Armco families and communities and send it on its way to bolster the freedom of America."

■ With its scrap consumption exceeding receipts and stockpiles virtually depleted, American Rolling Mill Co. asked employes and citizens in Middletown, O., and Ashland, Ky., to co-operate in a collection campaign. Appeals through letters to workers and newspaper advertisements brought an early response and old iron and steel from many sources flowed into the plants. Dealers collect the material and sell it to Armco. Shown above are Gov. Keen Johnson of Kentucky, Mayor Henry D. Shanklin of Ashland, and James T. Norris, past state commander of the American Legion, tossing scrap from their homes into a collection bin

FBI Questioning Scrap Firms At Henderson's Request

WASHINGTON

Federal Bureau of Investigation last week was reported to be interrogating various scrap companies in compliance with OPACS Administrator Henderson's request that the Department of Justice investigate the industry's practices. Although Department of Justice officials refuse to discuss the case, it is understood the investigation is up for preferred action.

If preliminary investigation substantiates Henderson's complaints, it is reported, the department may take the case before a grand jury.

A. C. Witrude of the antitrust division is in charge of the investigation.

Scrap Consumption This Year Increased 46 Per Cent

Domestic steel mills and foundries consumed 26,533,000 gross tons of iron and steel scrap in the first half of 1941, exceeding by 46 per cent the 18,212,000 tons melted in the first half of 1940, the prior record, according to an estimate by the Institute of Scrap Iron and Steel Inc., Washington.

In the first half of 1939 consumption was only 13,214,000 gross tons, or less than half that of the first half of 1941. At the peak of the first World war monthly consumption averaged only 2,200,000 tons, compared with 4,422,000 tons thus far in 1941.

Exports of scrap in the first five months of 1941 totaled 350,715 gross tons, compared with 1,152,341 tons in the corresponding period of 1940.

■ High-speed drills and precision micrometers valued at $5000 were stolen recently from the Standard Supply & Equipment Co., Trenton, N. J.

Million Tons of Steel To Be Awarded For 1820-Mile Pipeline to East

■ PIPELINES to ease the petroleum shortage in eastern United States and Canada, caused by the transfer of American and Canadian tankers to the British war effort, are under construction or in advanced planning stages. American oil men believe the shortage in the United States will be alleviated within a year by the new lines, unless many more American-flag tankers are transferred.

Plans are prepared and an immediate start is planned on a 1820-mile, 22 and 24-inch line from east Texas and the Midcontinent areas to the Philadelphia-New York area. The line, to be the longest in the United States, will carry 250,000 barrels of crude oil daily and will require 9 months to complete. Costing between $70,000,000 and $80,000,000, it will be a joint venture by 11 major oil companies.

Formal orders for approximately 1,000,000 tons of steel sheets and pipe for this project are expected to be placed soon. The main line will require 700,000 tons of heavy-gage sheets, 76 inches wide, which will be electric welded. The gathering lines ranging from 4 to 8 inches will require 300,000 tons of pipe.

Only four companies, it is said, have capacity for the type of sheets desired — Carnegie-Illinois Steel Corp., Jones & Laughlin Steel Corp., Republic Steel Corp. and Youngstown Sheet & Tube Co.

The tonnage will take a high priority rating, probably second to shipbuilding, and shipments are expected to start early in the fourth quarter.

Resumption of work on the Southeastern Pipe Line Co.'s system from Port St. Joe, Fla., to Atlanta, Ga., and thence to Chattanooga, Tenn., is expected soon. Held up temporarily by failure to obtain right-of-way under Georgia roads and railroads, the line will carry 30,000 barrels daily.

Preliminary work has been completed for the construction of a 1200-mile line from Baton Rouge, La., to Greensboro, N. C., which will carry 60,000 barrels daily. The $20,000,000 project has been given an A-2 rating by the OPM.

The line between Portland, Me., and Montreal, Que., is expected to be in operation late this year, saving tankers a long haul up the St. Lawrence river.

Develops Substitutes To Free War Materials

■ Edison General Electric Co. Inc., Chicago, has adopted changes in its electric ranges which will release larger amounts of aluminum, nickel and other metals for vital defense industries.

Aluminum outer shell in a cooker has been changed to a double-wall unit with inner wall finished in a ground coat of porcelain enamel. Outer shell is tinned steel. Porcelain enamel also is used for the pail and lid, formerly aluminum. An aluminum pudding pan, heretofore provided as an accessory, has been eliminated.

Other changes include aluminum reflector pans, now made of chrome alloy, the new material containing approximately 12 to 16 per cent chromium, but no nickel.

To help conserve zinc, the oven vent on ranges, formerly of die castings, has been replaced with a steel vent with baked japan finish.

■ Workers lift the last section of an international pipeline, from Portland, Me., to Montreal, Que., into place on the United States-Canadian border. When placed in operation late this year, the line will save tankers long haul up the St. Lawrence river, alleviate Canada's petroleum shortage. NEA photo

18,500,000 on Federal Government's Payroll

■ Figures obtained from official government reports and compiled by a competent authority show 18,500,000 on the present federal payroll, perhaps the largest in history. The 18,500,000 is exclusive of army, navy and marine personnel. The following lists the numbers in various classifications:

6,000,000 farmers receiving federal checks for co-operating with the Agriculture Department's AAA program;

4,400,000 employes in various government departments, agencies, commissions, boards and the like;

3,400,000 individuals receiving some form of social security checks;

1,758,000 employed on WPA projects;

850,000 World war veterans and dependents of dead veterans receiving checks;

62,000 cases for which subsistence payments were certified by the Farm Security Administration;

274,000 in Civilian Conservation camps;

471,000 employed under student work program of the National Youth Administration;

482,000 in the out-of-school work program of the NYA;

751,000 employed on construction projects other than those financed from WPA funds;

17,000 engaged in other federal work and construction projects.

■ In recognition of continuous service in the employ of the company for ten years and 20 years, Farrel-Birmingham Co. Inc., Ansonia, Conn., and Buffalo, recently awarded service emblems to 577 employes who have completed either of those terms.

STEEL

More Scrap, Without Inflation

■ NOT long ago Leon Henderson testified before the House Banking and Currency Committee to the effect that serious inflation is imminent. He urged that Congress lose no time in approving the price control bill on the plea that this legislation was needed immediately to combat present inflationary tendencies.

Apparently the committee was not impressed by Mr. Henderson's testimony. In fact, it was so unmoved by the OPACS chief's alarums that on Thursday it voted to recess its hearings on price control until mid-September.

• • •

Of course everybody knows that the threat of inflation is real and that it is serious. Mr. Henderson was not exaggerating when he strongly emphasized the danger.

But he weakened his case when he admitted that the legislation is desired to control only certain price tendencies. He wants to control rents and the prices of some materials and products.

For instance, we can assume that he would control the prices of iron and steel scrap, rolled steel, aluminum, etc. But by Mr. Henderson's own testimony, he would not use the legislation to control the price of corn, wheat, cotton, etc.

He would like to control rents, but he would not use the proposed law to control wages.

In a similar way, Mr. Roosevelt would like to restrict installment buying by the public for the reason that such restriction would curb inflation.

But Mr. Roosevelt apparently has no desire to curtail installment buying by the government. Uncle Sam has been buying—first for recovery and now for defense—on installment terms that would shock the most liberal of finance companies.

And so Mr. Roosevelt and Mr. Henderson and most of the other administration officers who view inflation with alarm want only curbs that will restrict some price movements and leave untouched the prices, rates and terms of their pet projects.

Perhaps that is why the House Banking and Currency Committee is so bored that it will recess until mid-September.

While congress is resting, Mr. Henderson might study the inflation problem by again checking into the scrap situation.

He is dead set against raising the price of scrap. Consequently those who have scrap can't afford to collect it and offer it for sale.

• • •

In 1917, under similar circumstances, a shortage of scrap was avoided simply and without ruinous inflation.

W. Vernon Phillips explained how this was accomplished in a paper read to the American Iron and Steel Institute on Oct. 26, 1917. He said:

". . . . Such enormous calls were made on the scrap business that prices were advanced nearly 100 per cent. However, this had the desired effect and scrap was brought to the consumer from the remotest parts of the country . . . so that the price quickly receded with the satisfied demand."

We can have scrap without inflation if Mr. Henderson will say the word.

E. L. Shaner

EDITOR-IN-CHIEF

August 18, 1941

The *BUSINESS TREND*

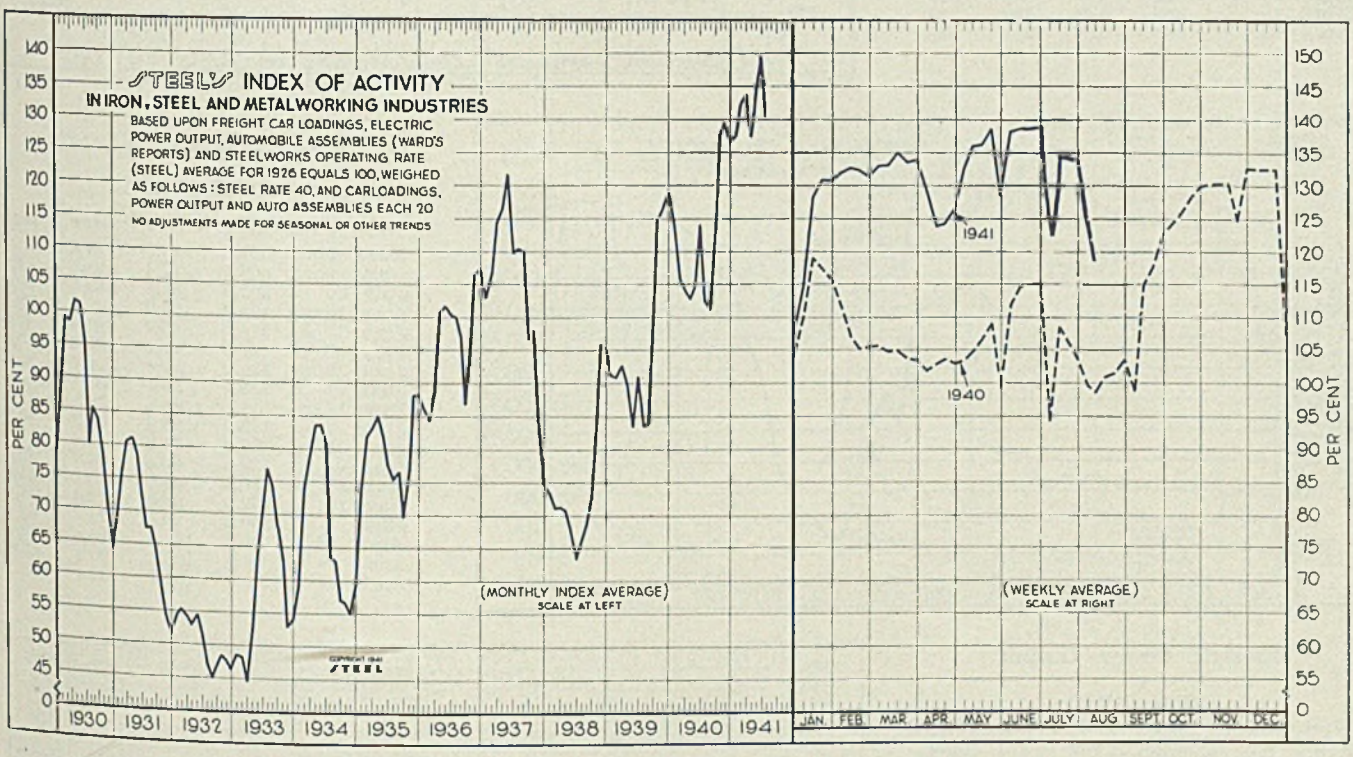
Activity Index Moves To Lower Level

■ INDUSTRIAL production in those lines closely related to the defense program, continues to show steady improvement in most instances. Output of machine tools, aircraft, guns and the numerous other military items should continue this upward tendency as numerous plants now under construction to produce them are placed in operation.

During the latest week STEEL'S index of activity declined 5.6 points to 118.1. Led by a sharp seasonal drop in automobile production, each of the industrial barometers composing the index eased moderately during the latest week. A year ago the index stood at 98.4, while in the same week of 1937 and 1929 it was at the 113.8 and 117.2 level respectively.

Automobile output during the week ended August 9 reached the lowest level recorded this year of 41,795 units, compared with 62,146 last week and 11,635 in the comparable 1940 period. August output will probably not decline as sharply as in previous years, as changeovers have been of comparatively short duration.

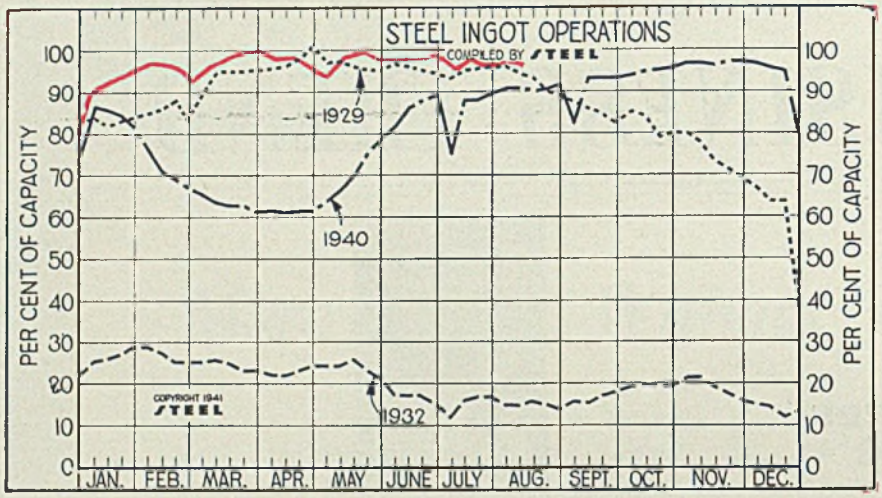
Electric power consumption was 3,196,009,000 kilowatts in the latest week, off slightly from the all-time peak of 3,226,141,000 recorded in the preceding period.



STEEL'S index of activity declined 5.6 *points to* 118.1 *in the week ended Aug.* 9:

Week Ended	1941	1940
May 24	138.6	109.1
May 31	128.4	99.2
June 7	138.4	111.9
June 14	138.7	114.6
June 21	138.7	114.8
June 28	138.8	115.3
July 5	122.9	94.2
July 12	134.5	108.5
July 19	134.1	106.0
July 26	133.3	109.4
Aug. 2	123.7	99.7
Aug. 9	118.1	98.4

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	131.2	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3



Steel Ingot Operations

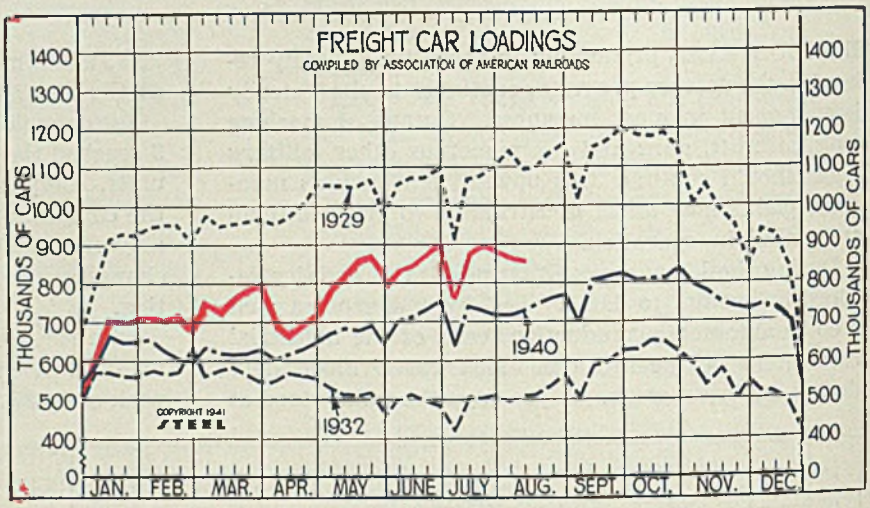
(Per Cent)

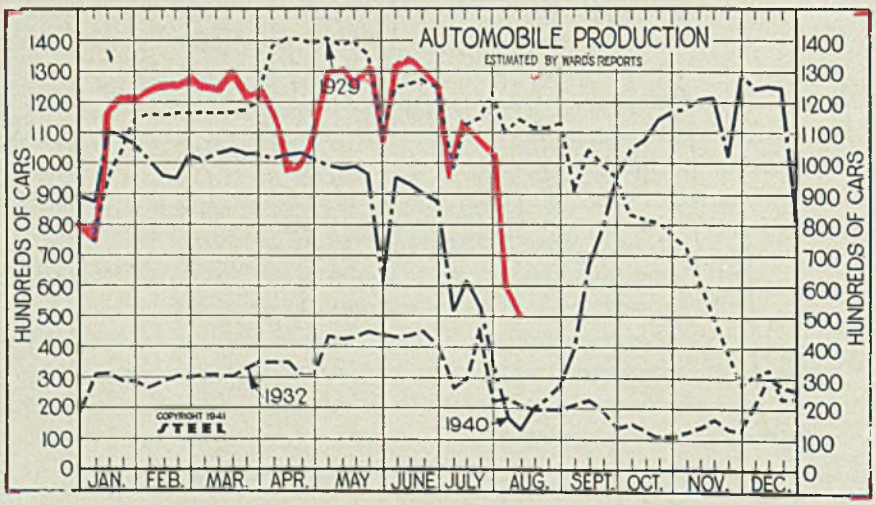
Week ended	1941	1940	1939	1938
Aug. 9....	98.5	90.5	62.0	40.0
Aug. 2....	98.5	90.5	60.0	40.0
July 26....	97.0	89.5	60.0	37.0
July 19....	97.0	88.0	56.5	36.0
July 12....	97.5	88.0	50.5	32.0
July 5....	96.5	75.0	42.0	24.0
June 28....	99.5	89.0	54.0	28.0
June 21....	99.0	88.0	54.5	28.0
June 14....	99.0	86.0	52.5	27.0
June 7....	99.0	81.5	53.5	25.5
May 31....	99.0	78.5	52.0	25.5
May 24....	100.0	75.0	48.0	28.5
May 17....	99.5	70.0	45.5	30.0
May 10....	97.5	66.5	47.0	30.0
May 3....	95.0	63.5	49.0	31.0
April 26...	96.0	61.5	49.0	32.0
April 19...	98.0	61.5	50.5	32.5
April 12...	98.0	61.0	51.5	32.0

Freight Car Loadings

(1000 Cars)

Week ended	1941	1940	1939	1938
Aug. 9.....	879	727	665	590
Aug. 2.....	883	718	661	584
July 26.....	897	718	660	589
July 19.....	899	730	656	581
July 12	876	740	674	602
July 5.....	740	636	559	501
June 28.....	909	752	666	589
June 21.....	886	728	643	559
June 14.....	863	712	638	556
June 7.....	853	703	635	554
May 31.....	802	639	568	503
May 24.....	886	687	628	562
May 17.....	864	679	616	546
May 10.....	837	681	555	542
May 3.....	794	666	573	536
April 26.....	722	645	586	543
April 19.....	698	628	559	524
April 12.....	680	619	548	538





Auto Production

(1000 Units)

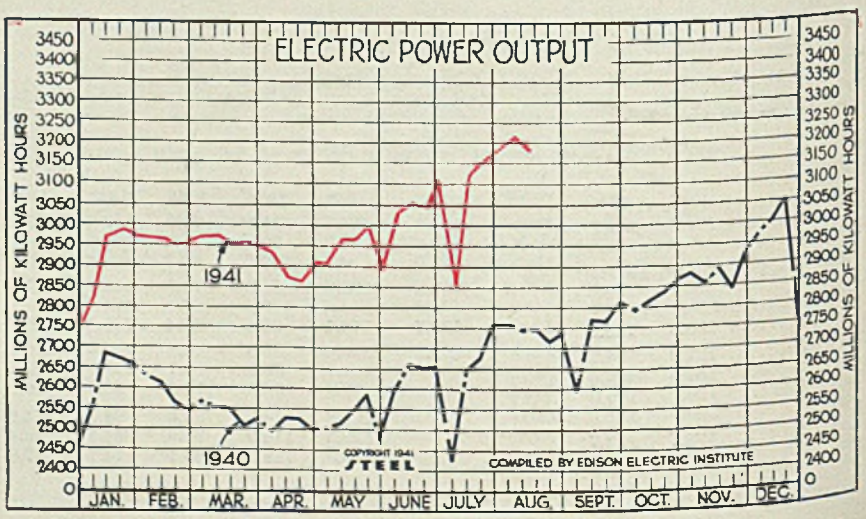
Week ended	1941	1940	1939	1938
Aug. 9 ...	62.1	12.6	24.9	13.8
Aug. 2....	62.1	17.4	28.3	14.8
July 26....	105.6	34.8	40.6	30.4
July 19 ...	109.9	53.0	47.4	32.1
July 12 ...	114.3	65.2	61.6	42.0
July 5....	96.5	52.0	42.8	25.4
June 28 ...	121.9	87.6	70.7	40.9
June 21 ...	133.6	90.1	81.1	40.9
June 14 ...	134.7	93.6	78.3	41.8
June 7....	133.6	95.6	65.3	40.2
May 31....	106.4	61.3	32.4	27.0
May 24....	133.6	96.8	67.7	45.1
May 17....	127.3	99.0	80.1	46.8
May 10....	132.6	98.5	72.4	47.4
May 3....	130.6	99.3	71.4	53.4
April 26...	108.2	101.4	86.6	50.8
April 19...	99.9	103.7	90.3	60.6
April 12...	99.3	101.9	88.1	62.0

Electric Power Output †

(Million KWH)

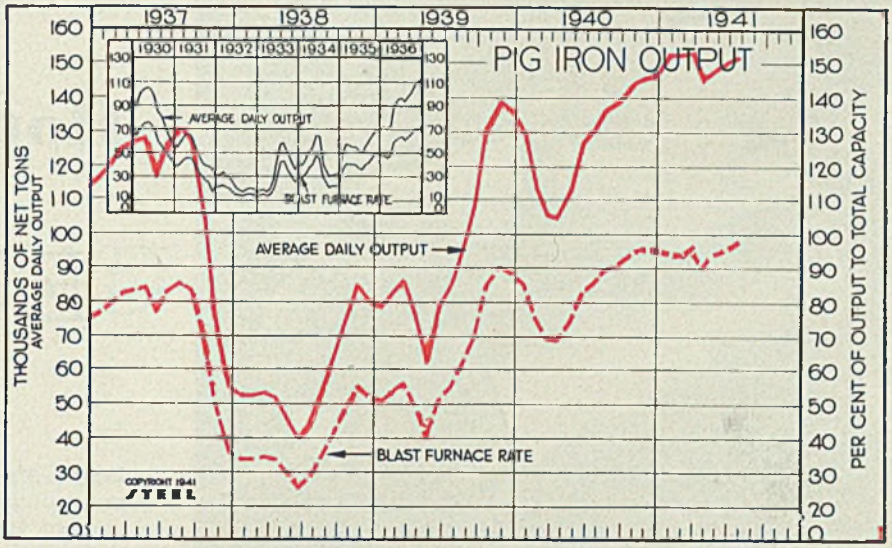
Week ended	1941	1940	1939	1938
Aug. 9.....	3,196	2,743	2,414	2,198
Aug. 2.....	3,226	2,762	2,400	2,194
July 26.....	3,184	2,761	2,427	2,160
July 19.....	3,163	2,681	2,295	2,085
July 12.....	3,141	2,652	2,403	2,154
July 5.....	2,870	2,425	2,145	1,937
June 28.....	3,121	2,660	2,396	2,074
June 21.....	3,056	2,654	2,362	2,082
June 14.....	3,057	2,665	2,341	2,051
June 7.....	3,042	2,599	2,329	2,057
May 31.....	2,924	2,478	2,186	1,937
May 24.....	3,012	2,589	2,278	2,031
May 17.....	2,983	2,550	2,235	2,024
May 10.....	2,975	2,516	2,239	2,019

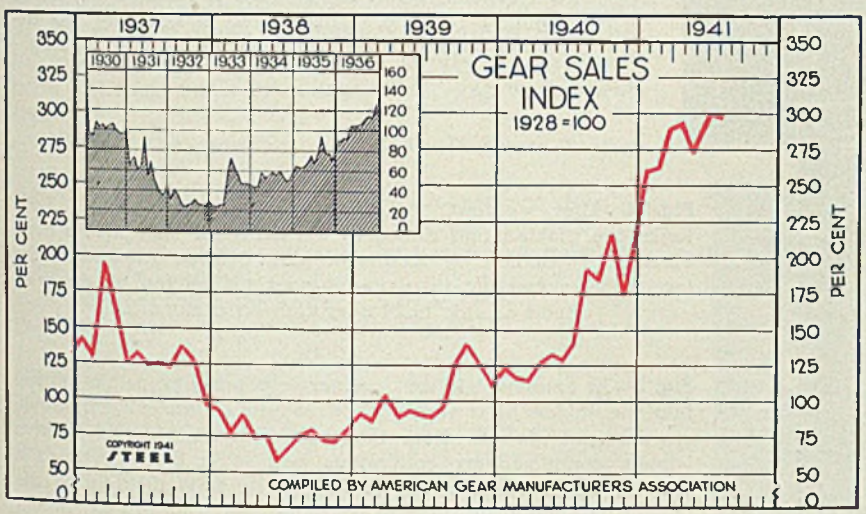
†New series: Includes additional governmental and power generation not previously reported.



Pig Iron Production

	Daily average Net Tons			Blast furnace Rate (%)		
	1941	1940	1939	1941	1940	1939
Jan.	150,524	129,825	78,596	95.5	85.4	51.0
Feb.	150,244	113,943	82,407	95.3	75.0	53.5
Mar.	151,707	105,502	86,465	96.3	69.5	56.1
Apr.	144,685	104,635	76,732	91.8	68.9	49.8
May	148,262	112,811	62,052	94.1	74.2	40.2
June	151,701	127,103	79,125	96.3	83.6	51.4
July	153,749	130,984	85,121	97.6	86.1	55.0
Aug.	136,599	96,122	....	89.9	62.4	
Sept.	139,085	107,298	....	91.5	69.7	
Oct.	143,152	131,053	....	94.2	85.2	
Nov.	146,589	138,883	....	96.4	90.3	
Dec.	146,544	136,119	....	96.4	88.5	
Ave.	128,128	86,375	....	84.3	62.6	





Gear Sales Index

(1928 = 100)

	1941	1940	1939	1938	1937
Jan.	259	123	91.0	93.0	144.0
Feb.	262	116	86.0	77.0	130.5
Mar.	288	114	104.0	91.0	195.0
April	292	128	88.0	74.0	164.0
May	273	133	93.0	70.0	125.5
June	299	129	90.0	58.0	134.0
July	298	141	89.0	67.0	124.0
Aug.	...	191	96.0	76.5	125.0
Sept.	...	183	126.0	80.5	123.0
Oct.	...	216	141.0	72.5	139.5
Nov.	...	173	126.0	72.0	127.5
Dec.	...	208	111.0	81.0	97.0
Ave.	...	155.0	103.0	76.0	135.5

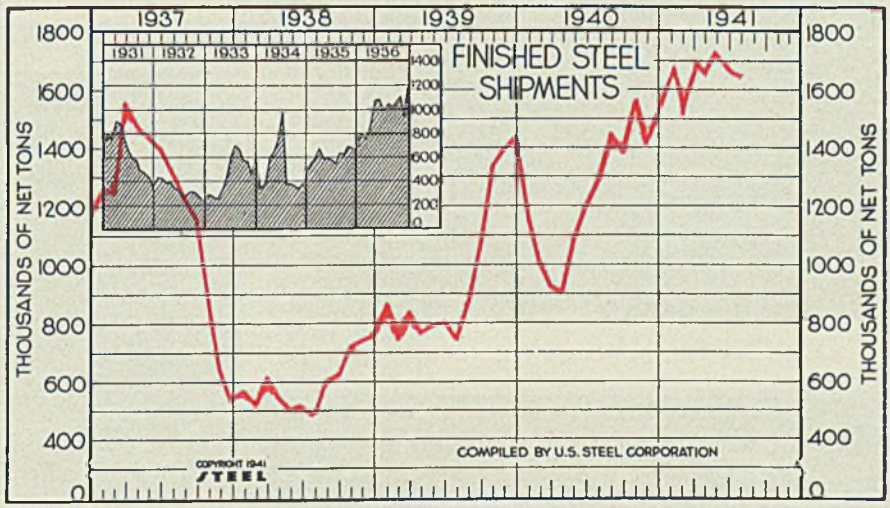
Finished Steel Shipments

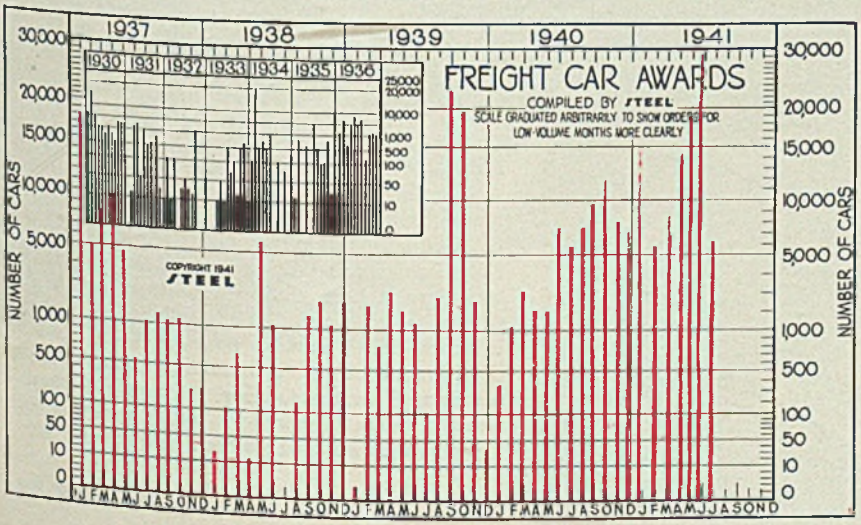
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1941	1940	1939	1938	1937
Jan.	1682.5	1145.6	870.9	570.3	1268.4
Feb.	1548.5	1009.3	747.4	522.4	1252.8
Mar.	1720.4	931.9	845.1	627.0	1563.1
Apr.	1687.7	907.9	771.8	550.5	1485.2
May	1745.3	1084.1	795.7	509.8	1443.5
June	1668.6	1209.7	807.6	525.0	1405.1
July	1666.7	1296.9	745.4	484.6	1315.3
Aug.	.....	1455.6	885.6	615.5	1225.9
Sept.	.....	1392.8	1086.7	635.6	1161.1
Oct.	.....	1572.4	1345.9	730.3	876.0
Nov.	.....	1425.4	1406.2	749.3	648.7
Dec.	.....	1544.6	1444.0	765.9	539.5
Tot.†	.....	14976.1	11707.3	7315.5	14097.7

†After year-end adjustments.





Freight Car Awards

	1941	1940	1939	1938
Jan.	15,169	360	3	25
Feb.	5,508	1,147	2,259	109
March	8,074	3,104	800	680
April	14,645	2,077	3,095	15
May	18,630	2,010	2,051	6,014
June	32,749	7,475	1,324	1,178
July	6,459	5,846	110	0
7 mos.	101,234	22,019	9,642	8,121
Aug.	.....	.....	7,525	2,814	182
Sept.	.....	.....	9,735	23,000	1,750
Oct.	.....	.....	12,195	19,634	2,537
Nov	.....	.....	8,234	2,650	1,232
Dec.	.....	.....	7,181	35	2,581
Total	...	.....	66,889	57,775	16,303

Hot Water Tanks

ENAMELE

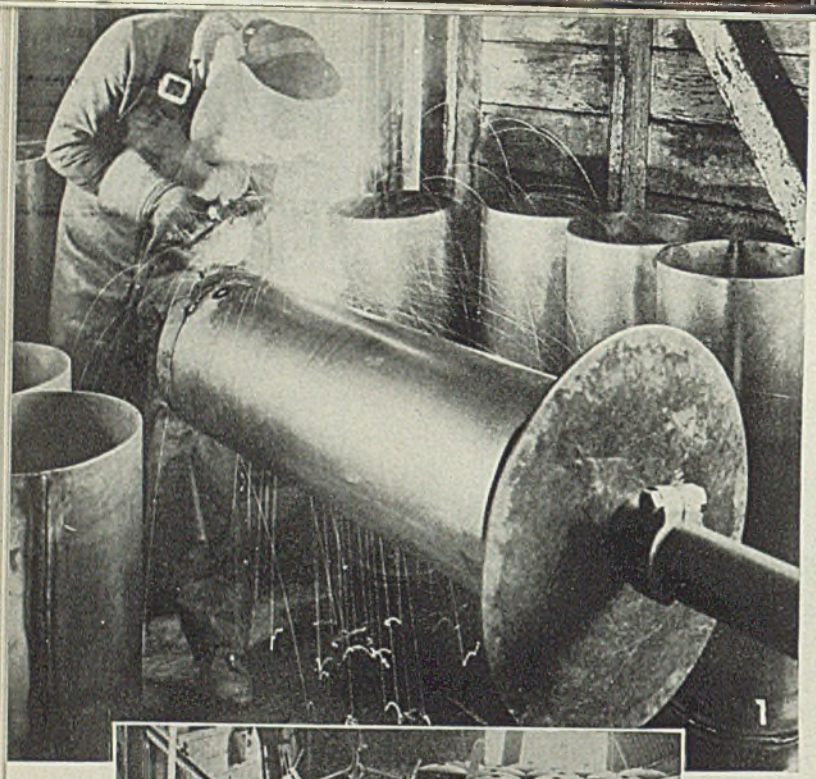


Fig. 1—After the sheets have been sheared to size they are put through forming rolls and longitudinal seams are arc welded. Then formed heads are butt welded to the shells as shown here. Note the fixture on which the welding is done. This makes it easy for the operator to position the material for downhand welding

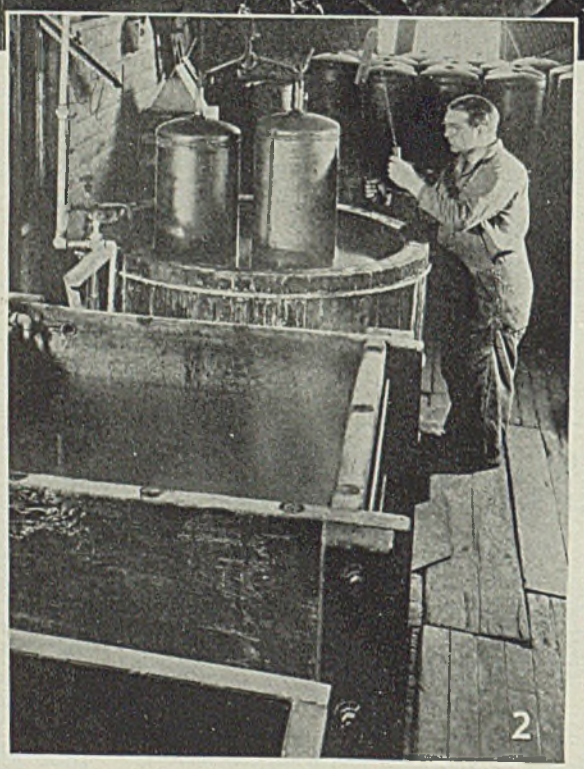
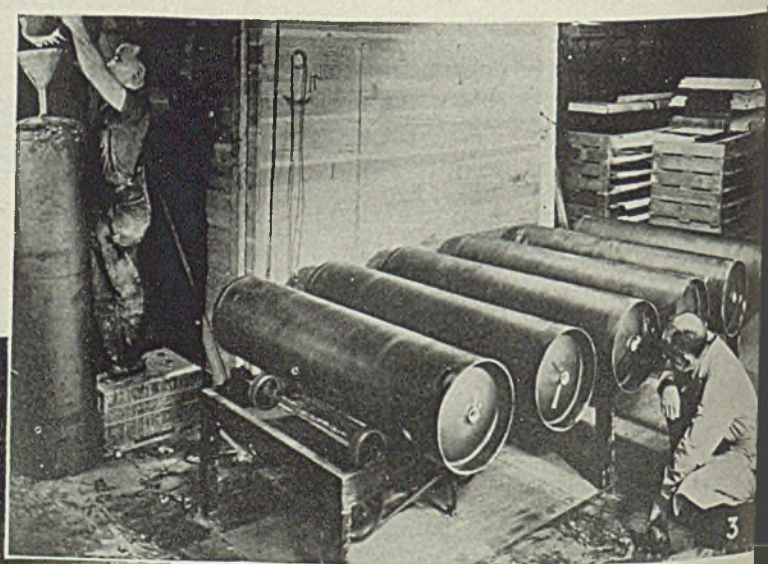


Fig. 2—After welding, welds are ground down flush. Then tanks are pickled and rinsed in the series of vats shown here. Tanks are handled by means of plug fixtures screwed in the top, these connecting to a double-hook lift, moved by an overhead electric hoist operating on a monorail

Fig. 3—At extreme left, an operator is pouring porcelain enamel into the inside of a tank. Then the tanks are placed in the special rack shown. Here the tanks rest on a series of drive wheels connected by continuous belt to a motor in such a manner as to revolve the tanks slowly, thus distributing the coating uniformly on the interior of the tank. This process is controlled by the inspector at the right



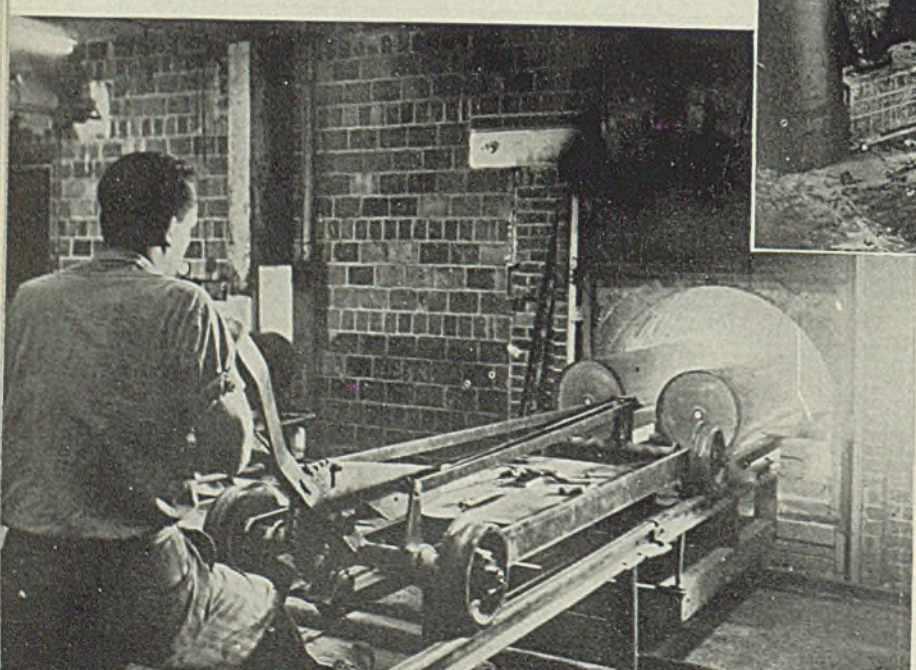


Fig. 4—When the liquid enamel has been dried, the tanks are fired at the usual enameling temperature of about 1580 degrees Fahr., using a box-type furnace such as the one shown. Note fixture handles two tanks simultaneously, advancing them through the open doors by means of a special lift cradle which places them on firing fixtures permanently located in the furnace. Thus the handling equipment does not remain in the furnace, so its life is lengthened. In the illustration, the operator is just removing two tanks which have been fired

INSIDE AND OUT

■ TO MAKE more durable hot water tanks, Fowler Mfg. Co., Portland, Oreg., began to make porcelain enameled steel tanks several years ago. Now they are being distributed in five western states, Canada, Alaska and the Hawaiian Islands. Most of these are for electric water heaters such as the units shown here, although some are supplied for gas water heaters.

Although the company also manufactures fluorescent lighting fixtures and porcelain enameled street and traffic signs, the water tanks are its most important production item. During the past year, the company has increased its employes by about 40 per cent. Shown here are the steps in manufacturing an electric water heater tank which is porcelain enameled inside and out. The enameling sheets are furnished by American Rolling Mill Co., Middletown, O.

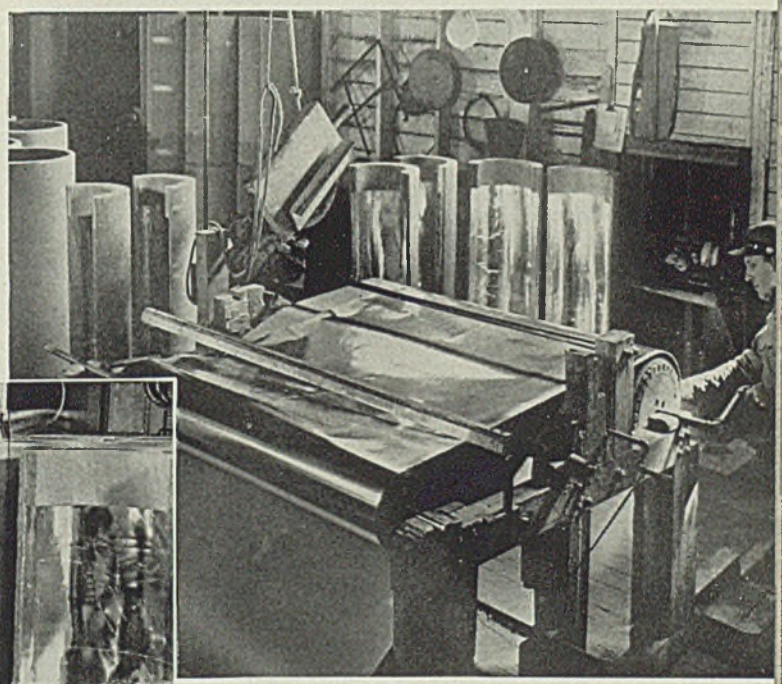


Fig. 5—The insulating jacket that surrounds the tank is also made in the Fowler plant. This jacket consists of corrugated fiber insulating board lined with aluminum foil, which in turn is spaced out from the tank itself by collars at top and bottom of the jacket, as shown in Fig. 6. Here operator is winding the aluminum foil into one of these jackets

Fig. 6—In this view the completely enameled tank is being assembled into the insulating jacket. Also the electric heating elements and controls are being installed. Note the collars at top and bottom of jacket to space it out from the tank. The dead air space thus produced is an effective part of the insulation

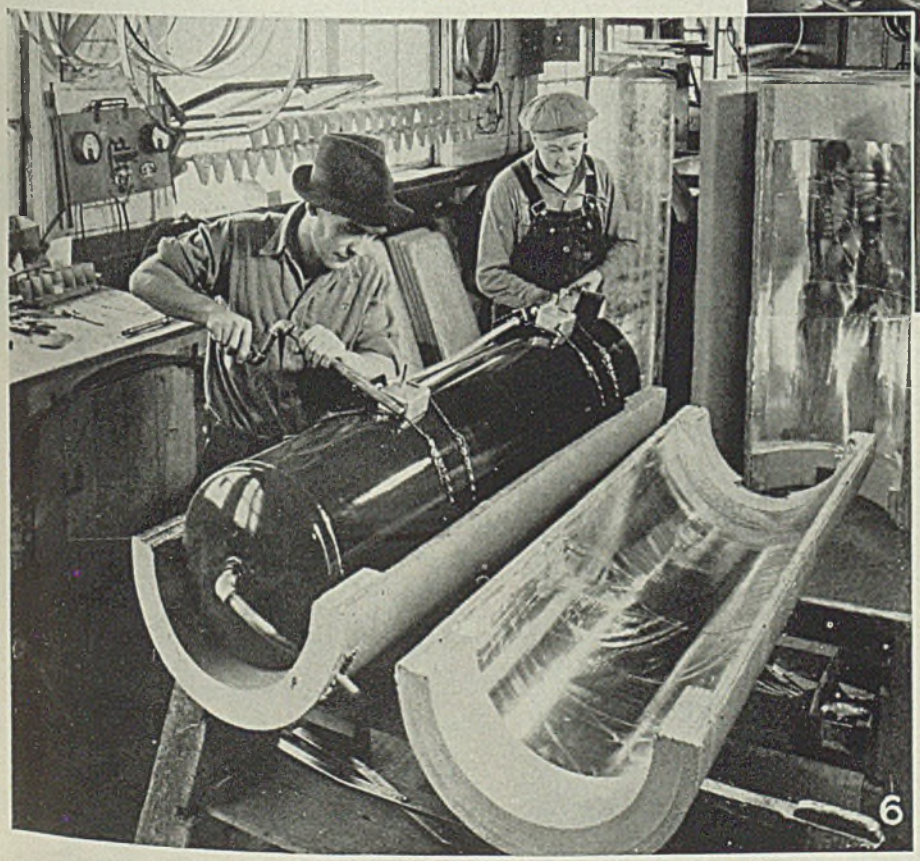


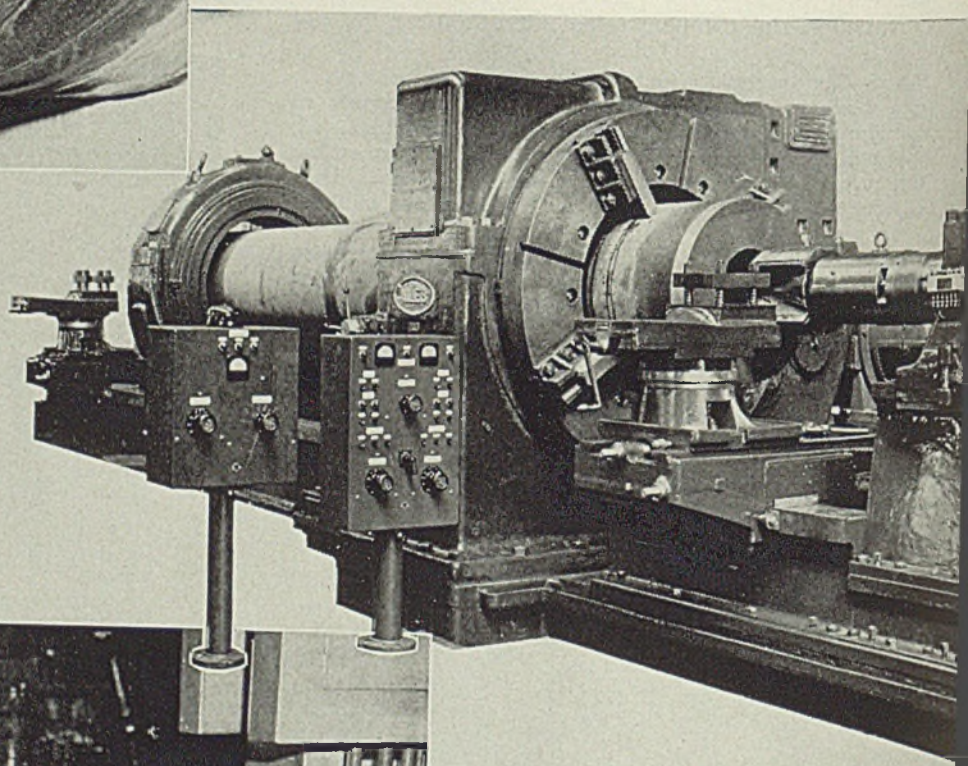
Fig. 7—Here completed electric hot water tanks are being inspected and crated for shipment. Note the 8-sided crates employed and the steel strapping around the center of the crate sections

Principles of

GUN CONS

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

Fig. 6—Machining operations, above, at Watervliet Arsenal on the seat for the breech block of a large-sized rifle: O.E.M. photo by Palmer



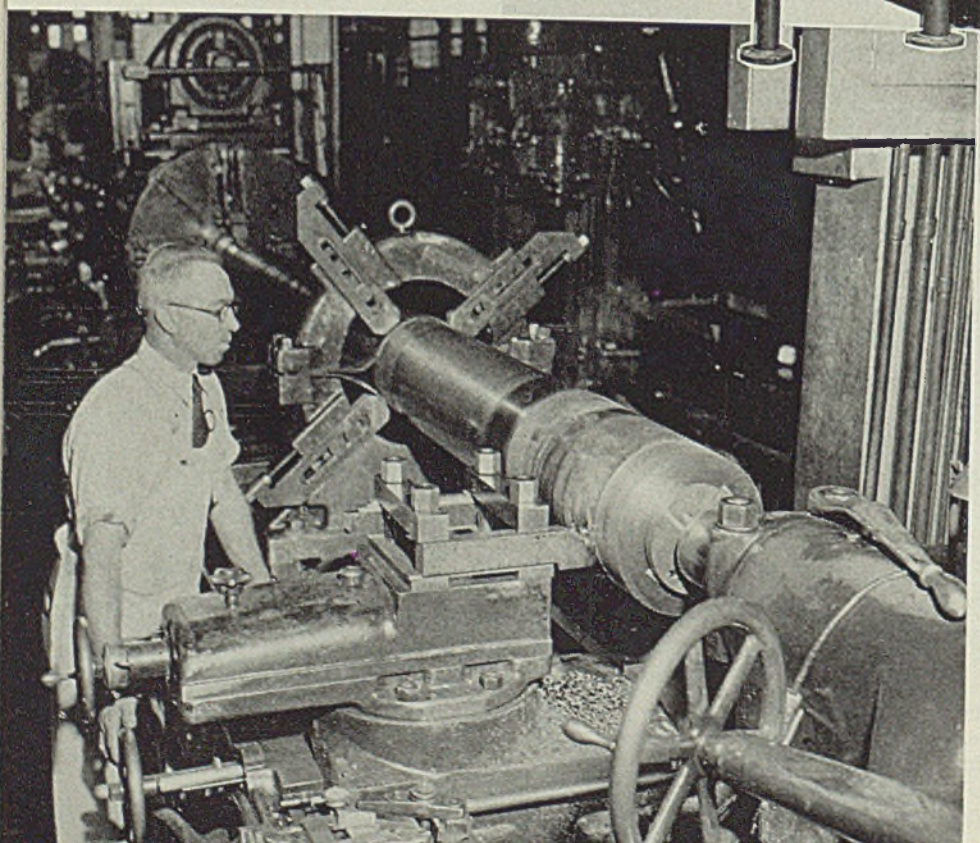


Fig. 7—Special machine, above, for facing and boring large guns: Cross slides are provided at each end of machine so both ends of gun can be faced in this unit. Note extremely heavy mountings to support the weight of the work: Also grip in foreground and nearby control panels are part of mechanism employed to revolve the huge piece of steel. Part of breech boring tool also can be seen here

Fig. 8—Machining outer surface of a medium caliber gun barrel at Watervliet Arsenal: Two tools, immediate left, are carried by the cross slide in the foreground, both tool points being used simultaneously. Note provision for steadying the long barrel near center

TRUCTION

How can amount of shrinkage of a gun barrel be determined from calculation of hoop tension? What about wire wound guns, autofrettage, radially expanded gun tubes, considerations governing rifling and how are rifling grooves cut

This Is Number 25 in a Series on Ordnance and Its Production, Prepared for STEEL *by Professor Macconochie.*

(*Concluded From Last Week*)

■ THE PROCESS by which the several hoops are assembled to form a compound cylinder or built-up gun is known as shrinkage, the difference between the exterior diameter of one element and the interior diameter of the one into which it fits being known as the absolute shrinkage; while the expression "relative shrinkage" is used to denote the absolute shrinkage per inch of diameter of the contact surfaces.

In applying the formula already derived to a gun tube consisting of two elements, for example, we should find first of all the tensile stress at the inner radius of the compound tube, neglecting entirely the effect of shrinkage. We might then use our equation to determine what exterior pressure on the inner layer would have to be applied to bring the tensile stress at the bore within prescribed limits. If this arrangement did not cause the total tensile stress at the inner radius of the outer jacket to rise above the prescribed limit, the arrangement would be satisfactory. The exterior pressure applied to the inner tube by the jacket would consist, as it were, of two parts—namely, that due to explosion in the gun and that originally the result of shrinking one layer upon the other.

To determine the amount of this shrinkage, the radial pressure at the common radius of the two elements due to the internal pressure alone would be found and thus the shrinkage pressure by difference. Having calculated the shrinkage pressure, we next find the tangential stress in the outer skin of the tube; this when divided by E gives the relative shrinkage. (The shrinkage all around the circumference is, of course, 3.1416 times the shrinkage in a diametral direction.) By multiplying the relative shrinkage of the tube by its diameter, we obtain the total or "absolute" shrinkage.

A similar procedure would now be followed in the case of the jacket in order to find the amount by which shrinking-on expands it. The sum of the reduction in the exterior diameter of the tube and the increase in the internal diameter of the jacket gives us the amount by which these diameters must differ when both tube and jacket are cold, if the result desired is to be achieved.

The ideal arrangement whereby the initial state of stress in the tube tends toward complete neutralization of the *variation* of the hoop stress resulting from internal explosion may be closely approximated by winding wire under tension upon a steel tube. The advantages of this plan are so obvious, inasmuch as great strength can be worked into wire of relatively small cross section and a high degree of control exercised over the initial distribution of the stress within the tube, that the most weighty considerations must have been responsible for its abandonment.

Square Wire, In Layers

As indicated elsewhere, the lack of rigidity of these guns (permitting droop) was undoubtedly a prime factor, but there appears also to have been some difficulty about re-lining. The wire commonly used when guns of this type were constructed was of square cross section, 0.1-inch on the side, and was wound under uniform tension, each layer exerting pressure upon the one beneath. After winding, an outer jacket of steel was shrunk upon the windings, the finished gun being as strong as any yet developed—weight for weight. As already noted the increase in the size and quality of forgings available for the several parts of the built-up gun has accelerated its use.

By way of amplifying the introductory reference to radial expansion as a means of distributing the total bursting load over the cross section of the tube, while we in this country have adopted what is known as the container method, it is by no means impossible to apply this procedure to a tube having no external support. Under this latter plan, which possesses a certain simplicity, a cylindrical bar is inserted in the tube which is bored out to a diameter rather less than finished size in order to permit expansion and subsequent machining. (Removal of large amounts of metal tends to have the effect of restoring the tube toward its original condition.) This bar has shoulders against which the packing bears. Water is then introduced into the small annular space between the bar and the tube and the pressure raised and held in accordance with the results of measurements of the outside of the tube.

Obviously it is possible by this method to control the expansion of the tube in sections by suitable adjustment of the plug. Actually, however, the outside of the tube is turned to a cylindrical shape (same diameter at all points) before being expanded. Tapering to form is done after expanding. With this method, it is highly important that the characteristics of the steel be the same at both ends. Usual specifications call for a difference of less than 6 tons per square inch. As a matter of fact, few British gun tubes vary by more than 2 (long) tons per square inch.

Much attention has been given in recent times to the design of such cold-working equipment for guns and perhaps most particularly to the plugs placed in the ends of the tubes. Lead appears to be finding favor as a seal, the arrangement embodying both steel and intermediate lead washers seated in convex bearing pads. In the container method, measurement of the outside of the tube is avoided by machining the interior of the container to the profile desired for the exterior of the gun after permanent enlargement. The outside of the container being cylindrical, the muzzle of the gun has greater support than the breech. These arrangements enable us to apply the pressure required by the thickest wall section throughout the entire length of the bore. In practice the extremely high pressures required for this work (90,000 to 120,000 pounds per square inch) are developed by the familiar arrangement of low pressure ram and intensifier from which special high-pressure piping leads to the interior of the gun through a valve control block.

Among the advantages of radial

Fig. 9—Measuring inside of a hoop for a large gun at Watervliet. O.E.M. photo by Palmer

expansion might be mentioned the increase in the yield strength of the steel arising from cold work. There is a mistaken impression in some quarters that the elastic modulus of the steel also undergoes important modification thus lending color to the notion that autofrettage embodies in some measure the principle of varying elasticities. One of the peculiar characteristics of steel is the permanence of its modulus of elasticity in the face of widely varying strength, yield, ductility and other physical characteristics. If the nature of the distribution of stress across the cross section during the application of internal pressure be again considered, it may be observed that the tangential stress in the tube will rise above the yield strength at first in the neighborhood of the bore and thereafter, as the internal pressure continues to rise, progressively in concentric cylindrical elements until the outer surface is reached. Meantime the stress has risen considerably above the yield point in those cylindrical layers first to feel the effects of the internal pressure, stretching them by amounts which diminish as we recede from the interior of the barrel to the exterior.

Thus the principal effect closely approaches the ideal—that is, an infinite number of infinitely thin hoops are shrunk one upon another in such fashion that the initial state of stress through the cross section tends to neutralize the variation accompanying the application of internal pressure to a thick cylinder. Other advantages of cold-worked guns include important economies in time, labor and materials, and the use of single forgings or centrifugal castings. Further, their increased elastic strength enables their weight to be reduced, thus offering greater mobility of the piece for a given service.

In a previous article in this series (The Flight of the Projectile), STEEL, June 23, 1941, p. 50, an explanation was offered of the necessity for giving the projectile a high angular velocity about its longitudinal axis in order that it might arrive at the target point-first and offer minimum resistance to atmospheric friction during flight. Accuracy also is secured by maintaining the axis of the shell in a direction closely paralleling the tangent to the path of flight. This is accomplished by cutting a series of spiral grooves in the bore of the gun. Their function is to engage the shell band immediately upon start of the shell and thereafter to produce rotation as the shell travels toward the muzzle. In order that the band may enter the rifling readily, its forward portion is coned to fit the chamfer on the rifling at its origin.

Among the considerations entering into the design of the rifling are the prime necessity for imparting the desired rotational velocity to the shell; the number and pitch of the grooves, their profiles and their depth in order that they may perform their function with the least amount of weakening of the gun and with a maximum of resistance to wear and erosion; and to a minor extent the cost of machining. In brief, the greater the number of grooves and the greater the number of calibers per turn, the narrower we can make the lands and the wider and shallower the grooves, with consequent lowered resistance to engraving. However, reduction in the depth of the grooves cannot be carried to the point of shortening the accuracy or life of the gun. While grooves of many profiles have been proposed and used, modern tendencies lean toward a simple symmetrical profile with radial, or slightly inclined sides and a generous fillet at the corners to avoid starting cracks.

Most naval guns in our service exhibit equal distribution of lands and grooves around the muzzle. Since the practice of tapering the groove toward the muzzle in order to provide a more effective gas check is very general, at least in naval practice, we would observe a higher proportion of groove space than land profile at the powder chamber end of the barrel. In determining the depth of the groove, muzzle velocity, propellant pressure, width of the shell band and the sectional density of the projectile must all be considered. In all cases the width of the land must be sufficient to resist the shear stress set up by the rotational inertia of the shell and sufficient bearing area must be provided to avoid localized heating and resultant erosion.

Uniform Twist Is Standard

In the early days of rifled cannon, the rifling always had a uniform pitch, but, the advantages of increasing twist becoming apparent during the era preceding the advent of slow-burning powders, many guns were constructed with rifling of decreasing pitch and with various combinations of increasing and uniform twist. Once more modern practice inclines toward uniformity; indeed, any other arrangement is unusual. By way of summarizing the respective merits and disadvantages of the two systems it may be remarked that while increasing twist reduces the maximum torque on the projectile and may also reduce erosion in the neighborhood of the breech end of the barrel, where this is greatest, it also obliges us to use a rather narrow band, since otherwise there would be difficulty of accommodation to the change in land slope. Further, we cannot use more than one band, and more copper may be left in the bore—especially in the middle third—than with a uniform twist.

C. F. Jeanson of the Bureau of Ordnance has tabulated the riflings of most American and many European cannon. Based on these observations, he offers the following relationship between the twist in calibers at the muzzle (T), the muzzle velocity in feet per second (v), the diameter of the bore in feet (d), the weight of the projectile in pounds (w), the area of the bore, including the grooves in square inches (A) and (K) a constant which has a mean value of 640, with a variation of 150 on either side of the mean:

$$T = v/d \cdot w/A \cdot 1/K$$

A "BRASS HAWK". When Revere Copper and Brass Incorporated receives your order, a corps of men take your interests in charge. Acting virtually as an arm of your own organization, they watch the materials in your order through each production stage, from casting shop to shipping platform. One of these "brass hawks" is Dominick Lombino, schooled in the critical inspection methods developed by Revere. His skill, in knowing what to look for in copper and copper-base alloys, helps to make Revere products so trustworthy. He, and dozens of inspectors like him, are a part of the painstaking Revere service which is now showing its value for defense by insuring the fitness of the materials you order from us. Revere Copper and Brass Incorporated, 230 Park Avenue, New York.

CHAMBERING

.50-caliber machine gun barrels

■ APPLICATION of automotive high-production manufacturing methods to ordnance production (*Mirrors of Motordom*, STEEL, June 23, 1941) is one of the most significant trends observable in plants being tooled up by the motor industry for manufacture of machine guns, anti-aircraft guns and related equipment. A specific example which well illustrates the trend is a gun-barrel chambering machine designed and built by H. R. Krueger & Co., Detroit, specialist in high-production machinery for the auto industry.

First, a word about chambering. It applies to the rough and finish reaming of the rear end of a gun barrel to fit the contour of the brass cartridge case containing the shell. In a .50-caliber machine gun, for instance, this chamber has a so-called stop shoulder depth or length of a little over 4 inches. Bore of the barrel is of course, 0.5-inch, and in the chambered section this flares out first to 0.562-inch, then again to better than 0.7-inch, and finally is chamfered off to better than 0.9-inch at the end of the barrel. See Fig. 1. The chamber actually has five tapers—three slow and two steep. The two steep tapers extend, respectively, about ⅛-inch and ¼-inch, while the slow tapers are 2½ inches for the main section of the cartridge case, ⅝-inch for the upper section, and about ½-inch for the blending to the bore diameter. The two steep tapers are of course interposed between the three slow tapers.

Because it is virtually impossible to turn, broach or grind this carefully finished chamber (tolerances generally being plus 0.002-inch and minus nothing), it is the practice to ream it with a series of nine specially shaped and precision honed tools. This has been done on horizontal-spindle machines, the tools being disposed axially about a circular head. The barrel is chucked into position and the tools index about it. Indexing is controlled by hand at the end of each return stroke.

The Krueger machine is based on a design which threw out previous concepts altogether and started from scratch to adapt the same types of tools to a vertical spindle machine. All tools, however, engage the work simultaneously, with ten barrels mounted in the machine at a time, thus producing one finished chamber with every operating cycle or indexing of the machine. It is easy to see how this method boosts production many times over that possible with horizontal hand-indexed machines which work on only one barrel at a time. Thus, the vertical machine, with a cycle of around 1½ minutes, turns out from 35 to 40 chambered barrels an hour with little or no difficulty.

The barrels are chucked in a vertical position above the tools during the chambering operation. Tools are advanced by lifting vertically to engage the work, an arrangement which eliminates any possibility of the barrel's sagging of its own weight, often a troublesome matter in horizontal machines where it may result in "bell-mouthing" of the chamber. Furthermore, the vertical arrangement greatly facilitates chip removal from the chamber, and also requires less floor space for the machine.

Each of the nine tools is controlled by a positive, individual cam, designed to produce the optimum feed rate. Speed of feed is maintained automatically and is entirely apart from the skill or mood of the operator.

Construction Is Rigid

The machine comprises a 4500-pound cast iron base, amply reinforced with radial ribs. Mounted on the heavy center column are the tool table assembly and cam ring at the bottom, the index unit and drive head at the top. Three equally spaced 1200-pound cast iron columns combine the base, center column and drive head into a single rigid unit, the center column being anchored firmly in both the base and drive head to provide support and alignment for both the tool-table assembly and the index unit.

The tool-table assembly is built as a hydraulic cylinder of which the center post is the piston rod. It has one loading and unloading station, plus nine work stations, and also carries the hydraulically driven cam ring on which the nine feed cams are mounted. Each station has its own cam, with the tool being mounted on a quill which rides on the feed cam. A 5-horsepower motor drives the hydraulic pump which actuates the tool-table assembly to and from the working position by rapid traverse.

The index unit is mounted on the center post on two roller bearings and one bronze sleeve bearing. It carries ten spindles at its upper end. Each spindle is equipped with

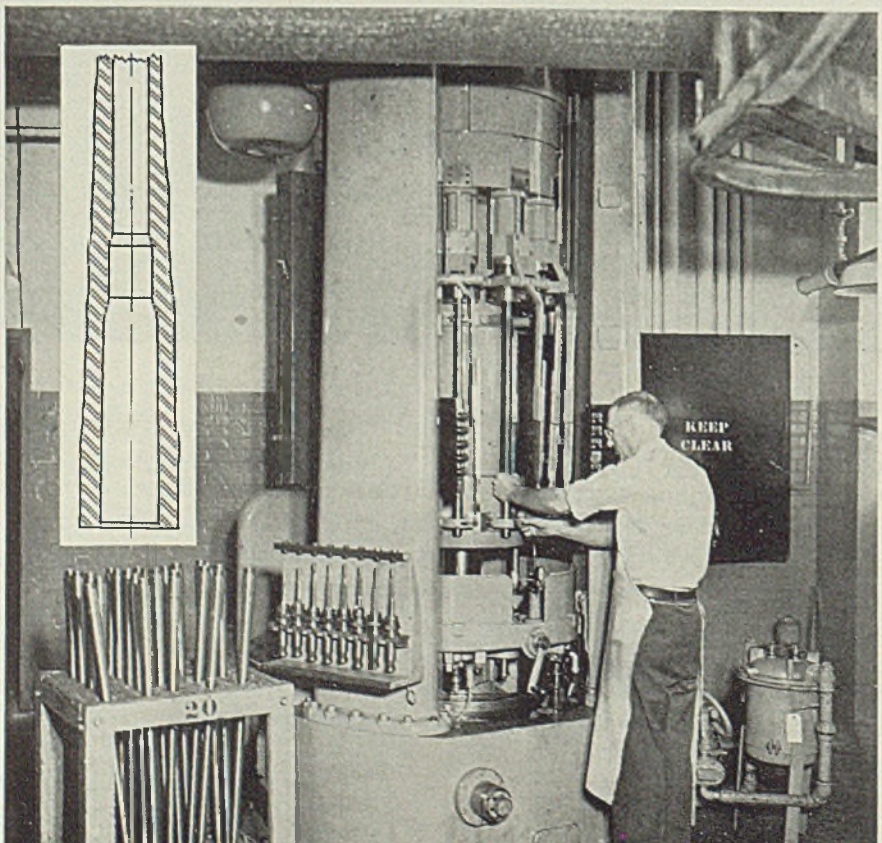


Fig. 1—Section through end of machine gun barrel, inset, showing contour of typical finished chamber

Fig. 2—Chambering machine installed at machine gun plant operated by AC Spark Plug Division of General Motors Corp., Flint, Mich., processing barrels for .50-caliber Browning machine guns. Note tool setting gage mounted on left column and filter mechanism for the oil at lower right. A barrel is being clamped into position at the loading-unloading station

REPORTS BLINDED ME —

Our assembly line had to be twice as *fast!* Experts said: "Phillips Screws will cut fastening time in half." But how could *I* afford Phillips?

I TOOK OFF MY COAT

Went down to our assembly line . . . watched our screw-driving operations. Fumbled screws, slipping drivers, scarred work, slow hand-driving — were wasting time *and money!*

THEY WERE TELLING ME HOW TO RUN MY BUSINESS

... AND THEY WERE RIGHT ABOUT ASSEMBLY DELAYS!

OLD-FASHIONED FASTENING?

Yes, slotted screws were costing me money through slow, wasteful screw-driving. And *I* had thought slotted screws cost less because their *price* is less — and I was wrong!

MY ANSWER ... PHILLIPS

So I began to buy Phillips Screws . . . the screws with the tapered recess that *clings* to the tapered driver and prevents driver slippage. They cut our assembly time 50% and went a long way toward solving our delivery-date problem. We now —

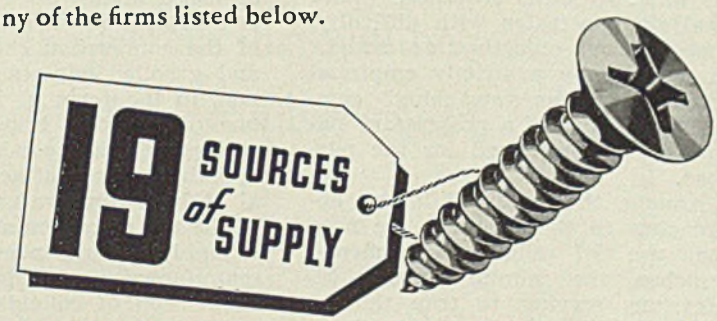
start *fast* with one hand
drive *fast* with power drivers
drive *fast* in awkward positions
keep going *fast* without slipping
seat screws *fast* and tight.

PHILLIPS SCREWS MAY CUT YOUR ASSEMBLY TIME 50%

Look out for wasteful, slow-driving slotted screws — which, though they cost a few cents less than Phillips Screws, are much more costly in the long run. For further information on how *your* industry can speed product deliveries with Phillips Screws, write to any of the firms listed below.

PHILLIPS

RECESSED HEAD SCREWS



Speed Product Deliveries by Cutting Assembly Time

WOOD SCREWS · MACHINE SCREWS · SHEET METAL SCREWS · STOVE BOLTS · SPECIAL THREAD-CUTTING SCREWS · SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338. Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Lock Washer Co., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N. H.

a spring collet-type chuck, actuated by hand levers. The machine illustrated accommodates a 45-inch gun barrel, but extension brackets have been attached to the work spindles to permit mounting a 36-inch barrel. These, of course, can be removed. Spring plunger steadyrests serve to absorb tool vibrations, and guides line up the barrels for entry into the collets.

The drive head supplies power to the work spindle through a 15-horsepower motor, V-belt and suitable helical gearing. It is designed to provide individual spindle speeds for each working station in accordance with the needs of the tool. The front spindle, being the loading and unloading station, does not rotate. All gears are mounted on ball bearings and are force-feed lubricated.

Operating cycle of the machine includes indexing, rapid approach, feed and rapid return. The indexing is accomplished through the drive head. Rapid approach involves moving the entire tool-table assembly upward against a positive stop, after which the cam ring is rotated in a clockwise direction to feed the tools into the work. For the rapid return movement, the cam ring and tool-table assembly are returned simultaneously to the starting position.

Provision of an idle station permits loading and unloading during the work cycle. The barrel to be loaded is placed on the loading pin and then elevated to the proper height for clamping by means of a jig-lock-operated rack and pinion. A dial indicator is provided to check the vertical location of the barrel both before and after chambering.

Each tool is provided with a torque-overload protection, comprising an adjustable spring which measures the torque and determines the point of cutout for each tool. When an overload occurs, the tool-table assembly is returned immediately at rapid traverse rate and a red pilot light appears in the control box, indicating the overloaded

(*Please turn to Page* 70)

"DRY" FORGING LUBRICANTS

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.

SUPPLEMENTING recent references to hot-forging lubricants, one observes that the "lubricant" applied to the punch of a forging press appears to fulfill at least three functions. First, of course, there is the necessity for cooling the punch if the operation cycle is short. Then there is the question of lubrication to ease withdrawal. And if we can use the lubricant as a protective coat, the life of the punch will be materially lengthened.

There is, perhaps, another effect to be considered, namely the generation of gas ahead of the punch in order to promote withdrawal—a process which no doubt offers a certain protection to the nose (where wear and "turning over" is greatest) against the very intimate contact which would otherwise occur. As in many other instances where analysis penetrates with difficulty, these various objectives are sought in practice by a strictly empirical method, various "swabbing" compounds—many of a proprietary nature—being employed for the purpose.

Among the many different approaches to the problem, we note the use of slightly roughened punches, the minute surface depressions serving to trap the lubricant until stripping takes place. It may well be supposed that each of these tiny pockets functions as a gas generator and that the lubricating effect is secured by a multitude of partially gaseous contacts under considerable pressure. For this purpose we refrain from giving the punch a high polish and preferably include tungsten in the analysis of the steel on account of its known tendency to produce a slight roughness of surface.

Another wrinkle, which either does not find favor or is not widely known in this country, is the use of a polished punch and a little powdered coal thrown in ahead of the punch where this can conveniently be done. Presumably the coal generates enough gas not only to help eject the punch but also to serve as a "lubricant" during the action. Then too, the presence of a film of carbon is always helpful in inhibiting the flow of heat from work to punch, just as in the case of metal molds, or when it occurs as a deposit on the interior surfaces of the combustion chambers of oil and gasoline engines. Indeed carbon, in the form of lamp-black, is one of the best known insulators and possesses the added virtue of resisting oxygen attack on the metal at high temperatures.

The use of carbon as an insulator is highly recommended by one shell manufacturer, who uses an aqueous suspension of colloidal graphite to produce the initial coating on the punch. Carbon, as most people are aware, occurs in several forms. When crystallized under greater heat and pressure than we have so far been able to produce artificially, we know it as the diamond; but it may also occur as graphite, crystallizing in the hexagonal as opposed to the cubic habit of its more valuable form. By contrast, numerous varieties are classed as amorphous (that is, without crystal form), the commonest being lamp-black, gas carbon, animal charcoal and the like. The purest artificial graphite (Acheson) contains but 0.5 per cent ash. It is made from petroleum coke in an electric furnace lined with firebrick faced with carborundum. The temperature reached in the process is such as to volatilize all impurities such as iron, silicon and other matter, thus giving a virtually pure product. A subsequent treatment known as "de-flocculation" makes possible its colloidal suspension in water or oil.

The initial coat on the punch is maintained by subsequent dippings in suspensions of colloidal graphite. Piercers, for example, are first heated to 300 degrees Fahr. and dipped from seven to ten times while hot into a 5 per cent solution of "aquadag", this treatment resulting in a coat of fine graphite particles. In this dipping process the hot punch is immersed until the liquid stops "hissing", residual heat being permitted to dry off the punch after removal from the bath.

In service, under friction and heat, this graphoid surface tends to become more or less permanently established, the "slick" coat on the punch being maintained by lubricating the tools with a 3 per cent concentrated "oildag" and 7 per cent "dag" de-flocculated graphite suspended in a paraffin base oil of around 350 seconds viscosity at 100 degrees Fahr. and with a flash point ranging between 375 and 400 degrees.

Forging tools so treated are reported to have produced 14,000 shell of 75-millimeter size as against 6000 to 8000 formerly obtainable. Still further gains are made by nitriding the surface of the vanadium steel piercer and subsequently applying the graphoid treatment outlined above.

TOLERANCE

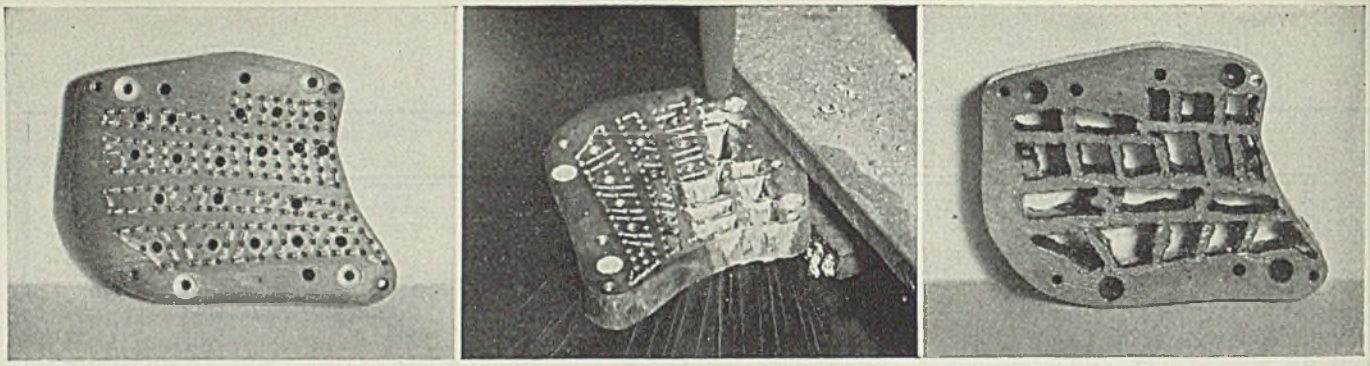
We know only too well how much you need steel. We are doing everything humanly possible to get it for you. Every man in this company is doing his utmost to produce every possible pound of material.

Because of the seriousness of this nation's emergency, defense must come first. We are cooperating with the Government to the limit as you would want us. At the same time we are keenly aware of the needs of our customers, and we are doing our best to serve you, too.

Tolerance is one of the virtues that will help tremendously in this hour of our country's need.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN, OHIO



BEFORE: The 19 shapes to be cut out of this die have been scribed and punch marked, and 1/8-inch starting holes have been drilled in the scrap pieces
CUTTING: Here is a close-up of the cutting operation, the setup for which is shown below. The operator is guided by the scribed lines and punch marks
AFTER: Only 4 minutes is required to complete all 19 cuts, less than one-quarter the time formerly required. Total cutting measures about 2 feet

Intricate Flame-Shaping by Hand

■ AN INGENIOUS setup for shaping small, intricate parts quickly and accurately by means of a hand-operated machine blowpipe is shown in the accompanying illustrations.

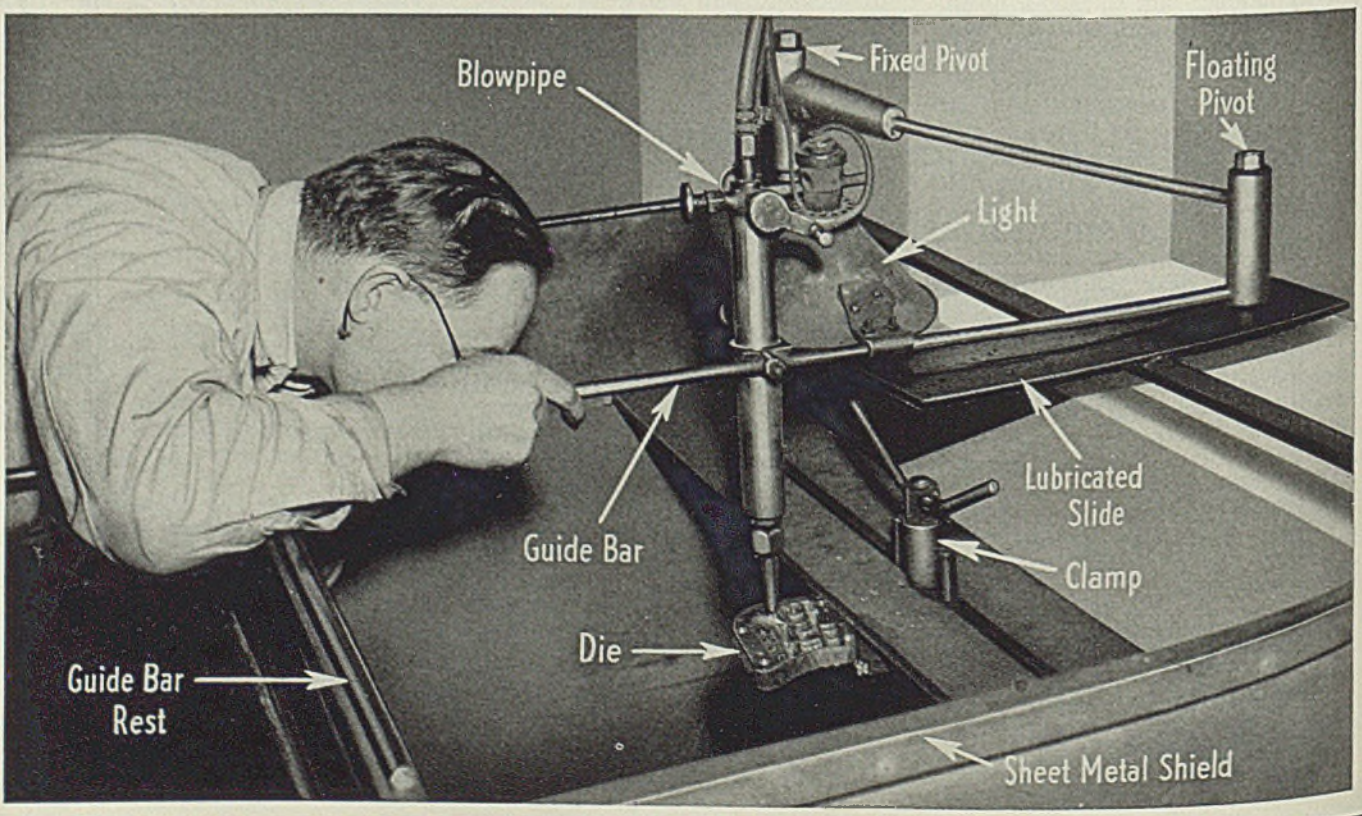
The part is a leather-cutting die for blanking out shoe parts. Formerly, 20 to 25 minutes were required to rout out the various pieces by drilling. Now they are flame-cut in only 4 minutes and to such close tolerances that subsequent routing operations are also speeded.

Plates as thin as ⅛-inch and as thick as 3 inches are shaped with equal ease by means of this setup, while holes as small as 3/16-inch square and slots as little as ⅛-inch wide are also regularly produced under the same blowpipe, as told by The Linde Air Products Co., New York.

Note that great accuracy in controlling the cutting torch is obtained easily simply by the principle of leverage. The pivot point for the torch control handle is located some distance behind the cutting torch while the control handle itself extends a considerable distance in front of the torch. This permits the operator to move the torch through small distances under positive control, contributing to the accuracy of the operation. Of course, the same principle could easily be adapted to other arrangements of slides, pivots and control levers to furnish the same excellent control to still finer cutting work.

A guide bar rest combined with use of a floating pivot on a slide maintains the cutting torch at the correct distance above the work no matter where it is moved, thus eliminating the necessity of the operator having to control that variable.

SETUP: The double-pivot arrangement provides universal motion to the hand-guided blowpipe



TUBING *for the backbone of our increasing air force. Tubing for equipment to keep those planes supplied with fuel.*

In national defense, recognition is given to the need for OHIO QUALITY Seamless Steel Tubing for such vital equipment as Condensers and Heat Exchangers for the oil industry and many other mechanical applications.

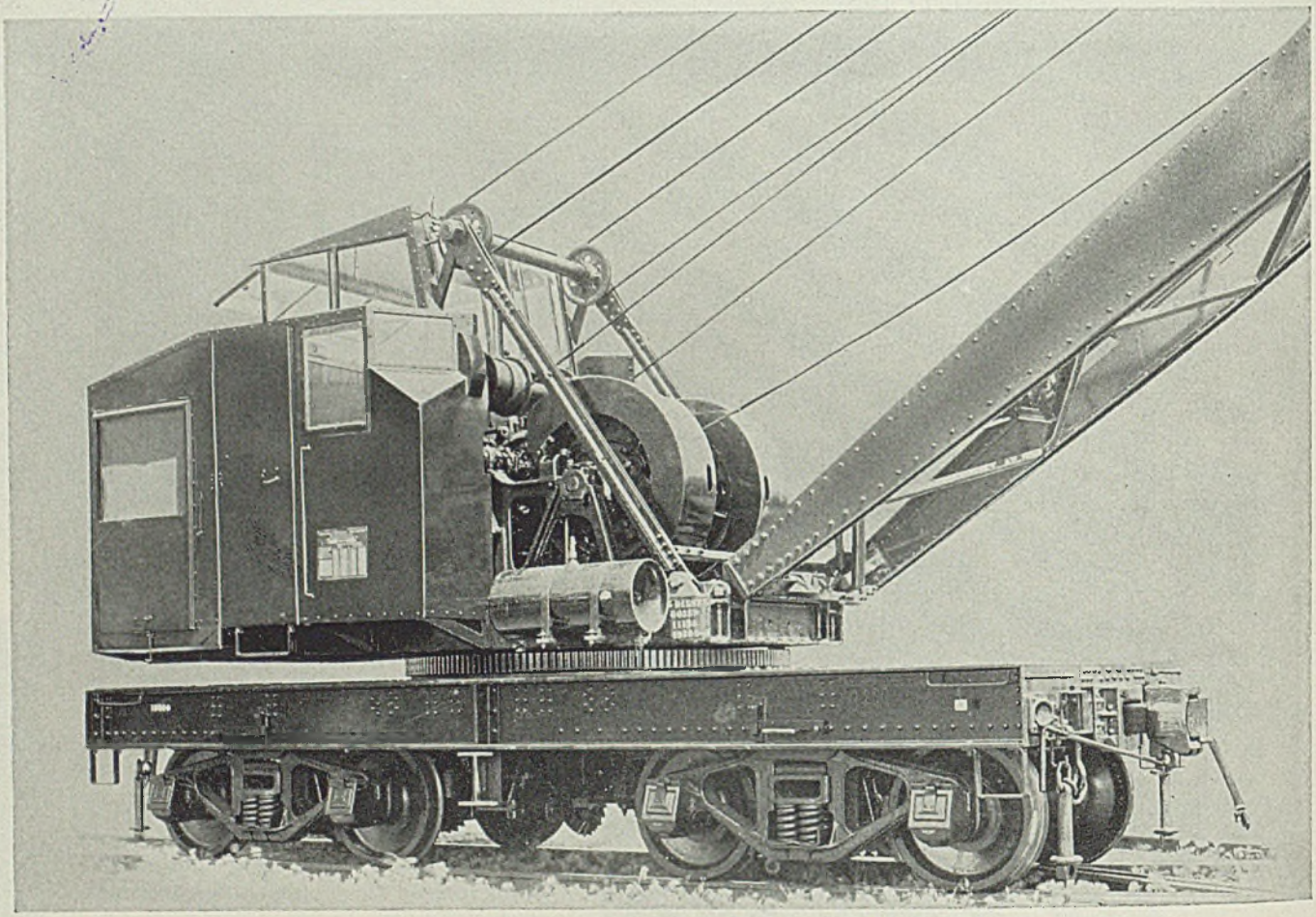
OHIO Seamless Steel Tubing contributes safety factors and the endurance required for sustained production in those projects essential to our National Defense effort.

The OHIO SEAMLESS TUBE CO.

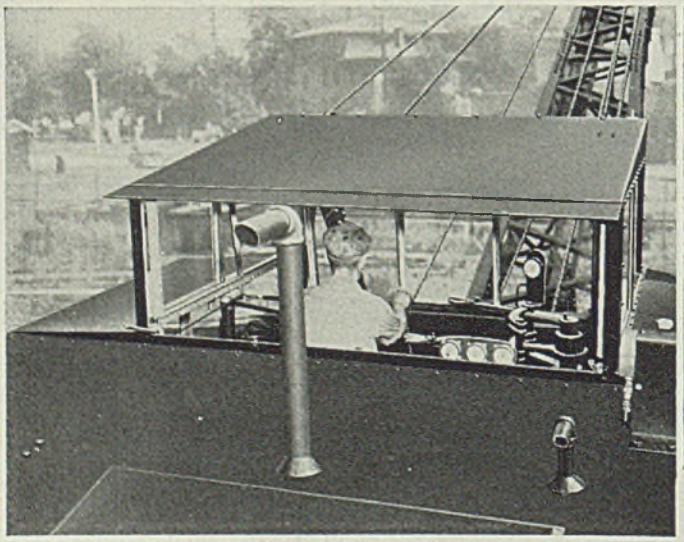
OHIO SPECIAL QUALITY

Shelby, OHIO

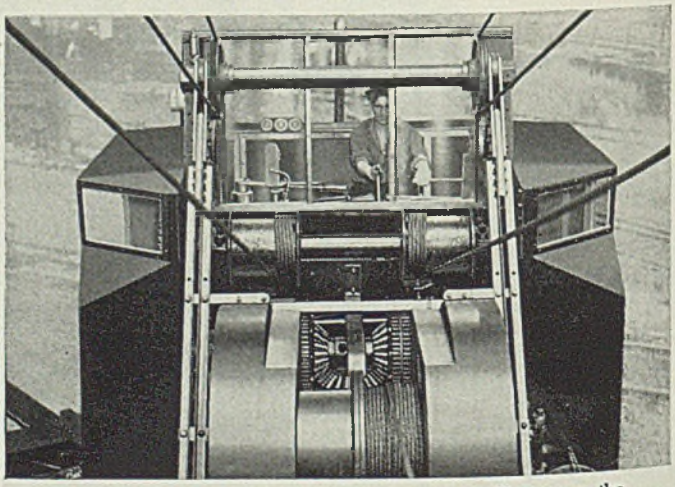
360° VISIBILITY, LESS NOISE AND MORE COMFORT PROVIDED BY NEW MONITOR TYPE CAB



The new, patented, Industrial Brownhoist Monitor-type cab increases an operator's safety, comfort and efficiency. From the full-view windows the operator can see the tip of the boom and the rope coming off the drums. Ventilation is far better than in ordinary cabs, and at the same time noise is considerably reduced.



Close up of rear window showing the perfect ventilation and 360° visibility offered operator in Monitor type cab. This cab is standard on all I. B. gasoline and Diesel Cranes from 10 through 40 tons.



Front view of Monitor type cab taken from half way up the boom. The Monitor type cab is an exclusive I. B. feature. Write today for further facts.

BAY CITY, MICHIGAN • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO

INDUSTRIAL BROWNHOIST
BUILDS BETTER CRANES

MATERIALS HANDLING PLANT

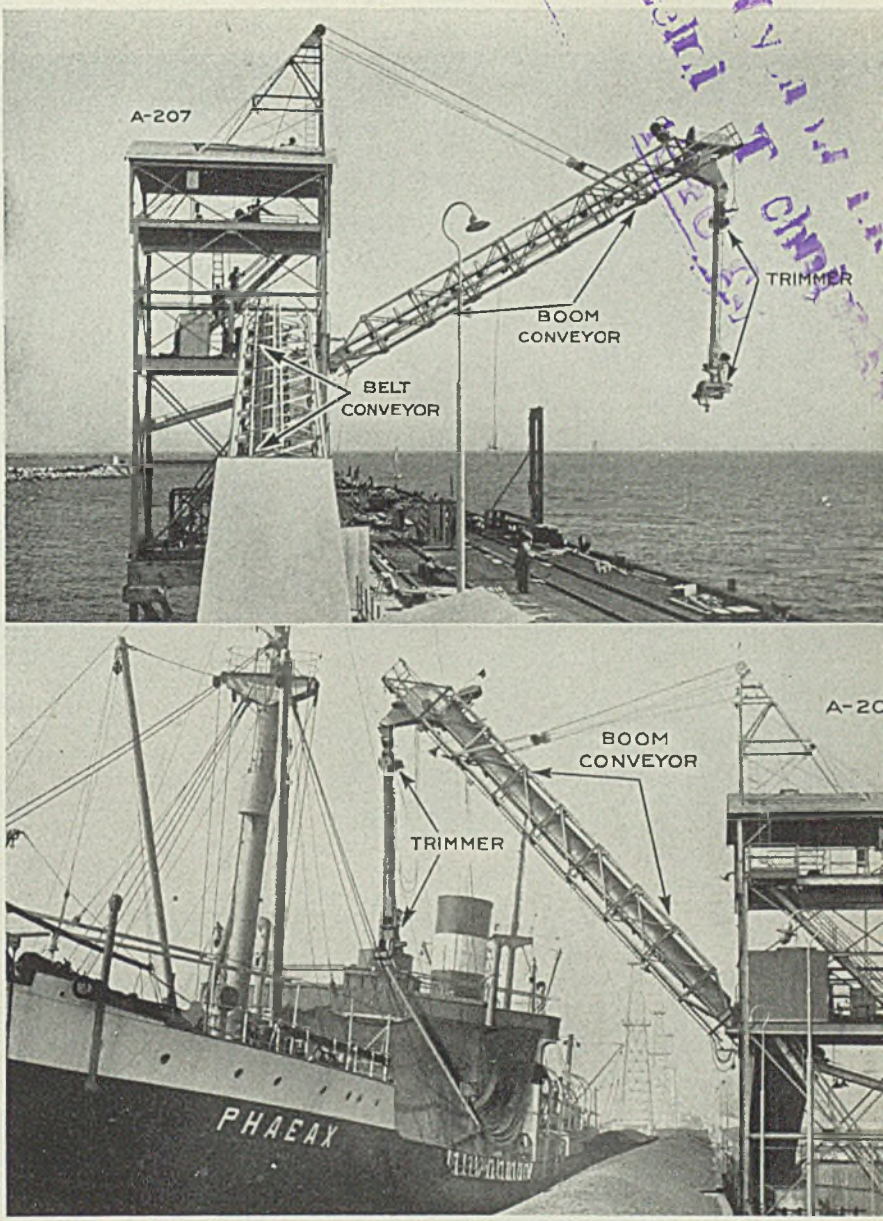
Loads 10,000 Tons Of Coke in 30 Hours

■ THE NEW shiploading plant of Great Lakes Carbon Corp., Long Beach Harbor, Calif., is said to be the largest and most complete bulk loading plant on the Pacific coast. It offers excellent shiploading facilities for most bulk materials and employs a materials handling system that includes some unusual features.

Mechanical materials handling equipment is used where practicable throughout the entire plant. Each unit or group of units is designed to synchronize with respect to others in the system to insure continuity of operation and maximum capacity.

Loading bulk material into ships from freight cars at the rate of 350 tons per hour requires careful spotting and continual movement of the cars. Careful planning and co-ordination of loading, spotting, train service and unloading operations are essential—especially where total shipments of 10,000 tons must be handled in 30 hours. Ample track storage space is available to accommodate 50 or more cars on the approach tracks to the wharf and for storage of 18 cars on the wharf ahead of the track hoppers. Two 15-horsepower electrically driven single-drum car pullers with a flexible cable system are provided for the wharf track operation of spotting the cars over the hoppers for unloading them.

Six welded steel hoppers within the concrete caisson receive the contents from two full bottom dump cars, or 100 tons of coke can be received at one time from the two tracks. Under each pair of hoppers is a 24-inch reciprocating plate equipped with a regulating gate and adjustable speed control which feeds a 24-inch transfer belt conveyor. These duplex feeders and transfer belts feed the main 36-inch incline belt which is 202 feet long, center to center. This belt handles 350 tons per hour of coke weighing 45 pounds per cubic foot. The belt is driven by a 30-horsepower motor through a speed reducer and is provided with an automatic hold back.

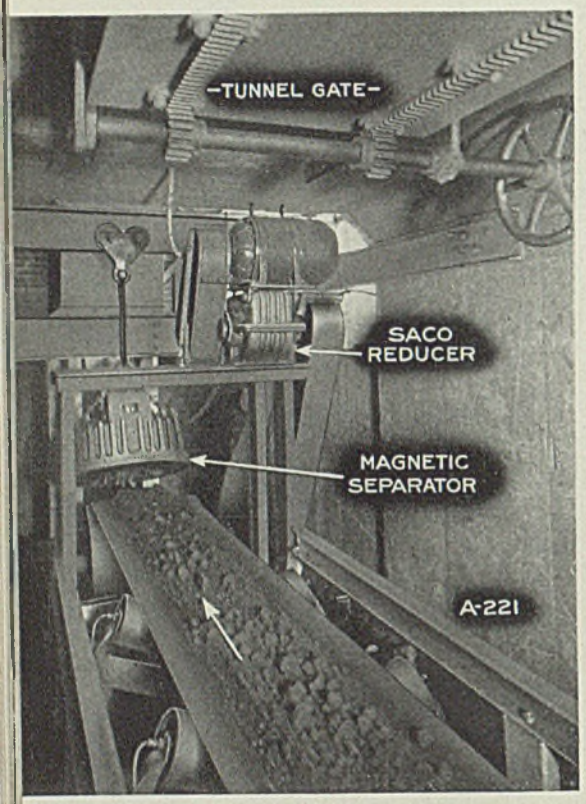


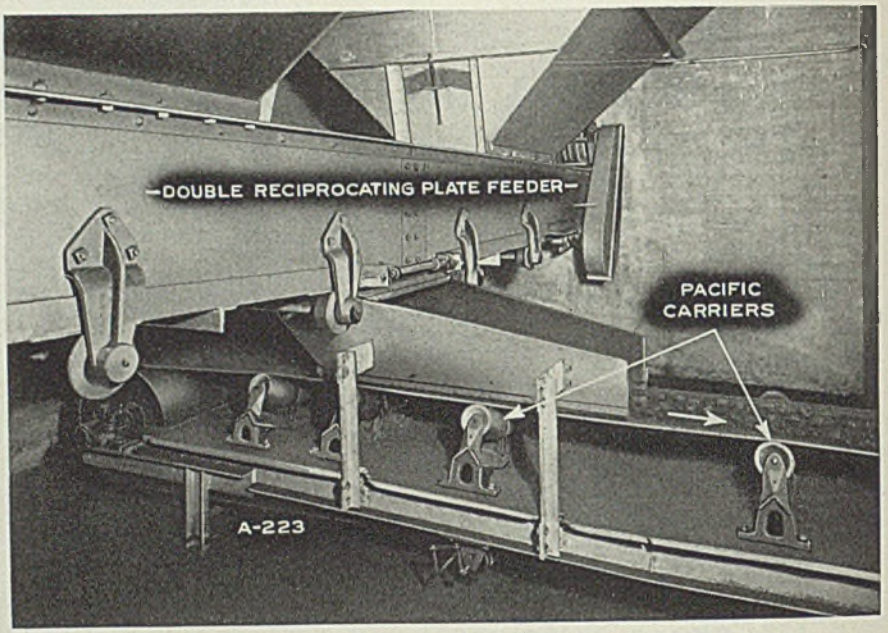
Above two views show the patented boat loader and trimmer furnished by Stephens-Adamson Mfg. Co., Chicago, with auxiliary belt conveyor and feeder equipment as installed at shiploading dock of Great Lakes Carbon Corp., Long Beach, Calif. The system handles all types of bulk materials. Top view shows boom conveyor and boat trimmer about to be raised and lowered by hoist. Lower view shows trimmer being lowered into hold of ship. Trimmer throws 350 tons of material per hour, at distances up to 40 feet in ship's hold. Mounted on swivel spout, trimmer can be swung 360 degrees, be raised and lowered 15 feet

At the head pulley of this conveyor is a magnetic separator for the removal of tramp iron. This main belt conveyor feeds a 36-inch wide by 65-foot long boom conveyor which is pivoted at the tower and can be lowered or raised to suit boat loading and to provide adequate boat and railroad clearance when not in use.

At the head end of the boom conveyor is a centrifugal boat trimmer. This device can throw a continuous stream of material at the rate of 350 tons per hour for a distance of 40 feet. It is mounted on a swivel spout which can be swung through 360 degrees as well as raised and lowered 15 feet. This permits the placing of the bulk material between decks and anywhere in the ship's cargo hold with a minimum of hand trimming.

In operation the trimmer is lowered by the conveyor boom into the ship's hold to the proper depth to clear the ship's deck framing, and a canvas dust tarpaulin is placed over the hatch. One operator located on the ship near the hatch controls the loading operations by means of a portable panel on which are mounted the push-buttons which actuate the various controls. This remote control arrangement greatly facilitates the





Just 5 miles from Long Beach shiploading dock is the Wilmington, Calif., coke calcining plant where the double Stephens-Adamson reciprocating plate feeder shown above feeds raw coke from a double track hopper to belt conveyor. The feeders at Long Beach are similar. Left shows head end assembly of raw coke tunnel at Wilmington. A similar arrangement is employed at the Long Beach plant

entire operation and makes possible adjustments for trimming immediately as conditions may indicate.

Considering the extreme rapidity of loading, it is quite important that the vessel be kept trimmed and on an even keel at all times because of the rapid changing of the ship's metacenter, which could easily cause disaster to the ship or damage to other cargo. Thus speed in controlling the trimmer is an important feature of this system.

The boom hoist for raising and lowering the boom conveyor operates at a rope speed of 50 feet per minute, is driven by a 15-horsepower motor and is provided with a safety holdback brake. For additional safety, a compensating set of counterweights is provided at the tower for elevating and lowering the boom conveyor.

The belt conveyor equipment is provided with roller bearings and high-pressure lubrication. Antifriction self-aligning bearings are provided on all head shafts to reduce power and maintenance costs. All inclined conveyors and vertical elevators are provided with holdbacks to prevent reversal of any unit and jamming of the system.

All drives are provided with speed reducers of the totally enclosed helical-gear type with shafts mounted on antifriction bearings and with roller-chain drive to the head shaft. The speed reducers in turn are driven by standard motors through V-belt drives. This provides maximum flexibility and permits motors to be changed readily in event of a motor burnout. All motors are totally enclosed fan-cooled dust-tight type, and most of the controls are in dust-tight housings.

All the conveying equipment is electrically interlocked by relays and selector switches so in the event that one unit should fail or otherwise stop, the connecting units will automatically cease operation, thus preventing the overflow of material on the units ahead of the stopped equipment.

Chambering

(*Continued from Page* 64)

station.

Eight of the nine cutting tools have spares mounted in a tool-setting gage which is attached to the machine. This permits the tools to be set at proper working height before they are placed in the machine. To do this, the inner tool-sleeve assembly is set on a hardened and ground steel plate, and an adjusting nut is advanced until a gage sleeve, which registers against a tapered portion of the tool, makes contact with a solid button at the top of the rack. The tool assembly then is ready to be placed into operation and requires no further adjustment.

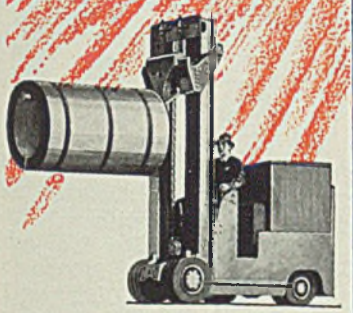
Coolant is circulated at a rate of 10 gallons per minute and is forced up through the shanks of the reaming tools by a 2-horsepower coolant pump. Coolant and chips descend into a circular trough around the tool stations, then through a screen and into a settling tank. A motor driven filter purges the coolant of foreign material before it is returned to the circulating pump. Reservoir capacity is 50 gallons.

The chambering operations proceed approximately as follows: The first four stations rough and semi-finish ream the four main tapers in the chamber. Then two tools finish ream the two lower tapers, one slow and one steep; two finish the upper two tapers, also one slow and one steep; and the final tool blends the chamber into the bore. This last tool, because of the extremely slow taper it produces, does not have to be gaged so closely, hence no spare is provided for it in the tool-setting gage. There is also a 45-degree chamfer on the end of the chamber, an operation which is combined with one of the other reaming steps.

Feed cams are of machined flame-hardened Meehanite and in general are smoothly inclined to produce a steady rate of feed. However, it has been proposed to shape the cams so the tools back off a fraction of an inch two or three times in the cycle so a better chip-breaking action can be achieved.

Height of the machine for handling .50-caliber barrels is 11 feet 10 inches. Net weight is 10½ tons. For satisfactory operation and to provide ample room for stock pans, operation and so on, a floor space 14 feet square is recommended to be allowed for the operation, about 200 square feet in all.

Break the bottleneck in handling materials ...power your trucks with Exide-Ironclads



HEAVY-DUTY TRUCKS handling steel coils in your plant must be fast and maneuverable.

To increase the tonnage hauled in your plant each turn, equip your coil trucks with Exide-Ironclad Batteries . . . as many steel mills and fabricators, large and small, have done. Frequently they've provided two Exide-Ironclads for each truck . . . so as to be sure of continuous, 24-hour operation.

Hint to hurried operating men: We've developed the Exide System to improve battery performance, simplify maintenance and prolong battery life. It's a system that really works . . . leaves your maintenance men free for other jobs. You'll find complete details in the *free* booklet, "The Exide System for Better Material Handling." Write for your copy now.

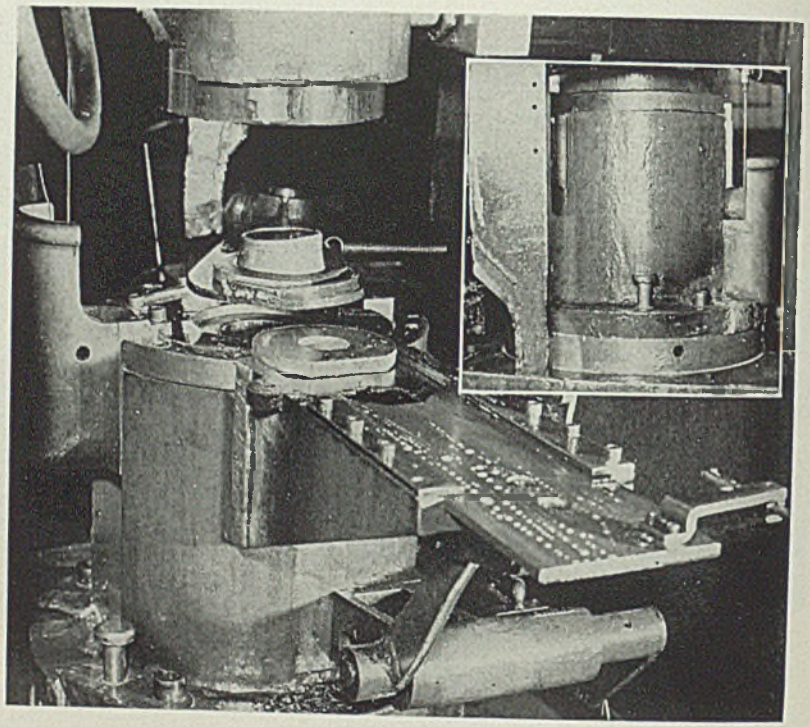
Using Exide-Ironclads, you have...

- Giant power to handle 15-ton steel coils easily.
- High voltage to maintain fast running speeds.
- Dependable performance throughout each turn . . . no breakdowns, no repairs.
- Long battery life and correspondingly lower cost per ton-mile.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

NEW FLANGING METHOD

. . . employs hydraulic press to force ball through broached hole in heavy stock



Here a swinging arm working from lower die is removing one flanged piece from the 500-ton hydraulic press while another piece is ready to slip into place for the extruding operation. Note mechanical slide and linkages for feeding work to dies

Rear view, inset, of press with dies closed and ball showing in chute at right

■ INGENUITY of tool and die designers is reflected in a new method for fabricating steel flanges for the ends of torque tubes, developed by the Buick Motor Division, Flint, Mich.

These flanges are used at either end of the torque tube, the one at the forward end being somewhat larger than that at the rear. In installation they are drilled and bolted to universal joints at the transmission end and at the differential end. Formerly, they were made on upsetters. The new system already has shown an appreciable improvement over the previous method. Essentially the present plan involves blanking disks from heavy gage strip with a small hole in the center. This hole then is broached out slightly and the disk forced down over a steel ball, extruding the required collar on the flange for subsequent welding to the torque tube proper.

Hole Enlarged, Collar Extended

The larger flange is of 9/16-inch low-carbon steel stock, the blank being 6 inches in diameter and formed with a 1⅞-inch hole. These pieces are blanked from strip stock on a 600-ton Clearing press, after which the pieces are transferred to a 6-ton vertical American Broach which enlarges the hole to 2-inch diameter and gives a smooth inside surface. The disks then are placed one at a time in a Williams & White 500-ton hydraulic press where the hole is expanded to 3⅛ inches in diameter by forcing the disk over a steel ball, and a 1⅜-inch collar extruded on the flange.

This is a most interesting operation. The lower die of the press is cylindrical in shape with a hole in the center large enough to permit passage of the steel ball, which rests on a tool steel post cupped out at the top and setting inside the lower die on the pressure pad of the press. The upper die of the press also is cylindrical, having a cavity shaped with sufficient taper so that the formed collar is drawn down to ⅛-inch thickness at the top. Reason for tapering the collar in this way is to prevent the steel from opening up or cracking on the upper edge, which occurred when the outer surface of the collar was made parallel with the inside surface.

As the dies close to hold the blank firmly centered over the ball, they start to lower and the blank is forced slowly and smoothly over the steel ball which, after emerging from the top die rolls down a chute to one side. This chute accommodates four balls and feeds them one after another onto the center post, in position for the subsequent drawing operation.

As the dies open, a swinging arm pivoted at the rear of the lower die moves in a horizontal plane to remove the formed piece from the dies. Movement of this arm is provided through a vertical cam rail bolted to the press frame against which one end of the swinging arm bears.

Travel of the press ram is 15 inches. Production averages about 4 pieces per minute.

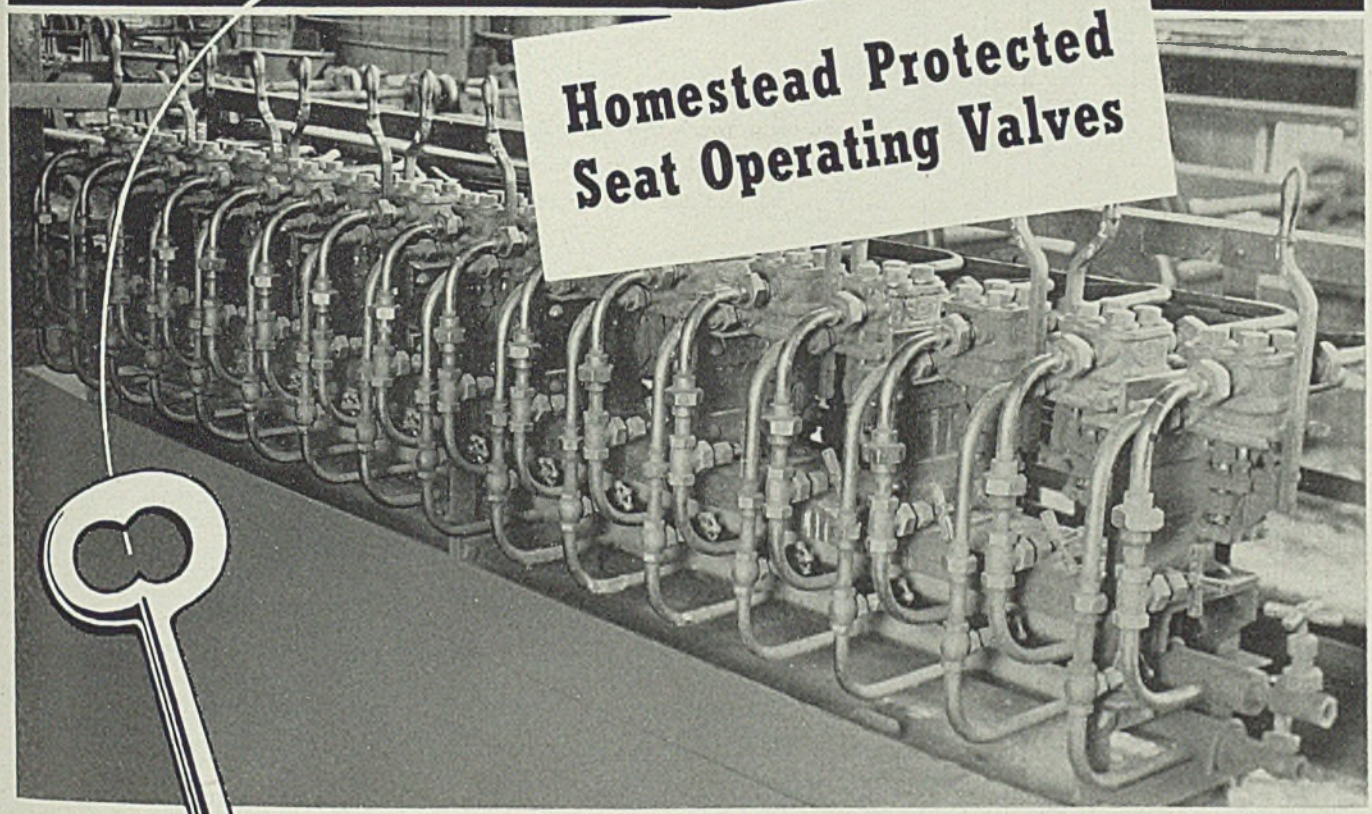
The smaller flange is blanked from 7/16-inch stock, blanks being 4 inches in diameter with a 17/32-inch hole, broached to 9/16-inch diameter and then ball formed to 1 9/16-inch diameter. Collar is 1 inch deep. Broaching and press equipment is similar to that used on the larger flange, except that seven steel balls are carried in the auxiliary chute on the press.

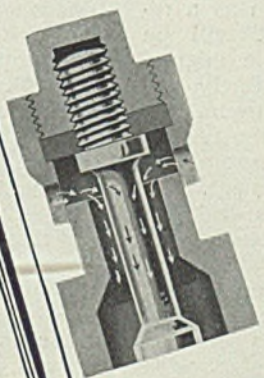
Balls Are High-Speed Steel

One of the problems incident to development of this unique method was that of obtaining satisfactory steel balls for the forming operation. Difficulty was experienced from galling during the process with the result that the steel balls would pick up metal on their surface and become rough and off-size. Chromium steel balls were tried first, ground and polished to a high luster. Then it was decided to bonderize the surface of the balls. This proved to be an improvement over the highly polished surface, but later it was decided to change to polished high-speed steel balls, which are now giving satisfactory service.

Another problem was selection of a suitable lubricant for the forming operation. Many different types were tried, including cutting oils of various trade names, but it was finally determined that ordinary machine oil gave the best results.

The KEY to unfailing hydraulic control





HOMESTEAD
Protected Seat
The original B. & O. Protected Seat. Eliminates wire drawing; assures extra long service, accurate control, extremely low maintenance.

Thousands of Homestead Protected Seat Operating Valves are used controlling hydraulic presses, furnace doors, manipulators, soaking pit covers, shears, ingot strippers, and dozens of similar jobs in steel and metal working plants the world around. Records of 12 to 18 months' continuous service without so much as the replacement of a fibre disc are common. The reason is simple. Homestead's Protected Seat stops fluid flow *before the seat and disk make contact;* prevents wire drawing of the seat; practically eliminates shut-downs, reduces maintenance costs, assures fast, accurate control. Made in 3-way and 4-way types, sizes ½" to 4", with hand operated or remote control for pressures to 3000 lbs. Investigate before you invest in your next operating valve installation. Consult our engineers about your hydraulic problems. Ask for our catalog No. 38, too.

HOMESTEAD VALVE MFG. CO., P.O. Box 22, CORAOPOLIS, PA.

HOMESTEAD VALVES

QUARTER-TURN VALVES:
STRAIGHT-WAY
THREE-WAY
FOUR-WAY
LUBRICATED TYPE
LIFT-TYPE PLUG

PROTECTED-SEAT VALVES:
HYDRAULIC (B. & O. PAT.) OPERATING
REMOTE CONTROL
HYDRAULIC DESCALING
ROSS AIR SHUT-OFF VALVES
HOVALCO BLOW-OFF VALVES

DEHYDRATOR REMOVES MOISTURE

from Blast Furnace Air

Based on a year's operation the new dehydrating unit will afford an increase in the production of iron, a reduction in the amount of coke per ton of iron and an improvement in the quality of metal. Unit designed to remove vapor down to 1½ grains per cubic foot

■ A DEHYDRATION plant of the absorption type has been developed by the Blaw Knox Co., Pittsburgh, for the conditioning of blast furnace air. The plant is fully automatic and requires only the normal supervision of motors and control equipment. Under the usual conditions found at most plants blast air can be supplied to the stack at any desired moisture content down to 1½ grains per cubic foot. Under certain conditions, even this 1½ grain loading can be decreased.

Experience with the first installation, which has been operating for a year at a steelwork's stack, demonstrates that the equipment has great flexibility and that the method employed for dehydration lends itself to low operating costs. There is evidence that the theoretically figured benefits in increased tonnage, reduced coke consumption and improved quality in the iron as a result of using dry blast will be realized to an appreciable degree. Thus, apart from the timely importance of assuring maximum tonnage in iron production, the results are gratifying enough to promise a good return on the investment.

The Blaw-Knox plant is designed to remove both water vapor and dirt from the blast air, controlling the air going to the blowing engines at a predetermined vapor content and temperature. The vapor is removed by absorption through contact with a hygroscopic salt solution. Heating and cooling coils ahead of the dehumidifier maintain the outlet air at the predetermined temperature, depending on the solution concentration and the cooling water available. The water vapor picked up by the solution is then, in a constantly operating closed cycle, driven off by heat supplied in steam coils so that the solution is maintained at the desired specific gravity corresponding to the set constant grain loading desired. The dirt is removed from the air by means of a continuous oil bath filter.

A number of variations may be secured in the operation of this equipment, depending on the temperature of the outlet air desired and the atmospheric conditions under which the unit operates. During periods of continued low atmospheric temperatures, the concentration of the salt solution may be reduced and the entire apparatus operated at some new setting of outlet temperatures with a resultant saving. If the humidity of the atmosphere is less than the maximum allowed for in the design, then the inlet temperature can be higher without affecting the control point, and the reverse is also true.

Air Flow

Air at atmospheric temperature, humidity and pressure enters the air filter where dirt is removed by an oiled continuous screen, and then the air passes through the aerofin heating and cooling coils. The air filter is protected by a weather shroud. The aerofin heating and cooling coils either heat or cool the air depending on the setting of a dry bulb controller in the outlet air; this compensates for the difference of temperature in the atmospheric

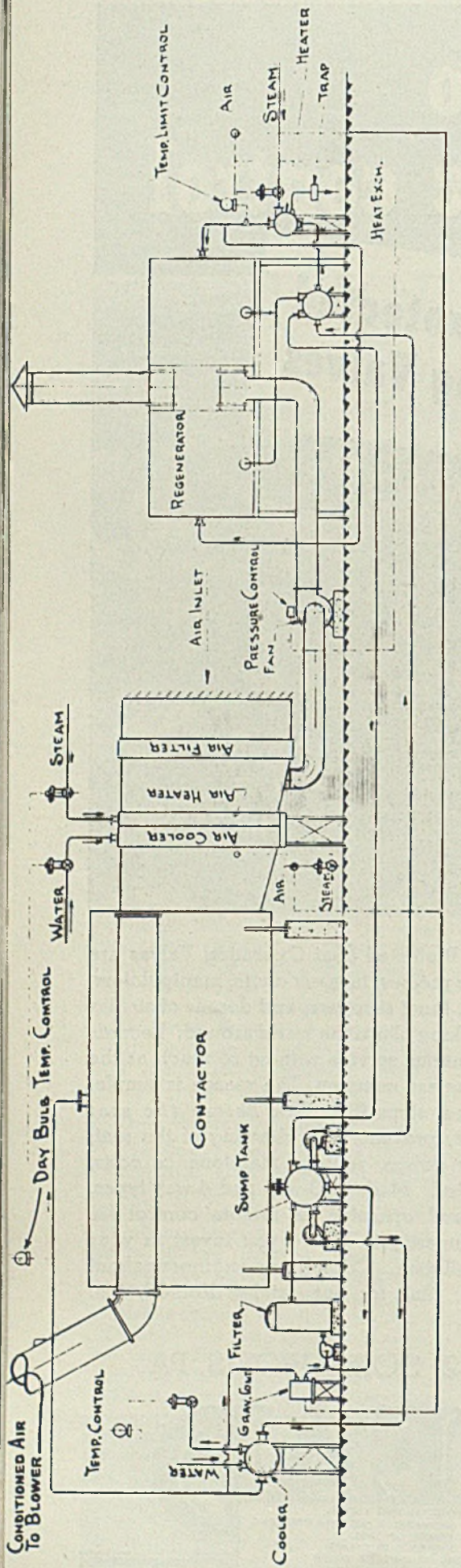
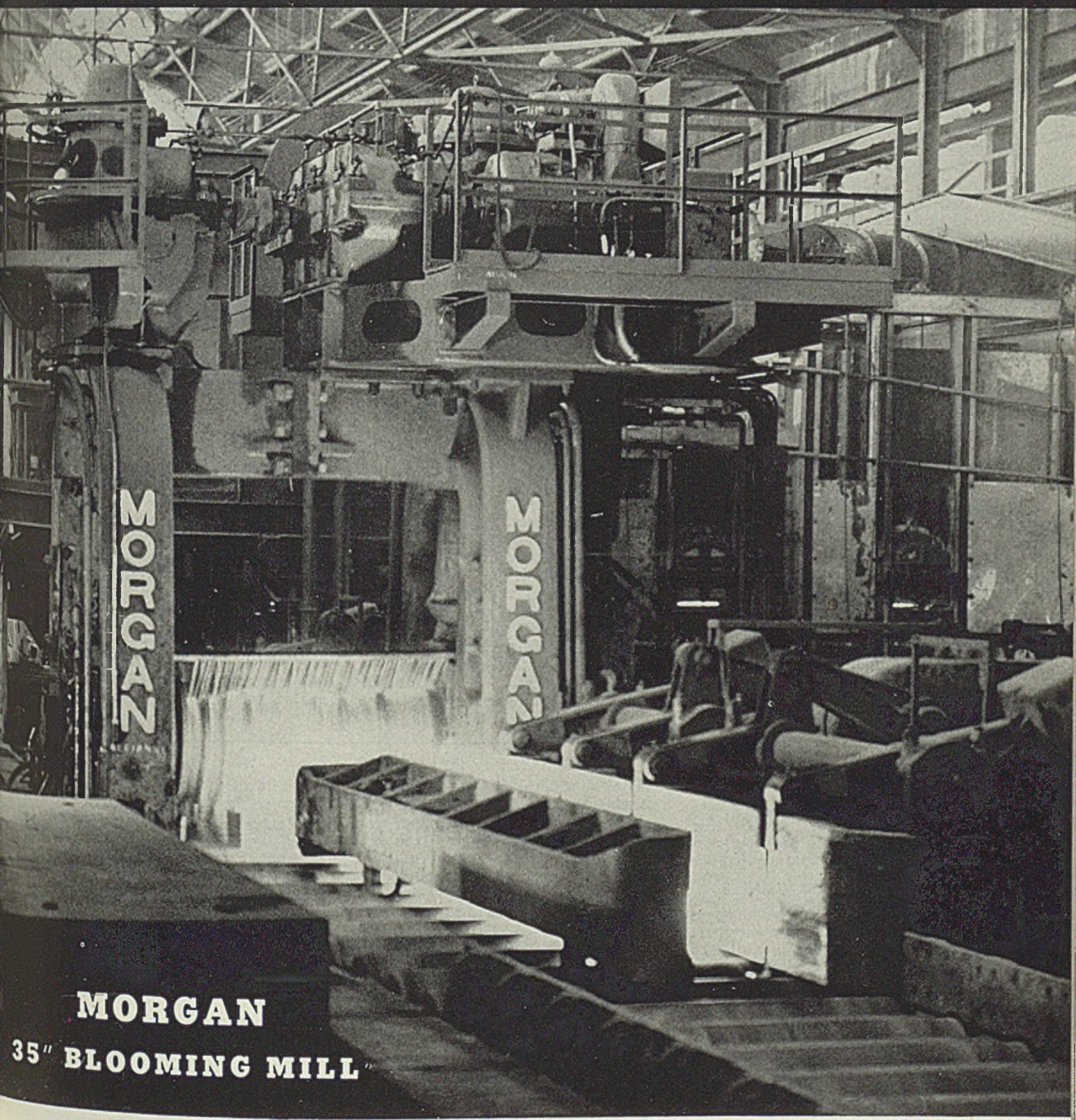


Diagram of Blaw Knox dehydration plant for maintaining the air going to the blowing engines at a predetermined vapor content and temperature. All dirt is removed by an oiled continuous screen. Temperature limit and other controls protect the system from overheating and during power failures

BUILT BY MORGAN *Engineering*



MORGAN
35" BLOOMING MILL

ABOVE is shown a Morgan 35" two-high blooming mill complete with double manipulator, front and rear tables. A hydraulic roll changing device is provided. Housings are one-piece steel castings of the closed top type. Top roll balance is of the counterweight type.

Manipulator is of the overhead type, compact and accessible. Tables are of heavy design, equipped with anti-friction bearings. Screw-down drive is arranged to provide crane hook access when changing guides. Provision is made for automatic lubrication

★ **DESIGNERS • MANUFACTURERS • CONTRACTORS**
BLOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS
★ ELECTRIC TRAVELING CRANES • CHARGING MACHINES
INGOT STRIPPING MACHINES • SOAKING PIT CRANES
★ ELECTRIC WELDED FABRICATION • LADLE CRANES
STEAM HAMMERS • STEAM HYDRAULIC FORGING
PRESSES • SPECIAL MACHINERY FOR STEEL MILLS
★

THE MORGAN-ENGINEERING CO., Alliance, Ohio

air, making it all uniform and in conformity with the control point. The cooling is dependent on the water available and a differential control does not permit this cooling operation if the inlet air temperature is less than the water temperature. The amount of heating, accomplished through steam, is dependent on the outlet air control point and the amount of moisture absorbed since the latent heat of absorption tends to raise the air temperature.

After the air passes through the heating and cooling coils, it enters the plenum chamber of the dehumidifier and then through the contact section where it contacts the dehydrating solution and gives up its water vapor, and at the same time is equalized to the outlet air temperature setting. This contact section consists of raschig rings held in place by two parallel open mesh screens. The air passes horizontally while the liquid drops vertically. Contact between the air and liquid takes place on the surface of the rings, as a result of which entrainment of the solution is avoided. The heat generated by the absorbing action is taken up by the solution trickling down over the contact bed.

Under certain humidity conditions when the inlet moisture is extremely low, moisture must be added to maintain a constant grain loading; this is done by means of a steam jet just ahead of the dehumidifier. Under these circumstances the required heat is supplied by the inlet air heaters.

The amount of moisture added or taken out is controlled by a gravitometer, which also regulates the moisture removal in the solution regenerator circuit and also the steam addition ahead of the dehumidifier.

After passing through the contact bed the air continues through a dry bed composed of berl saddles, which acts as a separator to stop any particles of solution that may have dropped in the air path from the open mesh screen. Air leaving the dehumidifier flows through the outlet collecting pipes past the dry bulb control thermometer to the blowing apparatus at the predetermined moisture and temperature conditions.

Solution Flow

The dehydrating salt solution is fed to a distributing pan at the top of the contact bed section. From this pan it flows down over the ring packing where it makes contact with the air, until it finally flows into a solution sump located directly beneath the dehumidifier. The solution is partly diluted by the absorption of water from the air, and in order to maintain the proper gravity part of the solution is sent through a regenerative cycle and reconcentrated. The greater portion of the solution, after leaving the solution sump, is pumped through a solution cooler, where the heat of solution is transferred to the water used for cooling.

The amount of cooling of the solution is controlled by a differential indicating control, which has one bulb in the solution coming from the dehumidifier and the other bulb in the solution leaving the cooler. In effect, this is controlling the temperature of the outlet blast air, as the air in passing through the dehumidifier assumes the mean temperature of the solution. After undergoing this cooling effect, the solution passes under pump pressure back to the distributing pan.

That portion of the solution to be reconcentrated is first filtered and then passed through a heat exchanger picking up heat from reconcentrated solution being returned to the sump. The partially heated solution then goes to a steam heater where the solution is heated to the proper reactivation temperature before it is sprayed over the contact bed of the regenerator. In this contact bed the solution meets air being blown up through it. In meeting this air, the solution gives up the moisture that had been absorbed in the dehumidifier. The air passes through a stack to the atmosphere and the solution drains back through the heat exchanger where it in turn gives up its heat to the cold solution coming to the regenerator, and finally flows back into the sump under the dehumidifier.

The solution temperature to the regenerator is controlled by the gravitometer which is interconnected with the fan supplying air to the regenerator, so that when the solution does not have to be heated, the fan will not operate. Temperature limit and other controls protect the system from overheating and also from the effect of power failures.

Wing Tips

(*Continued from Page* 39)

stock, are piled on the router as many as 15 deep and routed and drilled together. The Bell equipment for routing-drilling is similar to a pantograph arrangement, except that the movement of the router or drill is on two tracks, one lateral and the other longitudinal. Control is through two electric motors which are actuated by relay switches governed by movement of a stylus following the shop template mounted on an adjacent parallel table.

Router tools come in a number of different types and sizes. They are of carbon tool steel and a conventional type of router tool will traverse ¼-inch stock at a rate of 240 inches a minute. Drills used in the work have a fast spiral, and there are bits of many types.

Another special machine of which Bell is particularly proud is called a spar cap milling machine invented and developed by Bell, engineered and built by Farnham Co., Buffalo. It permits the complete milling of a wing spar even when angular profile is required. The extruded spar section is clamped to a fixed bed which is traversed by a pair of horizontal milling cutters, guided by a wheel which rolls on a template. Clamps which hold the part to the bed are arranged to drop away automatically as the cutters pass over, and return to holding position after the cutters have passed. The machine resulted in a saving of $168 on the $175 unit price formerly entailed in machining these spars.

Other Bell developments include a rivet making machine capable of heading about 30,000 aluminum alloy rivets an hour, countersinking machines, dimpling machines and gages for checking depths of countersinks or dimples.

A number of curved fuselage parts are shaped on bumping hammers, power hammers which deliver 500 strokes a minute, the operator holding the aluminum piece under the hammer dies and bending it to the proper contour. The noise in such an operation is terrific, as might be imagined.

While hand forming of aluminum is on the wane, there are still a number of parts, such as nose pieces and bulkheads, which are so shaped over wood or boiler plate forming blocks. Draw benches, bending rolls and press brakes also are used to a limited extent.

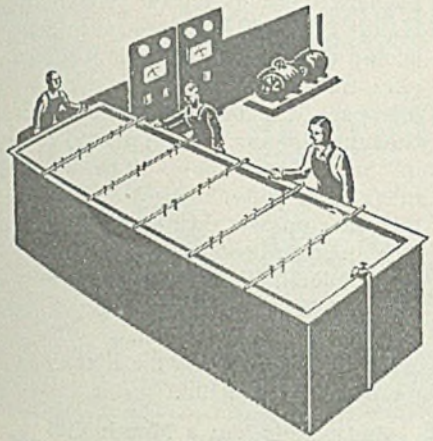
Statistics Show Welding A Defense Aid

■ Statistics released recently by the James F. Lincoln Arc Welding Foundation, Cleveland, show that welding can play an important role in aiding the national defense program—especially in repairing broken machinery.

Records compiled by the foundation, covering 21 pieces of equipment, ranging from machine tools to turbine shafts, show that the average cost of placing these items back in production was only 22.3 per cent of replacement.

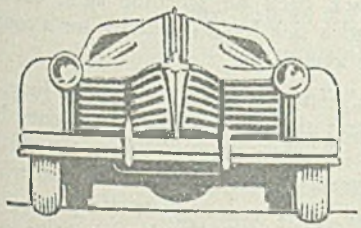
To the man with a problem

—OF FINISHING METAL TODAY



THE metal finishing industry faces a period of drastic adjustment. Curtailment of supplies makes necessary changes in time-honored procedure. Management has learned that today's problems must be met with *today's* resources . . . and tomorrow's developments may mean that new decisions must be speedily made.

With each plant the effect is different. Many contractors of defense work, for example, face the problem of plating new or unfamiliar parts.

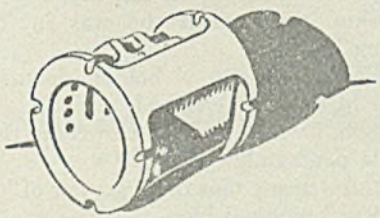


In some plants, restricted supplies require a change in the cycle of operation. In others, enforced substitution of materials necessitates the use of new methods or processes.

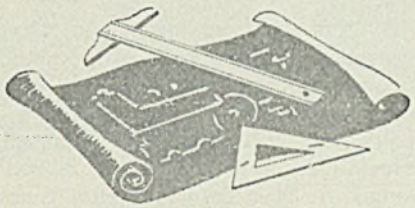
UNITED CHROMIUM
INCORPORATED
NEW YORK • WATERBURY • DETROIT

But whatever the situation, it must be studied in the light of the latest developments. No possible solution can be overlooked. Changes or adjustments must be made quickly and economically. These are the problems on which United Chromium believes it can be of real assistance.

In serving hundreds of licensees, many in the defense industries, United Chromium Engineers have



had wide experience in solving a great variety of finishing problems and in adapting plating programs to today's requirements. The technical assistance which we offer these companies includes:—Advice and suggestions in connection with metal-plating problems; Service-proved data on suitable processes —including layouts, blueprints and estimated costs of equipment; Supervision and advisory counsel in enabling licensees to place their



installations into prompt and efficient production.

We will be glad to assist in determining how the U. C. processes and products outlined below can be of service to you. Write us briefly explaining the nature of your problem. An inquiry addressed to Dept. S, United Chromium, Inc., 51 East 42nd St., New York, N.Y. will bring a prompt response.

THIS IS HOW U. C. CAN HELP YOU!

In the use of **CHROMIUM PLATING,** undoubtedly the most important plated finish in the defense program.

For the heavier thickness of copper, **Unichrome* ALKALINE COPPER** gives a smooth, lustrous deposit—saves buffing time and labor.

Where plating speed is paramount, **Unichrome* ACID COPPER** offers an economical and easy method of meeting specifications.

The trend toward color and the shortage of nickel make **ELECTROCOLOR*** (produced by the electrolytic color plating process) ideal for interior trim and decorative finishes.

For eliminating waste deposits of valuable metals on plating racks and work, **Unichrome* RESIST MATERIALS** and **RACK COATINGS** are efficient, economical and easy to use.

For resistant coatings on decorative articles, **Unichrome* CLEAR LACQUERS** offer an exceptional range of service characteristics.

** Trade Mark—Reg. U. S. Patent Office*

BETWEEN HEATS WITH *Shorty*

■ Say Fellers:

This is the vacation season as y' perhaps are aware 'n several of the boys have been sneakin' away with the ol' fishin' pole and box of tackle tucked away in the trunk compartment of their jallopies. We'll be hearin' some good ones in a couple of weeks as to how the 20-pounder got away or the 3-footer was thrown back in again because he was too small. Y' know how it is.

Some of the fellers over at the blast furnaces have been comin' up to the cottage over weekends to get their mugs fanned with the cool lake breezes free of all kish and dirt. You see, when the ol' wind starts blowin' 'round the blast furnaces, lottsa times y' get a mess of graphite all over your sweaty face that makes y' glitter like a decorated Christmas tree, or y' get a good whiff of sulphur fumes comin' from the slag at flush time. There's nothin' like this at the cottage.

Plenty Flyin' 'round Plant

Speakin' 'bout this graphitic kish that fills the air 'round the blast furnace cast house 'n over at the mixer building, we sent a sample over to the chemical lab last week and when the fellers put 'er through the casseroles and the beakers they sent word back to the furnace that they found the sample contained about 11 per cent silica and 0.3 per cent sulphur. The boys over at the open-hearth shop don't like tough, cold pig iron that throws off a lotta kish fer they gotta use more lime than usual to take care of 'er. Anyway they getta dirty-working furnace when there 's too much kish 'n so they always skim the mixer metal.

Last weekend a bunch of the fellers were layin' on the sandy beach after enjoyin' a weiner roast. Hep Mason, the blower on No. 1; Judy Black, who looks after the recordin' instruments 'round the plant; and Bill Mathews, the stockhouse boss were there. They started swappin' stories 'bout the early days when they first started furnacin' as they called it.

"These ol' waves bustin' all over the shore remind me of the times we used to get water in the stockhouse when the spring floods would plague us," sez Judy Black.

"Whaddya mean we use ta get?" asked Hep Mason, pushin' his feet deeper in the sand.

"Well I'll tellya, Hep. Do y' remember the little Atlantic stack that stood on the banks of the Shenango river down in the valley?"

"Seems as though I do, Judy. She ain't standin' now though, is she?"

"Naw. They tore 'er down 'long in the twenties. She made lots of iron in her day but she couldn't stand the pressure of the bigger furnaces 'n so they leveled 'er to the ground to cut down on taxes. Well anyway, I was workin' there when she was in 'er prime."

"What job was y' holdin' down?" Bill Mathews interrupted.

"Oh, I was one of the blowers of the little pot," Judy replied.

"How many tons didja get out of 'er a day?" inquired Hep.

"Oh, we'd average about 350 tons or so."

"What didja do, cast in ladles?"

"Nope. We ran the melt into sand beds and flushed all our slag into a granulating pit. Funny thing, fellers. I can remember when the railroads used to pay fer carloads of granulated slag, then there came a day when they said they'd haul the stuff away free of charge, and finally they came 'round one day and told us it was goin' to cost us so much for every car hauled away. Nothin' we could do 'bout it so we began payin' out the shekels."

All the time the conversation was goin' on, ol' Bill Mathews was squirmin' 'round in the sand, first in one position 'n then in another. Finally not bein' able to stand it any longer, he sez:

"Judy, you're worse than ol' Mother Hubbard. Y' start out by sayin' you're goin' to tell us all 'bout water in the stockhouse 'n then y' take us all 'round Robin Hood's barn 'n back ag'in. But y' ain't told us nothin' 'bout water in the stockhouse. So out with 'er or else me and my buddies are goin' to schedule y' fer a dip i the lake. Come on' out with 'er," se Bill, risin' to his feet to show Judy h meant business.

"Rest yourself, Bill. I'm comin' t 'er. One evening in April she startec to rain. She kept 'er up all that night the next day and a good part of that night. Couldn't 'ave been much more left up there when the little Shenango river started to rise. First thing we knew she was too near the top of 'er bank fer comfort. Water started comin' in the stockhouse. The bottom fillers were pullin' their buggies with the water up over their shoe tops. We dug up some boots but not enough to go all 'round. So we sent up town for 'bout 25 pairs and cleaned out a couple of shoe stores sellin' them."

"How'd y' git 'cross the river to git the boots?" asked Bill.

Judy Tells 'em a Mouth Full

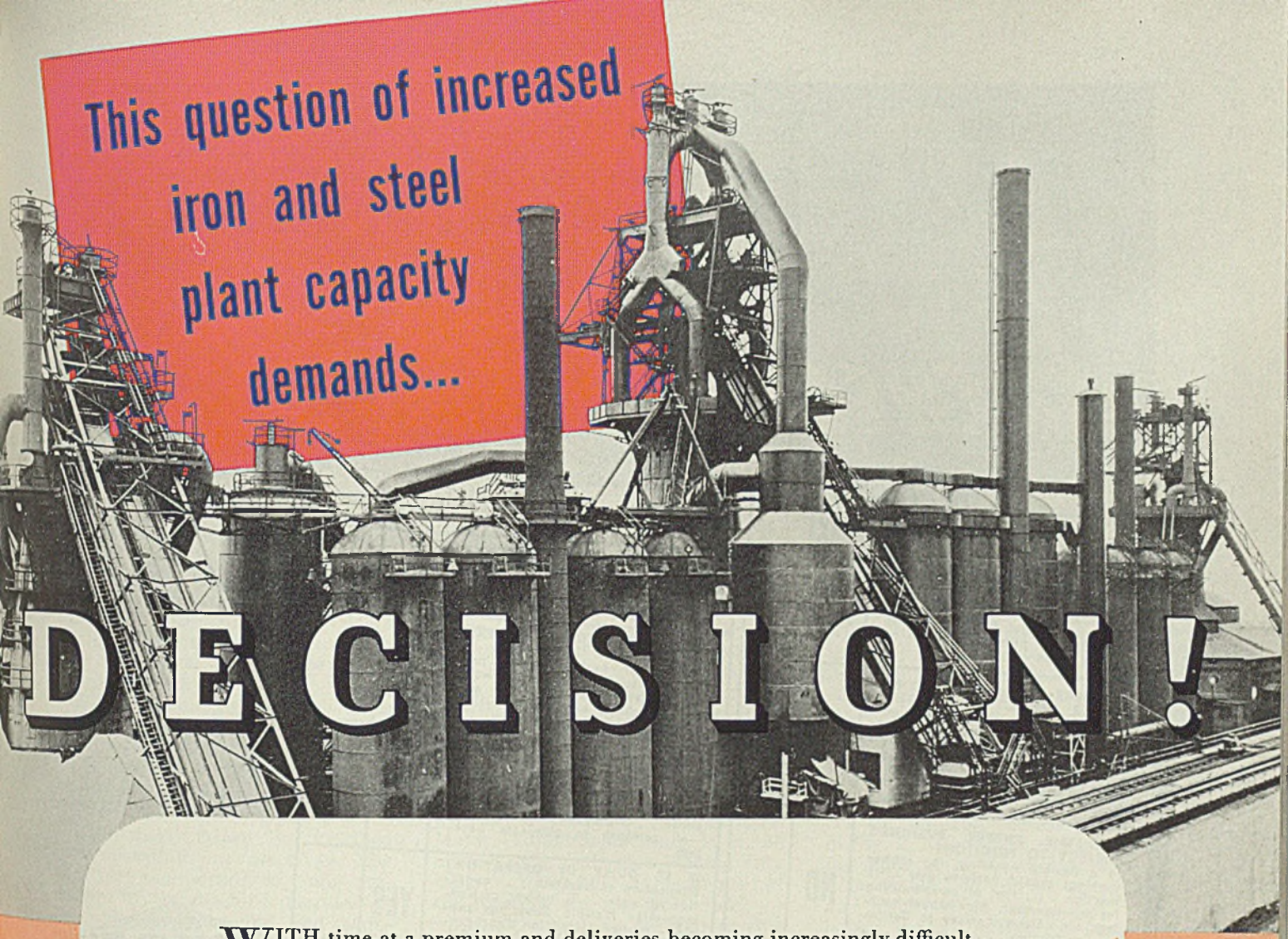
"Nertz to y', ol' topper," sez Judy, "Well anyway, the fellers in the stockhouse kept the furnace filled on half blast until the water came over the top of their boots, then we dropped the blowpipes, clayed up the tuyeres and let 'er stand. Mebbe y' don't think we didn't have one sweet time gettin' the little pot throwin' iron ag'in. When the river receded and we started blowin' ag'in we took the first cast of iron out through a cooling plate opening above the cinder notch, all the time burnin' the skull at the cinder notch with an oil burner—fer that's all we had to do the job in those days. Well anyway, we got the little stack back on schedule ag'in but we had a sick lookin' furnace for a couple of days."

"Y' understand," sez Bill to Judy, "I don't think your story is baloney but I still say it takes y' a long time to git 'round Robin Hood's barn. So when you want to dress yourself up real pretty like as though y' were goin' to a swell function, put on a Mother Hubbard wrapper 'n you'll be the cat's meow." N' with that Jim heaved as much sand at Judy as he could scoop up with his two hands and dove into the water.

After the boys got back on the job ag'in at the plant, it seemed as though the skip ran a little easier, the furnace threw more iron and the smiles on the faces of the gang were a little broader. If a couple of days away at the lake worked at our plant mebbe it'll do the same at your place. Didja ever try it?

So long, fellers. I'll be seein' y'.

"Shorty" Long



WITH time at a premium and deliveries becoming increasingly difficult, the question of who will do your construction work requires prompt decision.

Time ordinarily lost on preliminary negotiations can be saved by placing your job in the hands of a firm in whose ability, experience and integrity you have complete confidence.

During the past 36 years Arthur G. McKee & Company have earned the confidence of the iron and steel industry throughout the world.

An increasing number of iron and steel men are commissioning us to execute their new projects or rebuilding programs, permitting us, where possible, to duplicate designs of recently completed successful plants. By such duplication McKee can save you engineering time and can place orders immediately for many items on which delivery is critical.

In rebuilding existing units McKee arranges to have all essential material on hand before construction starts in order to eliminate delays and reduce non-productive time of the unit to a minimum.

Arthur G. McKee & Company

★ *Engineers and Contractors* ★

2300 CHESTER AVENUE • CLEVELAND, OHIO

30 ROCKEFELLER PLAZA, NEW YORK, N. Y. COMMERCE BUILDING, HOUSTON, TEXAS

AJAX FLEXIBLE COUPLINGS

PREVENT COSTLY SHUTDOWNS

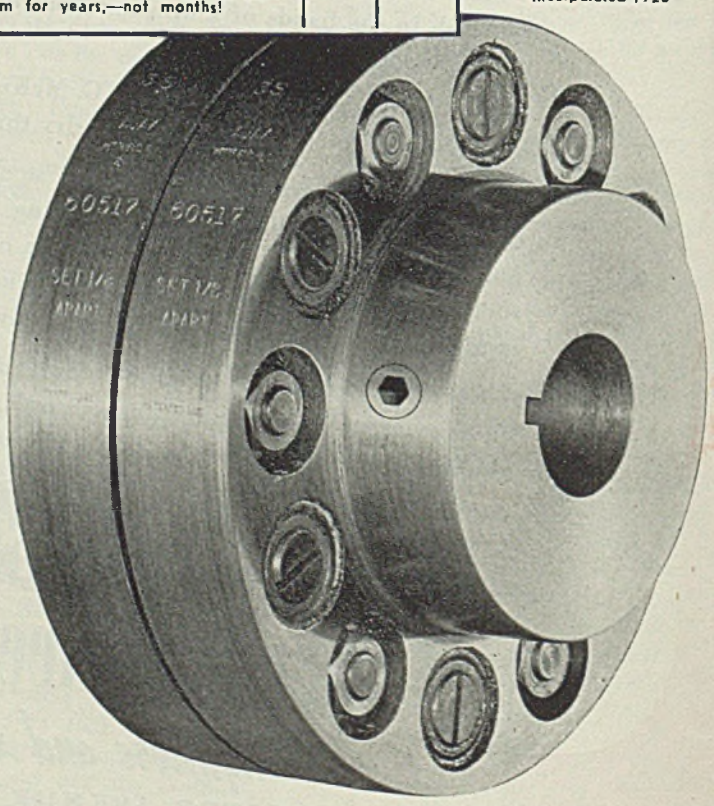
this CHECK CHART tells why...

	AJAX	
DOES IT REQUIRE LUBRICANT? Ajax graphite-bronze bushings eliminate lubrication problems regardless of centrifugal force, angle of installation, or presence of dust or abrasive laden air.	NO	
IS THERE A METAL FLEXING MEMBER SUBJECT TO FATIGUE? Constant compensation for misalignment sets up countless high speed flexing movements which result in fatigue and failure of metals. Ajax rubber bushings have inherent resiliency and recuperative powers to "take it."	NO	
ARE THE RUBBER BUSHINGS SUBJECT TO FRICTION? In a flexible coupling, the rubber bushings should perform only ONE function . . . that of compensating for misalignment. Ajax rubber bushings are cold vulcanized to flanges . . . no friction . . . no scuffing . . . no wear.	NO	
ARE THE RUBBER BUSHINGS SUBJECT TO SHEARING ACTION? In Ajax Flexible Couplings, hardened and ground steel studs in bronze bearings transmit all torque from driving to driven flange. Rubber bushings are not subject to shearing action between flanges.	NO	

	AJAX	
IS FREE END-FLOAT PROVIDED? Ajax design eliminates thrust between driving and driven machines. Electric generators or motors find their magnetic center.	YES	
DOES IT PROVIDE DI-ELECTRIC INSULATION? Ajax rubber bushed design provides di-electric insulation between motors, generators, converters and driven machines at normal working voltages.	YES	
DOES IT ELIMINATE BACKLASH? Ample bearing area . . . interlocking multiple drive studs . . . elimination of lubrication problems . . . precision machined to close tolerances . . . positive resilient drive, —all combine to eliminate backlash.	YES	
IS IT QUIET IN OPERATION? Elimination of backlash . . . reduction of wear . . . rubber cushioning,—Ajax Flexible Couplings provide "rubber heels" for direct-connected machines. When it is quiet, it is efficient!	YES	
WILL IT OPERATE IN ANY POSITION? Horizontal, vertical or installed at any angle,—it's all the same to Ajax. With no lubrication problems, Ajax Flexible Couplings perform for years,—not months!	YES	

AJAX

Incorporated 1920



"Down time" is America's greatest enemy in today's battle of production. It is as important to keep machines running as it is to get new ones.

For twenty years, production and maintenance men have been depending on Ajax Flexible Couplings to keep machines running.

The Check Chart above gives quick facts about the Ajax principle and Ajax design.

Write for latest catalog giving data on the complete line of standard and shear pin types. Sizes from ½ inch bore up.

AJAX FLEXIBLE COUPLING CO.

4 English St.

WESTFIELD, New York

REPRESENTATIVES IN ALL PRINCIPAL CITIES

CUT WASTED SETUP TIME

by changing tool holders instead of tools

■ A SIMPLE possibility for increasing output per machine and per hour seems to be largely neglected —cutting time wasted in changing tools on machines. The tool holder in most cases has been the prime responsibility of neither the machine tool builder nor the machine tool user, especially with holders for machines on which turning, facing, boring and similar operations are performed.

With modern high speed machines permitting great outputs, setup time is more important than previously since even the same amount of time lost means a greater reduction in productivity.

With more relatively unskilled men operating our machines, less of actual tool setting is being performed by the machine operator as he just stands around and waits while the tooling is being adjusted. Since there is no superfluity of good tool-setters either, the machine operator frequently has to wait until the tool-setter can get around to his machine.

By J. R. LONGWELL
Chief Engineer
Carboloy Co., Inc.

Fundamentally, the ideal approach to the problem would be to eliminate all tool adjustments at the machine. It is doubted whether such an approach is feasible, except in rare instances. However it is possible to reduce vastly the amount of time lost in changing tools, simply by transferring all major adjustments to the tool room itself.

This can be done by the simple expedient of changing tool holders instead of tools on the machines. Major adjustments can then be made in the tool room leaving only minor "touch-up" adjustments at the machine for the tool-setter.

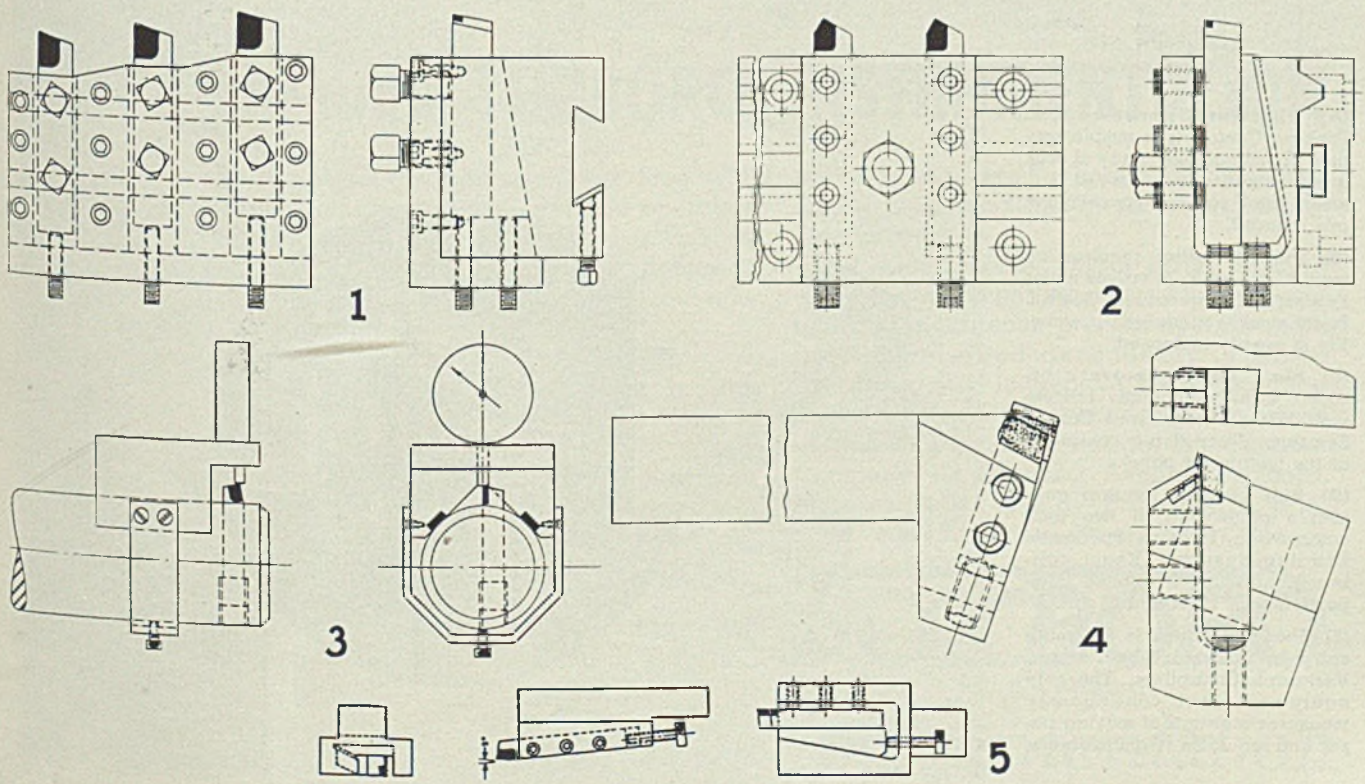
Little thought has been given this possibility, probably because the majority of machines do not have holders that are quickly interchangeable. Such holders, however, require no great ingenuity to design and are relatively inexpensive to make. Tool holder mounting plates on machines also can be modified easily to enable their use.

Fig. 1 for instance shows a suggestion for a simple type of quickly replaceable tool holder for multiple-point tooling setups. It may be attached in the conventional manner to the standard tool holder mounting plate on the machine.

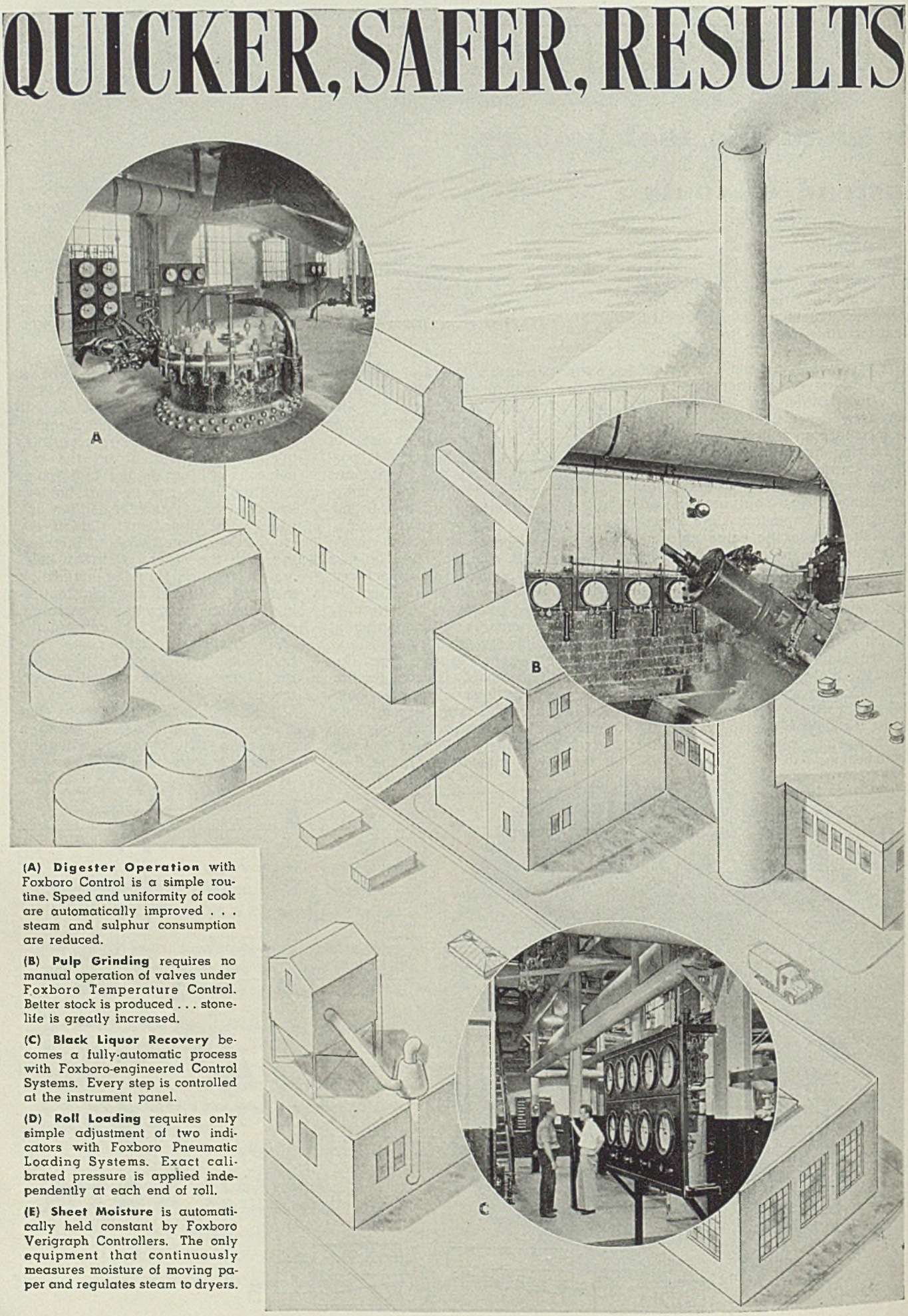
Note shims are not needed to adjust the tool to cutting height, a screw-adjusted wedge does it. The tool is raised to the correct height with this wedge and then is clamped tight with set screws. This permits in-and-out adjustment on the machine as well as in the tool room.

Where only one or two holders are used on a machine, either one can be unclamped and slid off the end of the dovetail without interfering with the other. If many holders are required, use the suggestion in Fig. 2. Although a special mounting plate on the machine is required, it is simple and can be constructed and installed at little cost. The holder is then located by means of the V-groove in the special mounting plate.

This tool holder, similar to that shown in Fig. 1, also uses a wedge to adjust for tool height. A second adjusting screw locates



QUICKER, SAFER, RESULTS



(A) Digester Operation with Foxboro Control is a simple routine. Speed and uniformity of cook are automatically improved . . . steam and sulphur consumption are reduced.

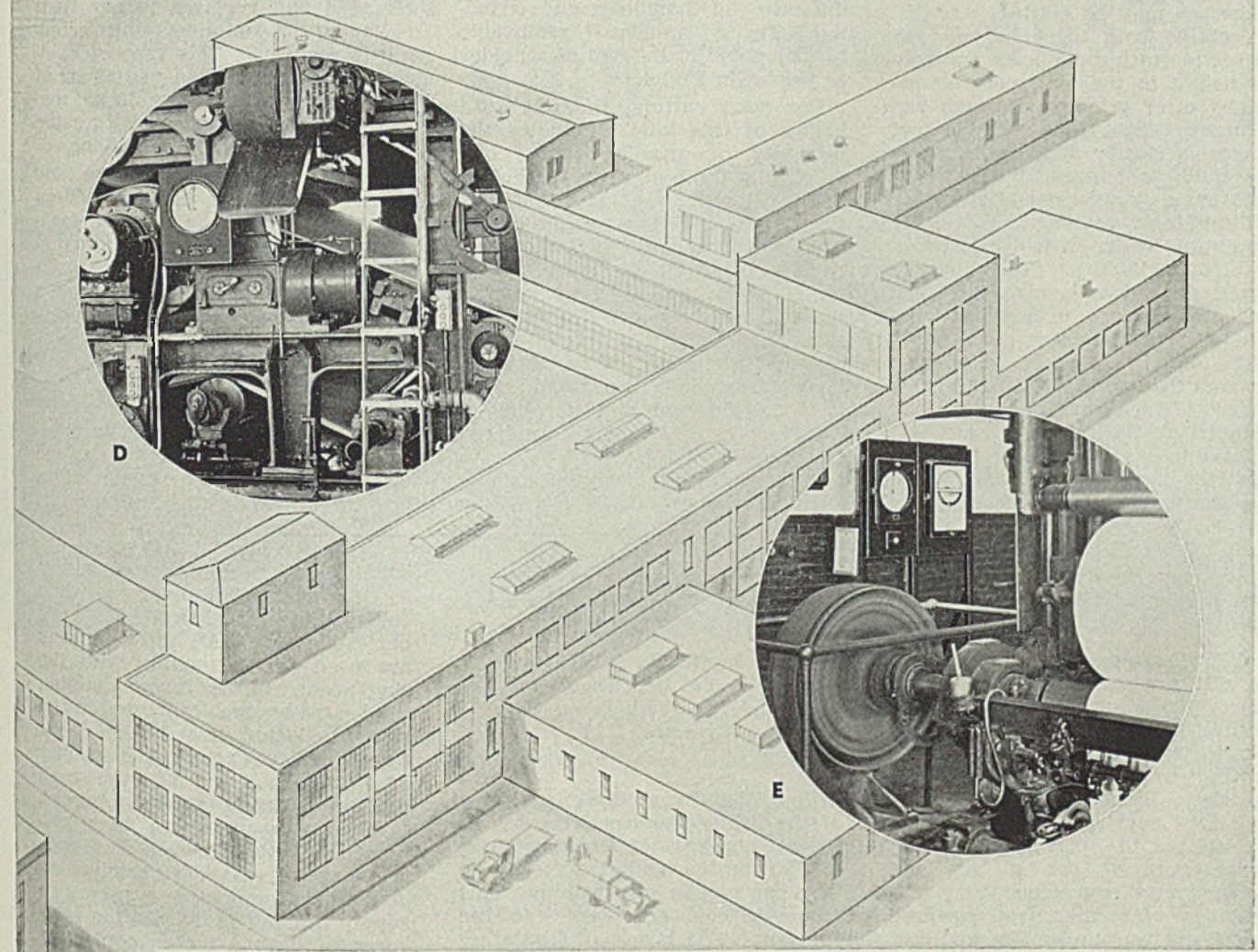
(B) Pulp Grinding requires no manual operation of valves under Foxboro Temperature Control. Better stock is produced . . . stone-life is greatly increased.

(C) Black Liquor Recovery becomes a fully-automatic process with Foxboro-engineered Control Systems. Every step is controlled at the instrument panel.

(D) Roll Loading requires only simple adjustment of two indicators with Foxboro Pneumatic Loading Systems. Exact calibrated pressure is applied independently at each end of roll.

(E) Sheet Moisture is automatically held constant by Foxboro Verigraph Controllers. The only equipment that continuously measures moisture of moving paper and regulates steam to dryers.

in Training New Workers...



through FOXBORO INSTRUMENTATION

You're not the only one these days, with orders piling up, with seasoned operators unobtainable, and some of your own men called to Service. In every manufacturing field, the big question is, "How to train new employees *fast*?"

More and more progressive plants are finding Foxboro Instrumentation a "life saver". With these precision automatic measurement and control systems, a few seasoned men can soon teach new employees to "take over" processes and get uniformly good results, *immediately!* Every step is automatically recorded, too, for guidance and check-up.

As a typical example, the illustration shows a few of many points in pulp and paper mills, where Foxboro Instrumentation makes production *faster, surer, practically "fool-proof"!*

Put your process control up to Foxboro and get instrumentation developed specifically to make each process operate more productively and dependably. Foxboro Instrumentation is *creative* instrumentation based on practical knowledge of processes as well as instrument design. The Foxboro Company, 118 Neponset Avenue, Foxboro, Massachusetts, U. S. A. Branches in principal cities of United States and Canada.

FOXBORO

REG. U. S. PAT. OFF.

Creative Instrumentation

the tool for in-and-out position. The tool holder is clamped through the center, resulting in a necessary wider spacing of tools than may be desired. In such a case, the use of two holders side by side will permit locating tools just as close together as may be needed.

Tools in both these holders can be set to cutting diameter and center height in the tool room, immediately after grinding, through use of simple gages for setting a tool to correct cutting diameter in a boring quill as suggested in Fig. 3. This gage consists essentially of a dial indicator mounted on a light aluminum holder in which is incorporated a V-block. To eliminate errors from wear, small hardened steel inserts are provided at the contact points for the quill.

The dial indicator is set to zero through the use of a simple "master gage." The light gage is then clamped on the boring bar or drill and the tool is set to correct cutting diameter by means of the adjusting screw in the boring bar.

Turning tools for very large work offer the possibility of saving a tremendous amount of time and labor, not only in setup time but also in tool handling and tool grinding. Such tools frequently weigh 60 or 80 pounds, involving considerable difficulty in handling and grinding. Try a "standard" removable tool mounted in the end of a holder as shown in Fig. 4.

For steel cutting, the use of a holder of this kind eliminates the necessity of grinding in a chip-breaker in the tool, since the holder itself will act as a chip-breaker. For this purpose, the front of the holder carries a wear-resisting cemented carbide insert at the point where the chip hits the holder. Note that the tool has been given a negative rake at the tip to direct the chip at the "chip breaker" and prevent its entering into the small space between the tool and the holder. The tool can be quickly replaced and easily adjusted. The chip breaker is also quickly adjustable since its design can be altered by changing either the rake on the tool or the distance of the holder from the tip of the tool.

Still another type of holder, Fig. 5, is designed for use on turret lathes for mounting single tools. The holder complete with tool is removed and replaced rather than replacing the tool alone when grinding is required. This type of holder makes possible the use of small bits—for light cuts—on large machines, and thus provides greater accuracy under such conditions.

These few suggestions show how this whole subject of tool holders can be approached in a simple fashion to eliminate time loss in changing tools. Such holders may make a change a matter of seconds.

Incidentally such holders for carbide tools should use dog point screws or screws with the end ground flat and square with the threads. Also, tool holders should be designed or installed with a minimum of tool overhang to reduce vibration—a possible cause of a breaking down of the cutting edge.

LOW-TEMPERATURE MELTING

By NELLIS SMITH
Industrial Heat Engineer
Central New York Power Corp.
Syracuse, N. Y.

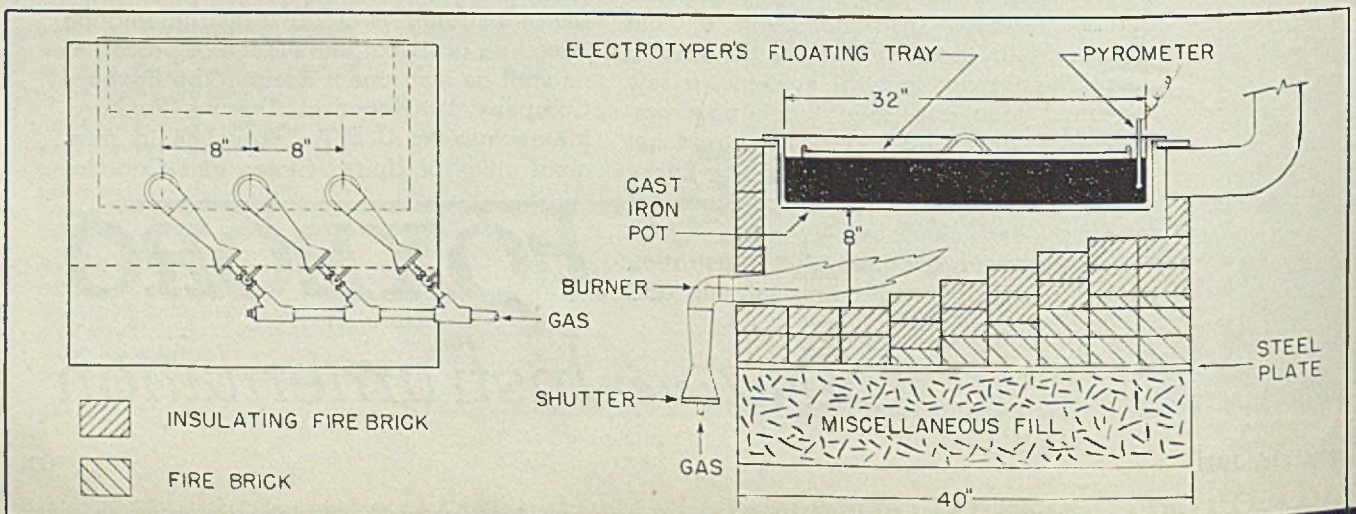
■ QUITE often equipment for melting alloys with low melting points, 600 to 700 degrees Fahr., produces trouble from frequent pot failure; erratic, spotty or hard-to-control heating; or from dirt and odors in the shop. Recently a gas-fired design was developed which has increased pot life, permitted uniform temperature of pot surface and cleaner, more convenient firing. Expenditure for the new gas-fired equipment was under $25, and cost of refractory and labor for rebuilding the firing chamber likewise was less than $25.

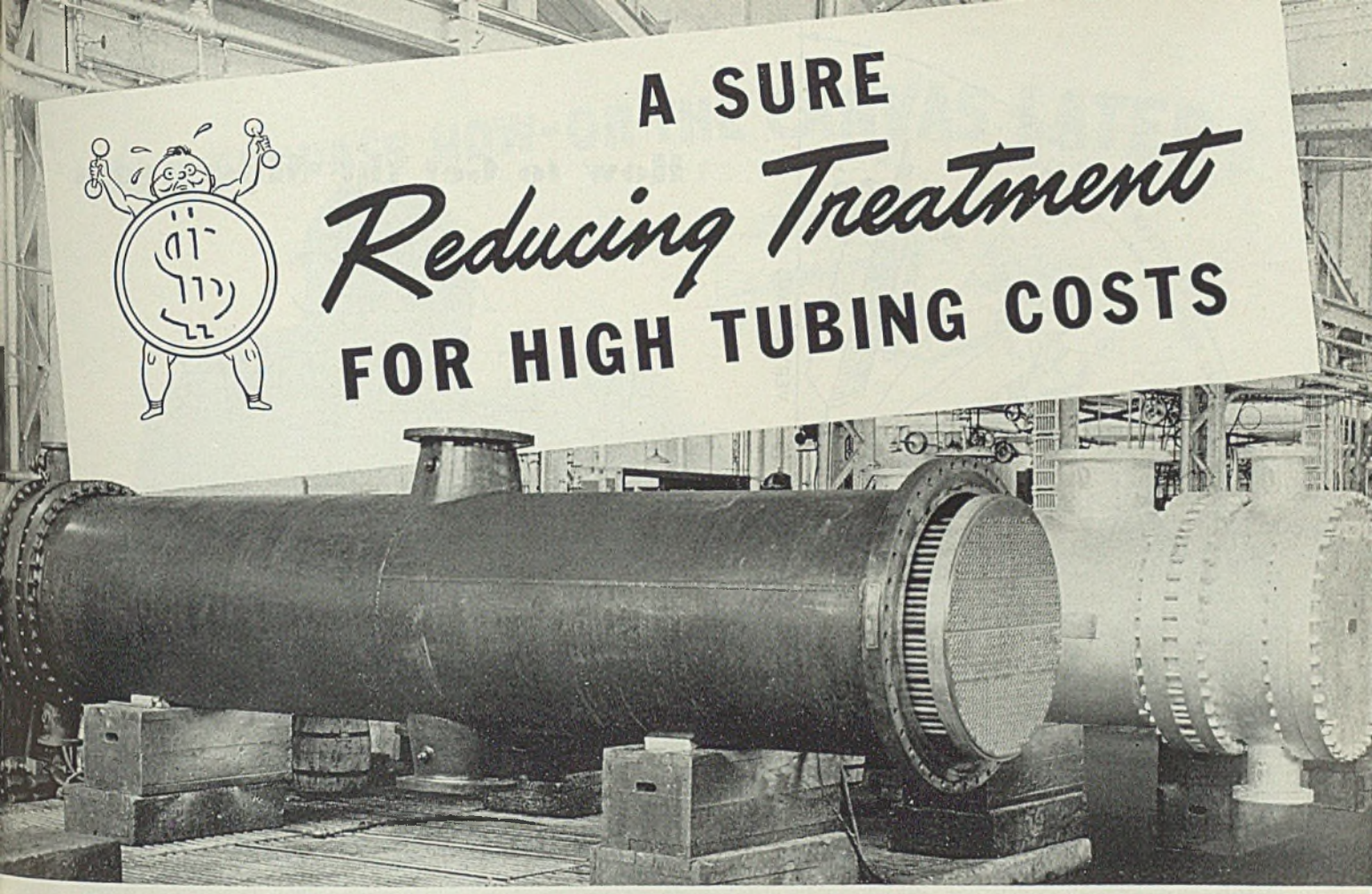
Accompanying illustration shows the new pot, setting and firing system. The "stepped" design of the setting floor achieves two specific objectives: The radiant floor of the fire box is closer to the pot as the flue outlet is approached and as the temperature of that floor decreases with distance from the point of firing. Also the cross sectional area of the firing chamber decreases as the hot gases travel from the flame toward the flue and are cooled and thus contract in total volume. This eliminate cold air leaks into the fire box. The layers of insulating firebrick provide adequate insulation for higher efficiencies—so much so in fact that present cost of operation with gas is no greater than with other fuels previously used. Also, automatic control is possible.

Three burners of the simple atmospheric type inject primary air at the shutter and secondary air directly into the flame at the burner port. All three burner heads are manifolded to a common 1¼-inch supply line. Each burner consumes 60 cubic feet per hour of gas when full on. The gas has 875 B. t. u.'s per cubic foot. All three burners are used during melting with the single center burner for maintaining the heat. An open T located in the galvanized iron flue 3 feet above the firing level acts in the manner of a draft hood and fixes the small draft required at a constant level.

Advantages of such a firing system include the fact that no blower is required for handling combustion air and no compressor is needed to supply the gas as distribution pressures of 5 to 6 inches equivalent water column are sufficient.

After several years of almost constant service melting electrotype metal at the Central City Electrotype Co., Syracuse, N. Y., the pot described shows no sign of failure whereas a similar installation using another type fuel developed two pot failures in a single year. This unit was changed as above and has now been in use over three years without pot failure or furnace maintenance.





A SURE *Reducing Treatment* FOR HIGH TUBING COSTS

When tubing replacement costs begin to grow fat—when they start to consume money which should nourish and strengthen profits—it's time to start this proved reducing treatment.

And the treatment is a simple one. You merely apply Republic ELECTRUNITE Stainless Steel Tubing to your condensers, evaporators, heat exchangers and other tubular equipment.

This tubing is made of Republic ENDURO* Stainless Steel—the corrosion-resisting, easy-to-clean, product-protecting and life-lengthening metal which is reducing bulging "bay windows" of equipment maintenance and manufacturing costs to trim, money-saving waistlines for all classes of industry.

*Reg. U. S. Pat. Off.

Now these same advantages are available in ELECTRUNITE Tubing—made by and possessing all the features of tubing fabricated by electric resistance welding.

Republic ELECTRUNITE Stainless Steel Tubing is consistently uniform in diameter, wall thickness, concentricity, ductility and fine scale-free surface—and the weld area is as strong and resistant to corrosion as the base metal from which the tube is formed.

It is made in popular analyses, in sizes from ¼ to 3-inch O.D., and in various gauges. Let us tell you more about how it can help you reduce replacement costs. Steel and Tubes Division, Republic Steel Corporation, Cleveland, Ohio.

REPUBLIC STEEL
DEFENSE FOR AMERICA

Republic ELECTRUNITE
REG. U. S. PAT. OFF.

ELECTRIC RESISTANCE WELDED STAINLESS STEEL TUBING

Also Boiler Tubes • • • Condenser and Heat Exchanger Tubes • • • Mechanical Tubing

How to Get the Most from ARC WELDING

—Section II—

..... Position of joints in fixed structures and how production and costs are affected by the joint chosen

By E. W. P. SMITH
Consulting Engineer
The Lincoln Electric Co.
Cleveland

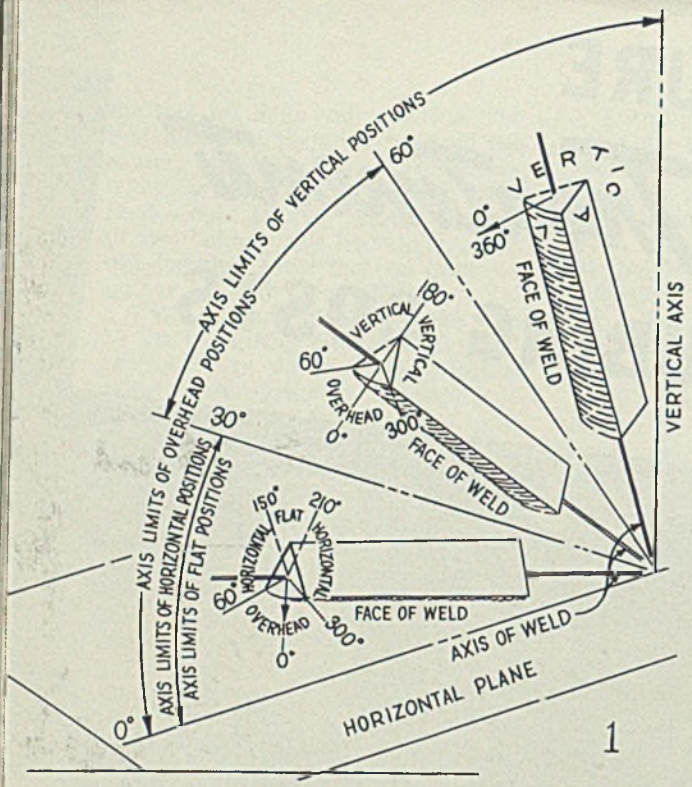


Fig. 1—Position of welds

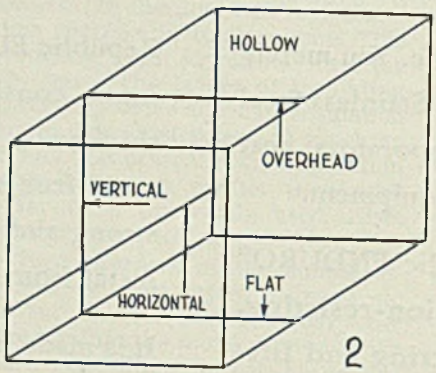
■ SPEED of production as well as welding costs is affected to a considerable extent by the position of welds in a fixed structure—one too large to revolve for making downhand welds or one fixed by its nature, such as framework of a building. Weld position may be defined as shown in the 3-dimension drawing, Fig. 1, and in Table I.

The horizontal reference plane is taken to lie always below the weld under consideration.

Inclination of axis is measured from the horizontal reference plane toward the vertical.

Angle of rotation of face is measured from a line perpendicular to the axis of the weld and lying in a vertical plane containing this axis. The reference position of rotation of the face invariably points in the direction opposite to that in which the axis angle increases. The angle of rotation of the face of the weld is measured in a clockwise direction from this reference position when looking toward point P, which is the American Welding Society's definition of position of welds.

For usual comparisons, the four major positions are: Flat, vertical, horizontal and overhead. For the purpose of this article, they are furthem explained as follows, with reference to Fig. 2, which might be taken as the structural frame for a building.



A *flat* weld is a weld made as on top of the floor of a room.

A *vertical* weld is made *vertically* as on the side wall of the room.

A *horizontal* weld is made *horizontally* as on the *vertical* side wall of a room.

An *overhead* weld is made on the under side of the ceiling of the room.

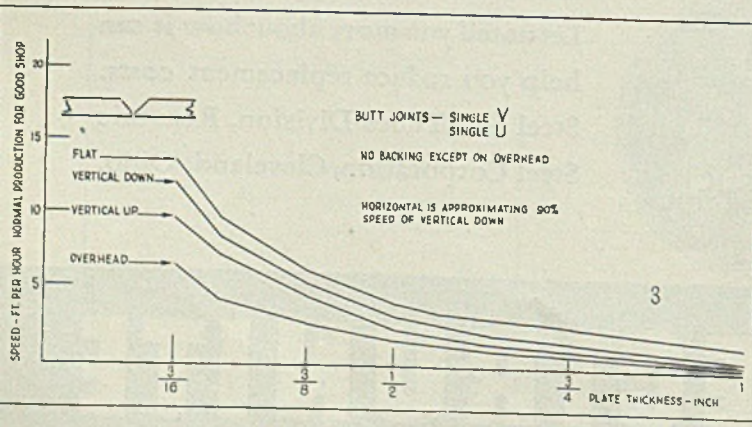
Note difference between flat and horizontal. These terms are often erroneously used interchangeably.

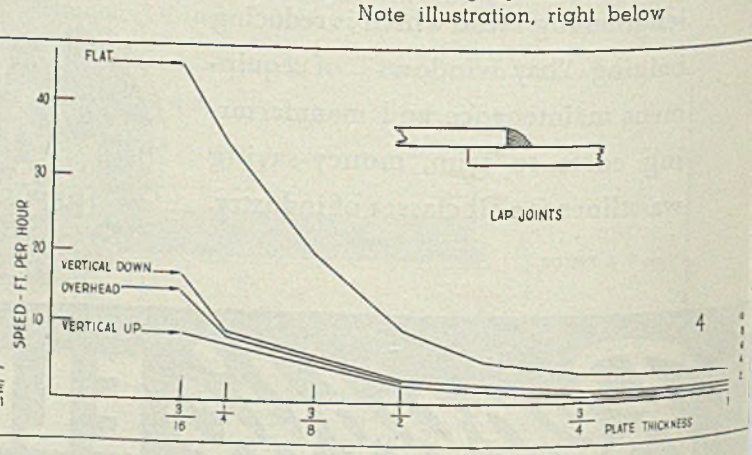
It is evident that a joint of given size and shape may be made at higher speeds in a flat position than in overhead position since it is easier

Fig. 2—Position of welds immediate left, with reference to walls, floor and ceiling of a room or fixed structure

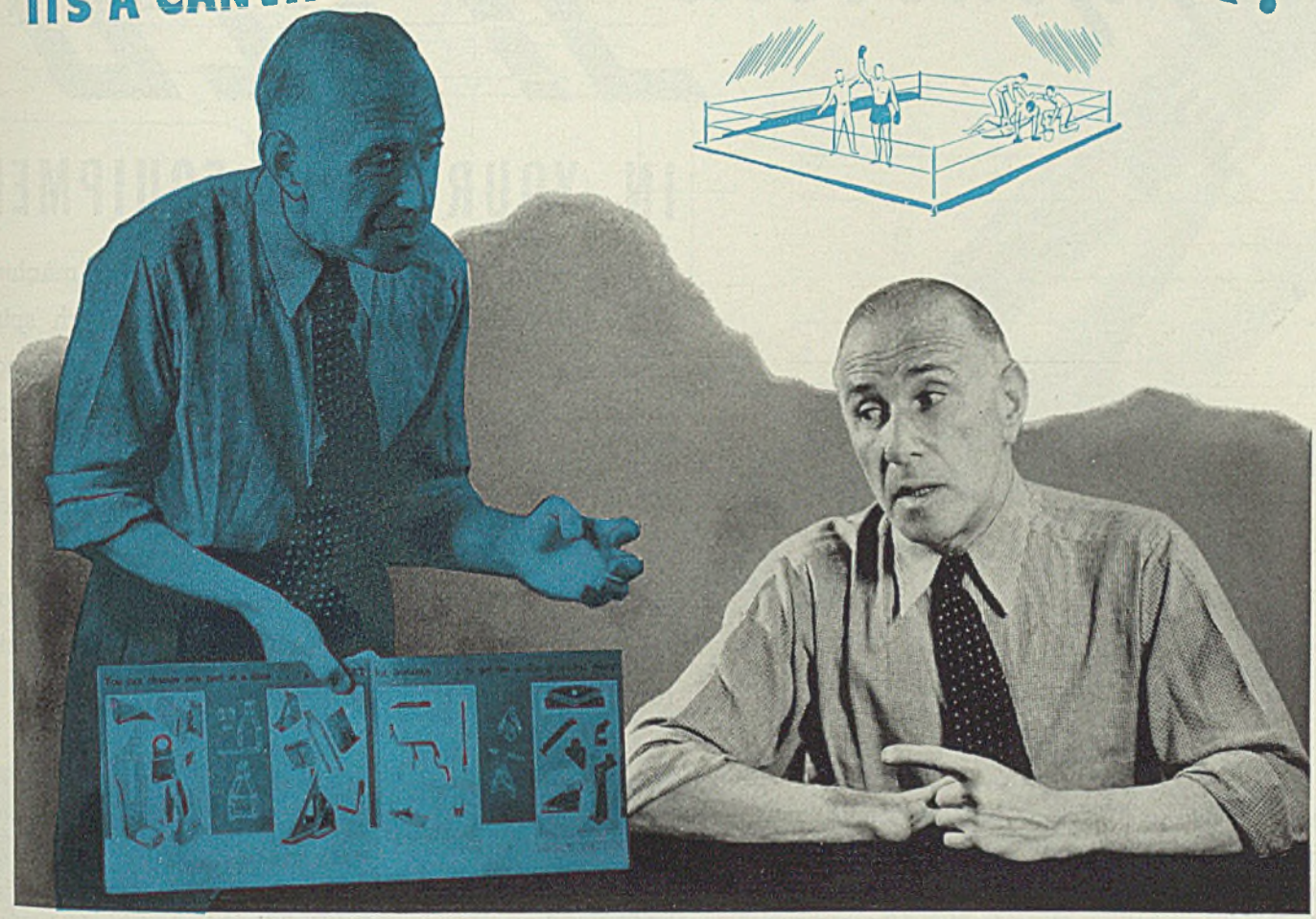
Fig. 3—Comparative welding speeds for butt joints in various positions (left below)

Fig. 4—Welding speeds for lap joint. Note illustration, right below





IT'S A CANVASS NOW-OR THE CANVAS LATER!



ALTER EGO: Literally "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

When volume drops perhaps we should think about taking up arc welding as a guard against competition.

ALTER EGO: Did you say "a guard"? It's too late to be on guard against welded competition when we're *surrounded* by it. It's too late to put up your dukes once the uppercut is on its way.

You mean we're at the point where we should use our dogs before we use our dukes?

ALTER EGO: Yes! Go into the big plants and see how they're breaking schedules and bottlenecks and turning out *better* products with welding.

Not a bad idea. Let's canvass every possibility—learn every dodge to protect us against the competitive troubles that are coming up—fast.

ALTER EGO: Now! You're getting your chin *up*... not *out*. It's a canvass now...or the canvas later.

• •

LINCOLN SUGGESTS: To canvass the possibilities of arc welding for your product: (1) Ask for a free copy of "How to Change-over to Welded Design". It gives a plan, backed up by a *guarantee* of profits. (2) Call in the Lincoln man and get his suggestions for improving your product and cutting your costs—to prepare for times ahead.

LINCOLN "SHIELD-ARC" WELDING

THE LINCOLN ELECTRIC COMPANY
Cleveland, Ohio

Authoritative Information on Design • Production • Welding Equipment

FINISHING SPRAYED METALS

By W. C. REID
Member, A.S.M.E.
Vice President
Metallizing Engineering Co. Inc.
Long Island City, N. Y.

■ THE STRUCTURE of sprayed metal deposits is granular rather than homogeneous. In spraying the minute particles of metal strike the surface at high velocity, flatten out, and build up one on the other in a manner that, under a microscope, resembles layer upon layer of fish scales or shingles. This structure, which by its relatively low coefficient of friction and oil-retaining qualities makes sprayed metal ideal for all bearing surfaces, creates a problem in finishing.

However, experimentation and research indicate that with understanding and appreciation of the characteristics of sprayed metal, both machining and grinding can be accomplished in the tool room or on the production line with less trouble than is caused by many alloy materials in solid or pre-sprayed form.

The machinist unfamiliar with sprayed metal will subconsciously grind his tool bit and set it according to his past experience on similar metal in its solid or pre-sprayed form. As a result, crumbly chips similar to those from cast iron will be obtained, regardless of the metal or the tool setting, and the surface obtained will appear full of "pin pricks" and will appear decidedly porous.

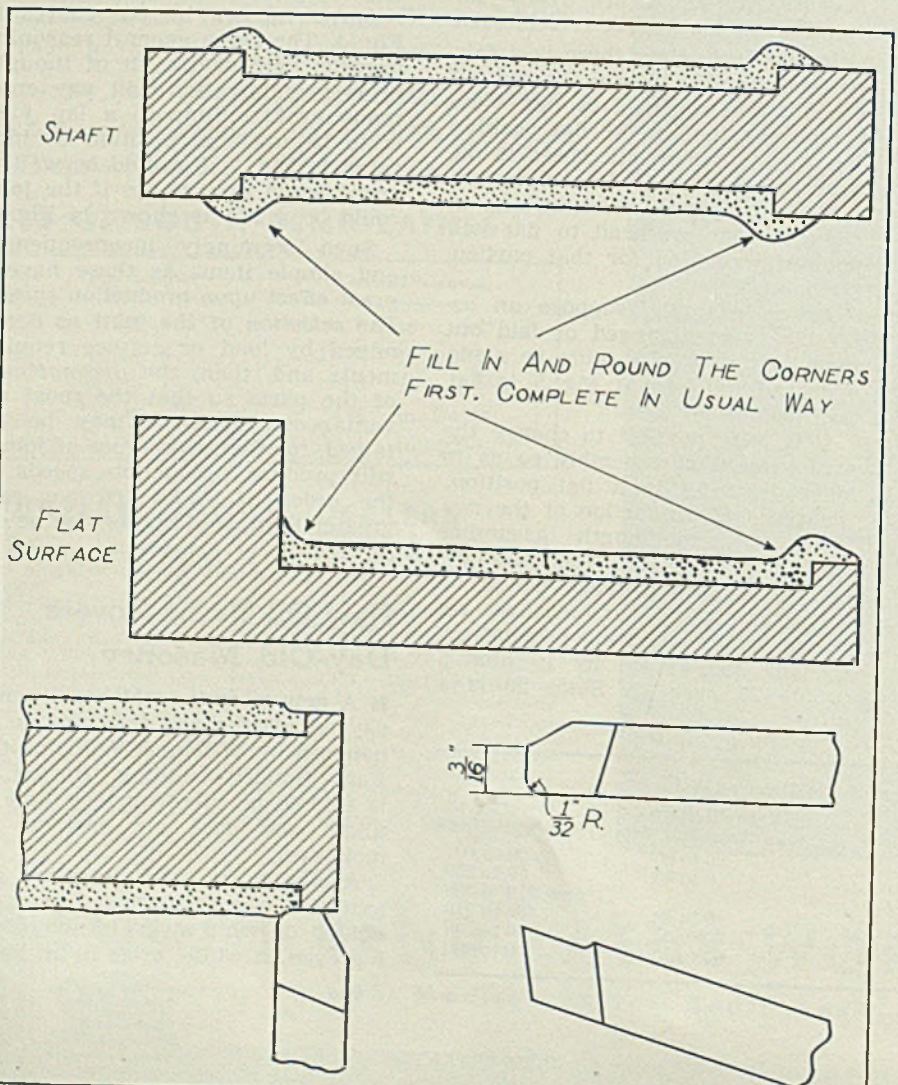
The grinding wheel operator will subconsciously use the grain and grade wheel that he is accustomed to use on the same material in pre-sprayed form, and he will find that regardless of the manner in which he dresses the wheel it will load up immediately and produce a spiralled and discolored surface. If he continues and attempts to remove stock by rubbing it off instead of cutting it off, he will end up with surface checks that cannot be removed.

Such results indicate, of course, that in the case of lathe finishing, the feeds, speeds and tool bit shape and settings need revision. In the case of grinding (wet or dry), the grain size, grade and bond, together with speeds and feeds, should also be revised.

Sufficient working data for both machining and grinding have been established to permit production finishing of all of the commercially used metals that have been developed for metal spraying. Naturally, some finish better than others, and some may be more troublesome than others, but commercial finishes within commercial tolerances can and are being obtained.

Fig. 1—The correct way to spray an undercut section or a corner. Hard sections that cause difficulty in finishing may be avoided by partially filling in the corners before spraying the remainder of the surface

Fig. 2—Blunt-nosed tool for machining the undercut sections of shaft before proceeding with the regular finishing



Many Factors Important

Before enlarging on the perfected procedures, it should be understood that metals for metalspraying have been developed over a period of years just as have rods for welding. Thus analysis (*AFTER SPRAYING*), as well as drawing and annealing specifications, play an important part in the results obtained. The procedures and recommendations herein are based on exhaustive tests with metals known by the trade names of Metcoloy's Sprabronzes, Sprabrasses, and Sprasteels. It should be emphasized that other wires, even if of same chemical analysis, may not necessarily give the same results. It should be understood also that other factors not in any way connected with machining or grinding operations can and do have a pronounced effect on the ultimate finished surface. Briefly, these are:

The analysis and drawing specifications used in the manufacture of the wire to be sprayed.

The texture or density of the

We have—

807 MACHINE TOOLS

62,255 MAN HOURS (PER WK.)

for defense sub-contracts

● Wariness on the part of prime contractors toward small sub-contractors has increased the pressure of defense production. To meet this situation, 26 industrial companies of Canton, O., have co-ordinated their facilities, which amount to 598,600 square feet of modern factory space with 807 machine tools, hundreds of skilled mechanics, responsible management, experienced engineering service and excellent transportation conditions.

Known as the CANTON DEFENSE PRODUCTION ASSOCIATION, this group has carefully studied its combined assets, knows exactly what it can produce, and has complete knowledge of its limitations. As a further guarantee of service, the Canton industrialists have retained, to act as field engineers, Designers for Industry, Inc., of Cleveland, New York and Chicago, whose engineers will assist in estimating, planning and expediting to insure maximum production. Contracts will be accepted to produce parts or sub-assemblies involving almost any type of metal working. This co-ordinated effort will assure results.

PRIME CONTRACTORS who desire to place defense sub-contracts with reliable companies under a single responsibility are urged to write for a printed detailed report covering the combined facilities of this group. Drawings and specifications may be sent and quotations will be made promptly.

Write to:

THE CANTON DEFENSE PRODUCTION ASSOCIATION

428 N. MARKET AVE. CANTON, OHIO

CHARLES E. GOREY — CO-ORDINATOR

DESIGNERS FOR INDUSTRY, INC., *Field Engineers for* C.D.P.A.
CLEVELAND, OHIO

coating. The finer the atomization, the better the machined or ground finish.

Cleanliness of air supply. Small quantities of moisture do little harm. Large quantities cause trouble *Oil in any quantity always causes trouble.*

Distance between gun and work while spraying. Five to eight inches from the end of the air cap to the surface being sprayed is normal.

Angle at which sprayed metal strikes the surface being sprayed. It should be 90 degrees whenever possible and never less than 45 degrees.

Flame setting of the gun, should be neutral, not oxidizing (too much oxygen) or carburizing (too much acetylene).

Machining or grinding troubles should call for an investigation and checkup on the foregoing before, not after, an investigation of machining or grinding procedure.

Machining: One trouble frequently encountered consists of the difficulty in machining the sometimes hard ring which may form adjacent to the ends of the undercut section when spraying carbon steels. This is caused by an accumulation of carbon in the corners, which seems to unite with molten particles of metal and actually form a metal with a substantially higher carbon content. Complete eradication of this difficulty has not been effected, but experiments indicate that it can be minimized by concentrating the spray into the corners when *STARTING TO SPRAY* so as partially to fill and round out the corners. This has the effect of causing carbon particles to ricochet away from the corner. See Fig. 1. While working on corners, frequent quick passes should be made over the remainder of the surface so that the bond will not be impaired by the collection of dust onto the prepared surface.

When machining, it is advisable to finish these hard sections first with a blunt nosed tool, Fig. 2, which should be fed into the raised section of the coating and not laterally into the "flash" or curled up edges.

The use of a mixture of one part cylinder oil, plus one part kerosene, as described in footnote in Table I is decidedly beneficial.

As before mentioned, the tool or cutter has a tendency to tear particles of metal loose rather than to cut or shear them, due to the structure of the sprayed metal. This, of course, results in a poor finish. A little experimentation in tool setting and cutter clearance may be necessary before this condition can be eliminated completely. A good general rule is to set the tool above center sufficiently to reduce the front clearance to a minimum, especially for the finish cut.

For rough machining, there are no special requirements as to the feed, depth of cut and the like, but the speeds and feeds given in Fig. 3 can apply both to rough and to finishing cuts.

The usual procedure is to machine to within 0.010 to 0.015-inch of the finished dimension on the first cut, taking the balance on the finishing cut and allowing for filing or polishing with emery cloth.

Fig. 3 illustrates various effective tool angles. The three tools for

TABLE I—Chart of Recommended Tools, Speeds and Feeds for Machining Sprayed Metals

Metal	Tool No. See Fig. 3	Speed—Surface Ft. per Min.	Feed—Inches per Revolution
Aluminum**	3	150-200	0.003 to 0.005
Sprababbitt—A & B (Government genuine: 97% tin, 3% copper)	3	150-250	0.005 to 0.007
Sprabrass Y* (Yellow brass)	2	100-125	0.003 to 0.005
Sprabronze A (Aluminum bronze)	1	100-125	0.003 to 0.005
Sprabronze C* (Commercial bronze)	3	100-125	0.003 to 0.005
Sprabronze M (Nonfuming bronze)	1	100-125	0.003 to 0.005
Sprabronze P (Phosphor bronze)	1	100-125	0.003 to 0.005
Sprabronze T (Tobin bronze)	1	100-125	0.003 to 0.005
Monel	3	100-125	0.003 to 0.005
Nickel	3	100-125	0.003 to 0.005
Copper**	3	100-125	0.003 to 0.005
Sprairon A*** (Pure iron)	3	75-100	0.003 to 0.005
Lead—A & B	3	150-250	0.005 to 0.010
Metcoloy No. 1 (18-8 stainless)	3	100-125	0.003 to 0.005
Metcoloy No. 2 (High-chromium high-carbon stainless)	Grind	.....	.....
Sprasteel 10*** (0.10% carbon)	3	75-100	0.003 to 0.005
Sprasteel 25*** (0.25% carbon)	2	50-75	0.003 to 0.005
Sprasteel 40*** (0.40% carbon)	2	50-75	0.003 to 0.005
Sprasteel 80 (0.80% carbon)	Grind	.....	.....
Sprasteel 120 (1.20% carbon)	Grind	.....	.....
Tin	3	150-250	0.005 to 0.007
Zinc	3	150-250	0.005 to 0.007

* To improve greatly the machine finish on Sprabronze C and Sprabrass Y, apply liberal coat of mixture of one part cylinder oil plus one part kerosene to the sprayed metal, with a brush, and allow to stand for 20 to 30 minutes before machining.

** The same treatment applied to copper and aluminum will give a slight improvement to machine finish.

*** The same treatment applied to Sprairon A, Sprasteel 10, Sprasteel 25, Sprasteel 40 will not improve the machine finish but will help greatly in preventing the tool from burning and permit higher machining speeds. The treatment is especially helpful in machining any hard sections that may be encountered at the ends of the sprayed section or in corners.

NOTE: Do not use this treatment* on Metcoloy No. 1, nickel, Monel, Sprabronze A, Sprabronze M, Sprabronze P and Sprabronze T since to do so will result in a poor instead of an improved machine finish.

TABLE II—Dry Grinding Recommendations

Metal	Metco Wheel No.	Work Speed Surface Ft. Per Min.	Wheel Speed Surface Ft. Per Min.**	Roughing Feed Per Revolution. Inch	Finish Feed. Inch
Sprabronze C*	44	40-45	5000 to 6000	1/32	1/16
Sprabronze M*	44	40-45	5000 to 6000	1/32	1/16
Sprabronze T*	44	30-35	5000 to 6000	1/32	1/16
Copper*	44	30-35	5000 to 6000	3/32	1/8
Monel*	46	30-35	5000 to 6000	0.006	0.015
Nickel	44	30-35	5000 to 6000	0.006	0.015
Sprairon A	42	30-35	5000 to 6000	1/32	1/16
Metcoloy No. 1	43	30-35	5000 to 6000	3/32	1/8
Metcoloy No. 2	46	110-125	5000 to 6000	0.006	0.015
Sprasteel 10	42	30-35	5000 to 6000	1/32	1/16
Sprasteel 25	42	30-35	5000 to 6000	1/32	1/16
Sprasteel 40	44	30-35	5000 to 6000	3/32	1/8
Sprasteel 80	44	30-35	5000 to 6000	3/32	1/8
Sprasteel 120	42	30-35	5000 to 6000	0.010	1/8

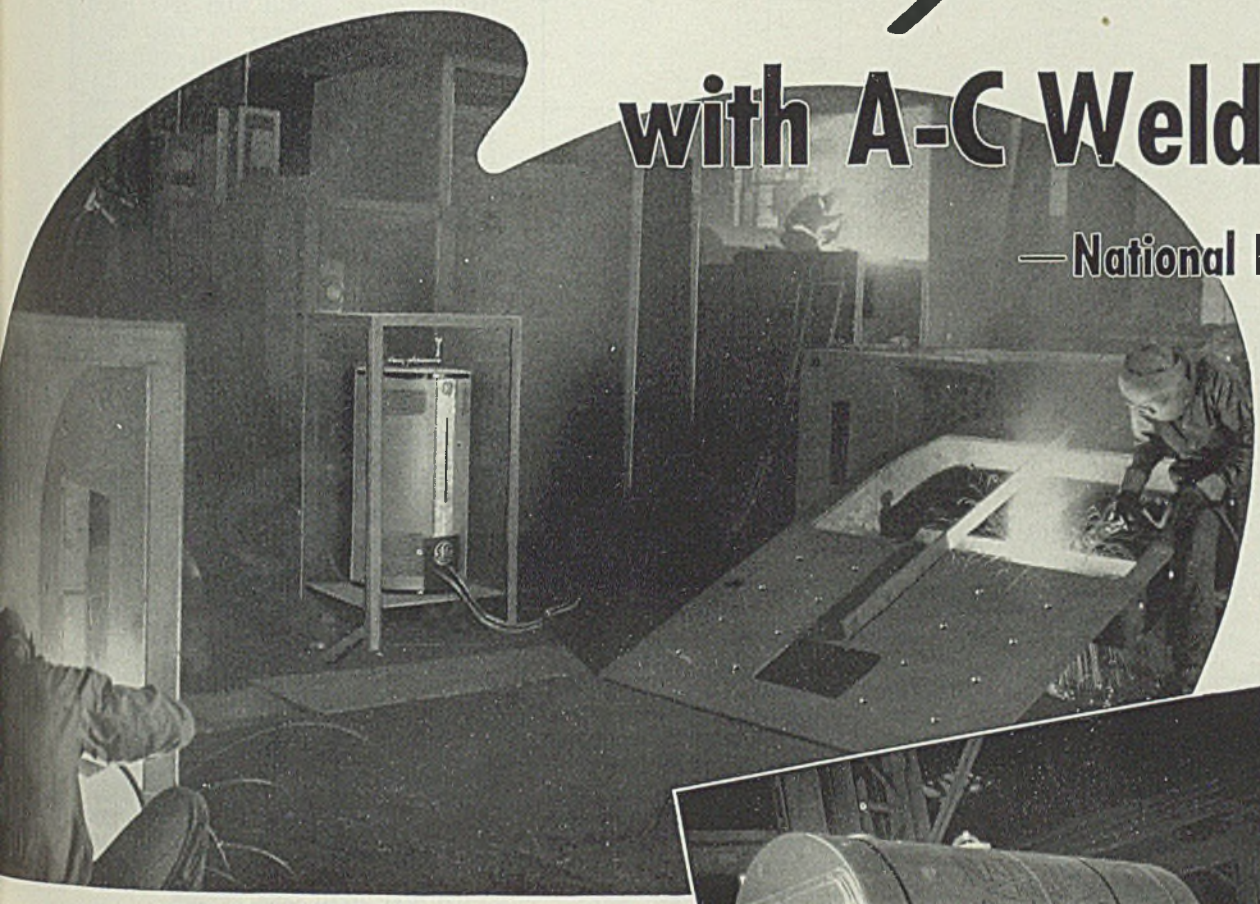
* It may be necessary to apply a light coat of machine oil between each cut to keep wheel from loading. A very light coat smeared over the surface is sufficient and effective.

** Wheel RPM for different size wheels, to give these surface speeds, are given on the nameplate of the grinder.

Note: For explanation of trade names in column one, see column one of Table I.

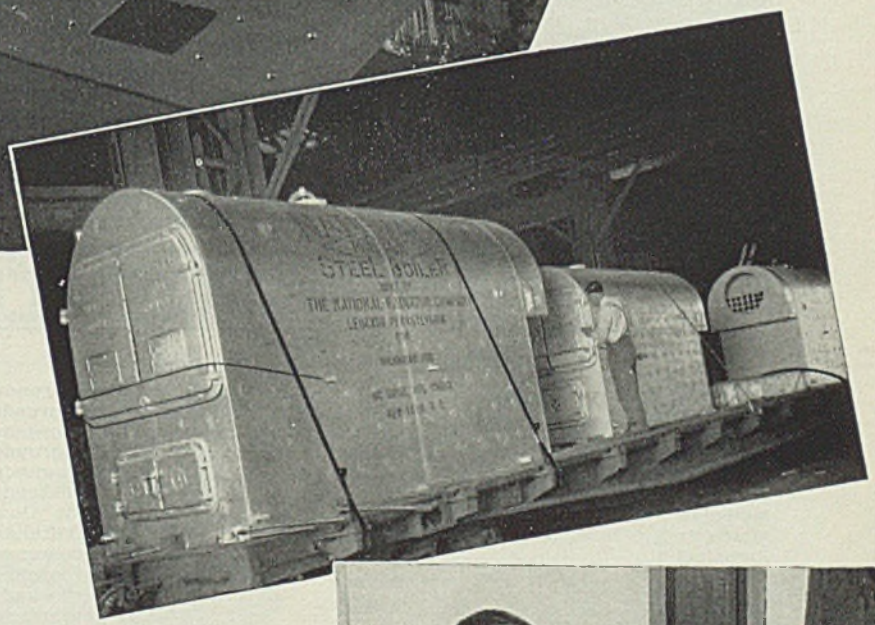
"We're Doing a Good Job *Better and Faster* with A-C Welding"

—National Radiator Co.



In the plant of the National Radiator Company, Lebanon, Pa., General Electric a-c welders improved the over-all power-factor 11 per cent.

BELOW: A-c welding and W-24 electrodes helped speed production and improve weld quality so effectively that rejects and reworks on leakproof joints in the National Radiator shops are practically unknown.



WITH production schedules up 100 to 200 per cent—with constantly increased demands being made for high-quality, high-speed welding—modern shops today are fabricating their work BETTER AND FASTER with a-c welding.

Because there's no magnetic blow, a-c operators are using higher currents and larger electrodes to get faster deposition and increased production on all types of joints. Built for extremely heavy duty, General Electric a-c welders are also cutting over-all welding costs as much as 10 per cent. Built-in power-factor correction, fan-forced ventilation, finger-tip current control—these are but a few features of G-E alternating-current welders that make welding easier, faster, and more profitable.

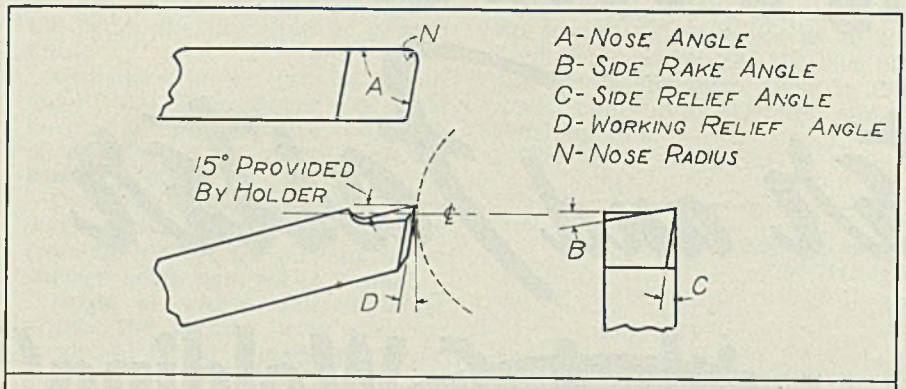
Try the G-E line of a-c welders. Sizes range from 100 to 1000 amp and larger. Your nearest G-E arc welding distributor, or G-E office, will be glad to arrange a demonstration at your convenience. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

672-39-8748

"A-c welding has shown us the way to substantial savings and better welding on our work. We're plenty satisfied with both production and savings."

John Tapparo, plant superintendent
National Radiator Co., Lebanon, Pa.



Tool #1	A-80°	B-0°	C-10°	N-.0030"	D	As Little As Possible
Tool #2	A-80°	B-10°	C-10°	N-.0030"	D	
Tool #3	A-80°	B-15°	C-10°	N-.0040"	D	

All Tools Ground For Use In Armstrong Type Holder

Fig. 3—Data for grinding tools for machining sprayed metals

which the angles are given will be found satisfactory for machining the metals listed in Table I. Note that the tool bits illustrated are ground for use in the standard Armstrong tool holder which provides 15-degree back rake without grinding this back rake angle on the tool bit itself.

Dry Grinding: Although no particular problems are presented in *wet grinding*, other than proper wheel selection, considerable difficulty has been experienced in dry grinding with the tool-post type of grinder.

This difficulty was a matter of selecting or obtaining the proper type of grinder and of developing the right wheel to use at the proper speeds of wheel and work. After considerable experimental work, a highly satisfactory grinder was developed in the plant of one of the leading manufacturers of lathe grinders, and a series of wheels for all of the commercially used sprayed metals was selected after thorough testing. Table II shows the results of the experimental and test program on wheels, traverse, work and wheel speeds. It should be noted that the recommendations are for the specific metals listed and may not necessarily apply to others.

Wet Grinding is preferable to dry grinding and should be used whenever suitable equipment is available. It presents no difficulties provided the right wheels are used, at recommended speeds and feeds. In the past, considerable difficulty has been experienced due to the lack of accurate information as to grinding procedure and wheels, and also because most machinists and grinder hands are inclined to disregard the all-important fact that sprayed metal calls for different wheels and different procedures.

All sprayed metals tend to "load" a wheel. Consequently, for grinding sprayed metal a wheel of relatively coarse grain and low bond strength is necessary in order that it may "break down" with comparative ease. A wheel suitable for finish grinding solid stainless steel will produce chatter marks and spirals on sprayed stainless unless it is dressed with great frequency. The same characteristic applies to all other sprayed metals.

In co-operation with the Carborundum Co., Niagara Falls, N. Y., exhaustive tests were run on sprayed metals in an effort to ascertain definitely the grinding characteristics, lubricants or coolants, speeds, feeds and traverse, and finally, the most suitable wheel. The results of these tests are shown in Table III. If these are followed, good commercial finishes and tolerances will be obtained at production speeds.

Finishing Flat Surfaces: Flat surfaces that have been metal sprayed should be finished on a shaper or planer instead of on a milling machine whenever possible. Using the same tool grinding and setting technique as described for lathe finishing, good results can be obtained on shapers and planers. The only precautions necessary are:

To remove by filing or grinding any raised sections or overlapping "flash."

To take light cuts.

A milling cutter, rotating in a direction opposite to the traverse or work feed, is cutting in an upward direction. This may, in the case of keyways and splines, result in lifting or breaking the sprayed metal along the edges. It is best, if a keyway has to be re-milled, to clean up the edges by filing or grinding before milling. Plain flat surfaces can be milled, provided raised or uneven areas, overlapping flashes, and the like (under which the cutter may catch) are removed first, and that very light cuts are taken.

Flat surfaces that have been sprayed with a hard metal can be readily surface ground, using the wheels recommended for dry or wet cylindrical grinding.

Finishing Internal Surfaces: Generally speaking, the smallest inside diameter that can be metal sprayed is 3½ inches. This means that rough and finish boring is a simple matter, based on the same technique as outlined for external machining.

The hard ring described previously will be very much in evidence if

(*Please turn to Page* 104)

TABLE III—Wet Grinding Recommendations

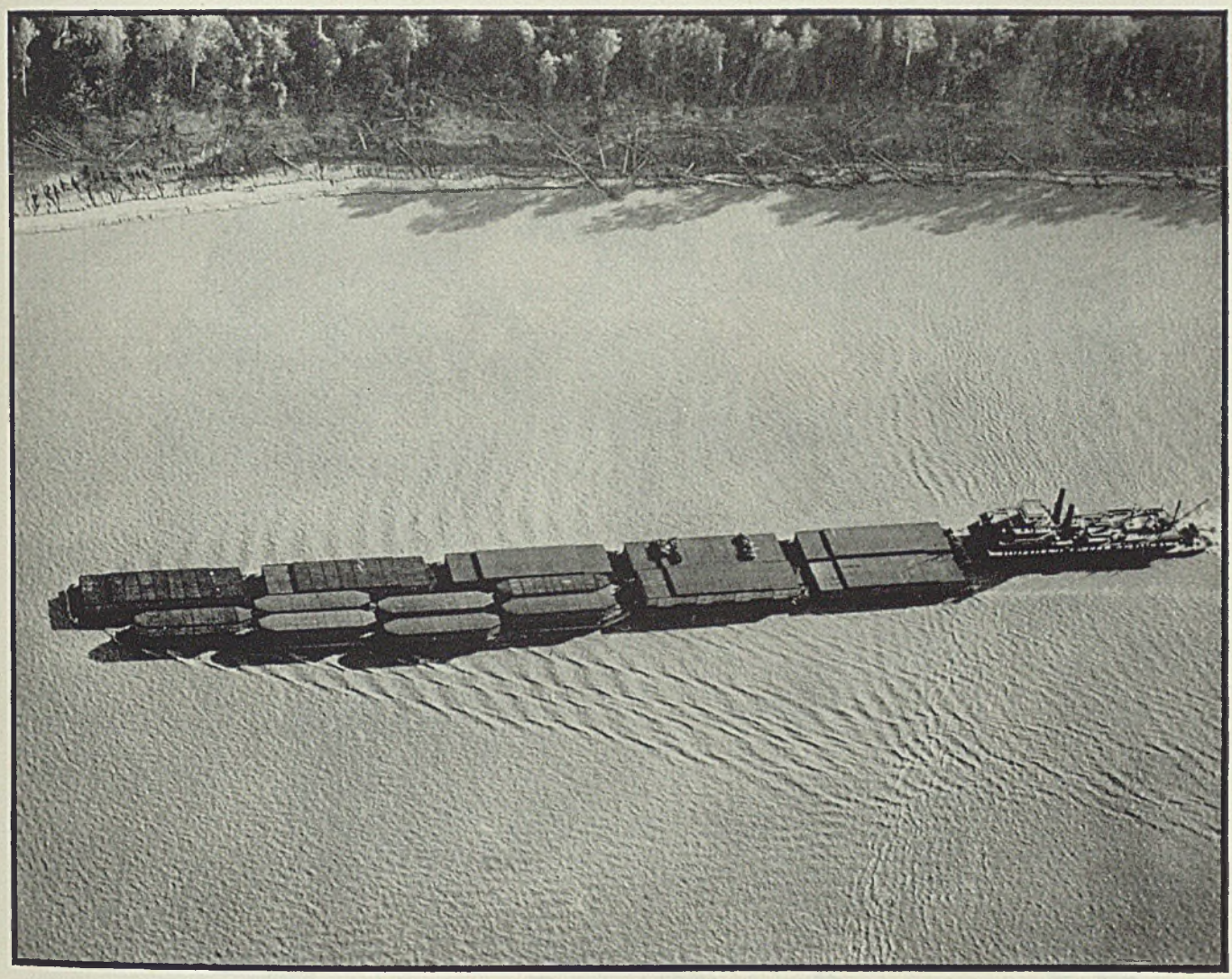
Sprabronze C*	G120—P-W Carborundum Vitrified
Sprabronze M**	36—N-E Carborundum Vitrified
Sprabronze T**	36—N-E Carborundum Vitrified
Copper**	36—N-E Carborundum Vitrified
Monel	G60—P-W Carborundum Vitrified
Nickel	G60—P-W Carborundum Vitrified
Metcoloy No. 1	401—P-30 Aloxite Vitrified
Metcoloy No. 2	36—N-E Carborundum Vitrified
Sprasteel 10	36—N-E Carborundum Vitrified
Sprasteel 25	36—N-E Carborundum Vitrified
Sprasteel 40	36—N-E Carborundum Vitrified
Sprasteel 80	36—N-E Carborundum Vitrified
Sprasteel 120	36—N-E Carborundum Vitrified
Notes:	
Wheel Speed	Approximately 6100 S.F.M. Peripheral Speed
Work Speed	Approximately 80 S.F.M. Peripheral Speed
Traverse Speed, Roughing	Approximately 3 feet per minute
Finishing	Approximately 2/3-foot per minute
Infeed	Roughing—(See ***)
Finishing	No infeed (dwelled cut)
Coolant	Soluble Oil—50 to 1 percentage

* Slow traverse (approximately ¼-foot per minute) and high work speed (approximately 140 S.F.M. peripheral speed) are absolutely essential in grinding Sprabronze C. High traverse rates cause the wheel to load badly and give a poor finish.

**Wheel G60—P-W is also recommended for Sprabronze M, Sprabronze T and Copper. It will give almost the same grinding action with an improved type finish.

*** Maximum infeeds and production rates were not determined due to the many types and sizes of work and equipment which will be encountered in the field. It is suggested that final traverse speeds and infeeds be determined under the prevailing local conditions and requirements.

For explanation of trade names in column one, see column one of Table I.

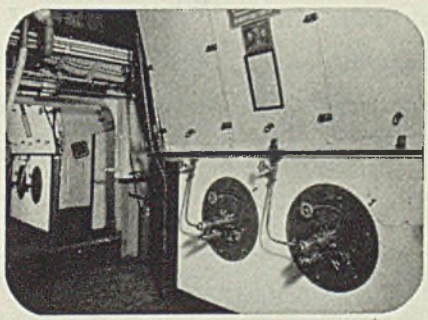


Life on the Mississippi-1941!

THINGS have changed a lot since Mark Twain was a steamboat pilot on the Mississippi River. There's more hustle and bustle now than ever, freight movements are mounting steadily, and to keep up with the rapidly increasing pace, Old Man River has gone modern.

Take the boats of the Mississippi Valley Barge Line Co. that run between Cincinnati and New Orleans. Their 1000-hp. oil fired boilers used to be lined with fireclay brick. Today, those boilers are putting out 1350 hp. each and the fireclay brick has been replaced with a modern lining of "Carbofrax" brick. And the reason is interesting to anyone who uses refractories:

Previously, with fireclay brick, it was often necessary to make repairs at some other point than Cincinnati, where the repair shops are located. But now with "Carbofrax" brick there are no unexpected shutdowns, no sudden failures and all repair work can be scheduled in advance. What's more, the new "Carbofrax" lining lasts two to three times longer!



This story about "Carbofrax" brick has a moral for you if you use refractories of *any* kind. It typifies the longer life, improved results and lower costs that all Carborundum Brand Refractory Products are bringing about, not only in the power field, but in the fields of ceramics, porcelain enameling, and heat treating, and in the chemical, metallurgical and process industries. Carborundum is especially proud of this service to industry now when America needs our utmost productive effort.

REFRACTORY CARBORUNDUM PRODUCTS

THE CARBORUNDUM COMPANY

REG. U. S. PAT. OFF.

Refractory Division, **PERTH AMBOY, N. J.**

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

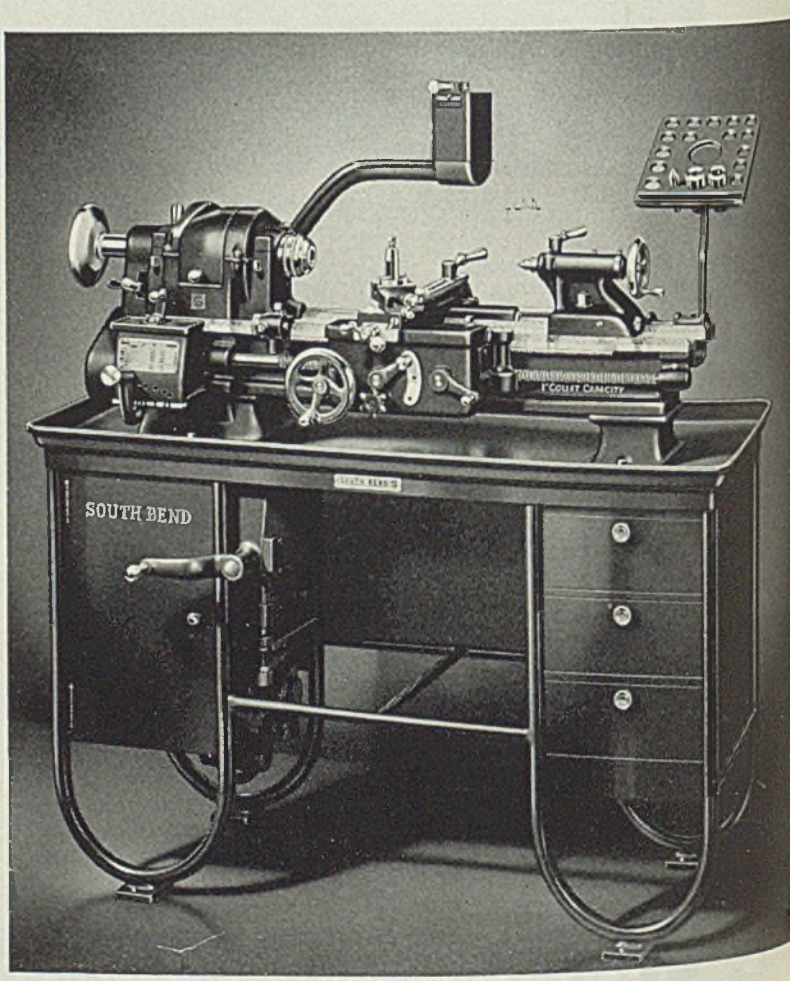
(Carborundum and Carbofrax are registered trade-marks of and indicate manufacture by The Carborundum Company)

Today You Need SPEED

IN YOUR SHOP EQUIPMENT

NOW, more than ever, you need shop machinery that will produce more in less time. High spindle speeds are essential for the efficient use of modern sintered carbide and diamond cutting tools. Smooth, vibration-free operation at high speed is achieved in South Bend Lathes by using a direct belt drive to the spindle, a precision balanced spindle assembly and spindle bearing surfaces that are hardened, ground and superfinished to a smoothness of five micro-inches (.000005").

At right—10" Swing, 1" Collet Capacity South Bend Tool Room Precision Bench Lathe. This lathe has nine spindle speeds ranging from 50 to 1357 R.P.M., 1⅜" hole through spindle, 1" maximum collet capacity, 48 power longitudinal carriage feeds, 48 power cross feeds, and cuts 48 different pitches of screw threads.



SIZES OF SOUTH BEND LATHES

Swing	Bed Lengths	Center Distances
9"	3' to 4½'	16" to 34"
10"	3' to 4½'	15¾" to 33¾"
13"	4' to 7'	16" to 52"
14½"	5' to 10'	24½" to 84½"
16"	6' to 12'	33½" to 105½"

PARTIAL LIST OF DEALERS

See a South Bend Lathe before you buy. Write today for free catalog and name of nearest dealer.

Baltimore, Md.—Carey Mach. & Supply
Boston, Mass.—South Bend Lathe Works*
Bridgeport, Conn.—A. C. Bisgood
Buffalo, N.Y.—R. C. Neal Company Inc.
Chicago, Ill.—H. J. Volz Mach. Co.
Cleveland, Ohio—Reynolds Mach. Co.
Dayton Ohio—C. H. Gosiger Mach. Co.
Detroit, Mich.—Lee Machinery Company
Los Angeles, Cal.—Eccles & Davies Mach.
Milwaukee, Wis.—W. A. Voell Mach. Co.
Newark, N. J.—J. R. Edwards Mach. Co.
New York, N.Y.—A. C. Colby Mach. Co.
Philadelphia, Pa.—W. B. Rapp, Mach.
Pittsburgh, Pa.—Tranter Mfg. Company
Portland, Ore.—Portland Machinery Co.
Providence, R.I.—Geo. T. Reynolds & Son
Rochester, N.Y.—Ogden R. Adams
St. Paul, Minn.—Robinson, Cary & Sands
San Francisco, Cal.—Moore Mach. Co.
Seattle, Wash.—Star Machinery Company
Syracuse, N.Y.—H. A. Smith, Machinery
York, Pa.—York Machinery & Supply Co.

*Boston Sales Office: 67 B'dway, Kendall Sq., Cambridge, Mass., Tel. Trowbridge 6369

TRADE MARK SOUTH BEND TWINS ENGINE LATHES

WE FAVOR ADEQUATE PREPAREDNESS FOR NATIONAL DEFENSE

SOUTH BEND LATHE WORKS

Lathe Builders Since 1906

890 E. Madison Street, South Bend, Indiana, U. S. A.

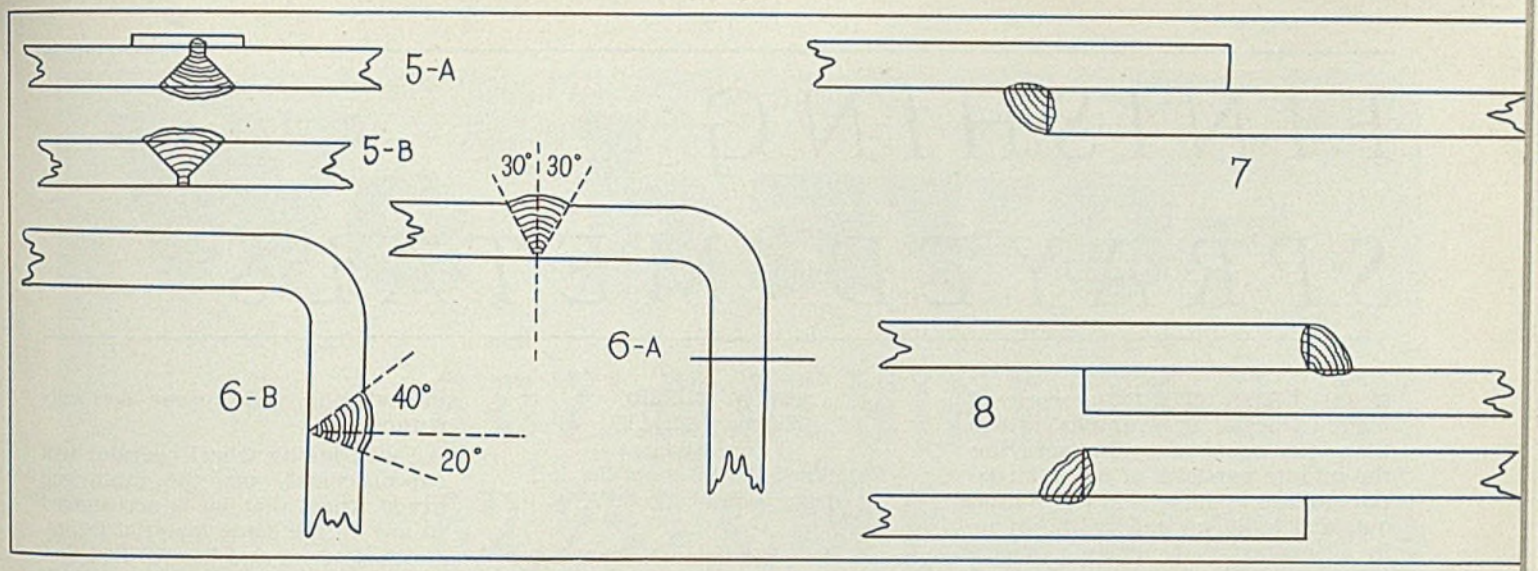


Fig. 5—Butt joint in overhead 5A and flat position 5B

Fig. 6—Butt joint horizontal 6B may be changed to flat position 6A in design

Fig. 7—Lap joint overhead. Often it may be possible to bring such a joint into a flat position by design shown in Fig. 8

Fig 8—Lap joint in two flat positions

to deposit molten metal downward than upward. It is also obvious that in an overhead weld there must (because of position) be a limit to size of electrode which may be used. Too large an electrode will not deposit effectively nor efficiently in overhead work.

Having considered the different positions of joints, let us now give our attention to how the joints may be arranged for maximum speed and economy of welding. This is with reference to work which cannot be moved, turned, or positioned for welding, such as large structures, heavy fabricated parts and the like.

A study of curves showing welding speeds for given types of joints for different positions will reveal some rather startling facts in reference to production speeds.

Two types of joints are studied, the butt joint, Fig. 3, and the lap joint, Fig. 4. A fairly detailed study of these two types will indicate the method. And this same method may be applied to other types or variations of these types as, for example, a butt joint with backing-up strip, which is not to be confused with a butt strap. The data for the curves are taken from actual shop practice.

The butt joints studies are single V-joint or single U-joint without backing for flat, vertical or horizontal. For overhead, backing is used because the nature of the joint position precludes a good joint without backing.

The conditions under which these joints are made are normal, good shop conditions with trained personnel, adequate equipment and electrodes of proper size and quality—modern large capacity generators and shielded arc electrodes.

Only the speed of weld production is considered in this article. It is assumed joints are ready for welding in the positions indicated.

In the butt joints there is a fairly even and uniform spread of speed from overhead to flat. Note that production in the flat position is more than twice the speed in the overhead position. It is evident that a study of joints which results in change from overhead to flat will double production for that particular joint.

As an example, suppose an assembly is so arranged or laid out that joint A, Fig. 5, must be made overhead and joint B, Fig. 5, in flat position.

If it were possible to change the arrangement or assembly so as to make joint 5A in a flat position, the speed of production of the two joints for same length (assuming both are same thickness and arc welded in flat position), would be increased 33 1/3 per cent as revealed by the following calculation: 10 plus 10, divided by 10 plus 5 equals 20 over 15. Since 20 is a third more than 15, production has been upped 33 1/3 per cent for the two joints.

Or suppose by giving thought to design that the joint may be placed as in A, Fig. 6, instead of B, Fig. 6. By referring to the curves, it will be seen that the speed of production is increased to such a degree as to make it profitable to consider thoughtfully this change in joint location.

A lap joint comparison is even more startling as to the possibilities of increased speed and economy of production. Beads are made in the flat position and at a very much higher speed than in any other position as shown by the curves in Fig. 4. The same general reasoning prevails here, and a bit of thought prior to fabrication will pay enormous profits. Suppose a lap joint is to be made in position as indicated in Fig. 7. It would be well to spend some time to see if the joint could be made as shown in Fig. 8.

Such seemingly inconsequential and simple items as these have a great effect upon production speeds. The *selection* of the joint as determined by load or service requirements and, then, the *arrangement* of the parts so that the most advantageous positions may be obtained, for the given types of joints, will produce production speeds of the order of 30 to 100 per cent greater than would otherwise be obtained.

TABLE I—Tabulation of Positions of Welds

Position	Inclination of Axis, Degrees	Rotation of Face, Degrees
Overhead	0 to 60	300 to 60
Horizontal	0 to 30	60 to 150 and 210 to 300
Flat	0 to 30	150 to 210
Vertical	30 to 60	60 to 300
	60 to 90	0 to 360

New Oil Paint Covers Day-Old Masonry

■ A new oil paint which will cover day-old plaster and masonry is announced by Wilbur & Williams Co., Park Square building, Boston. It is said to be unaffected by lime or alkali and does not seal in the moisture.

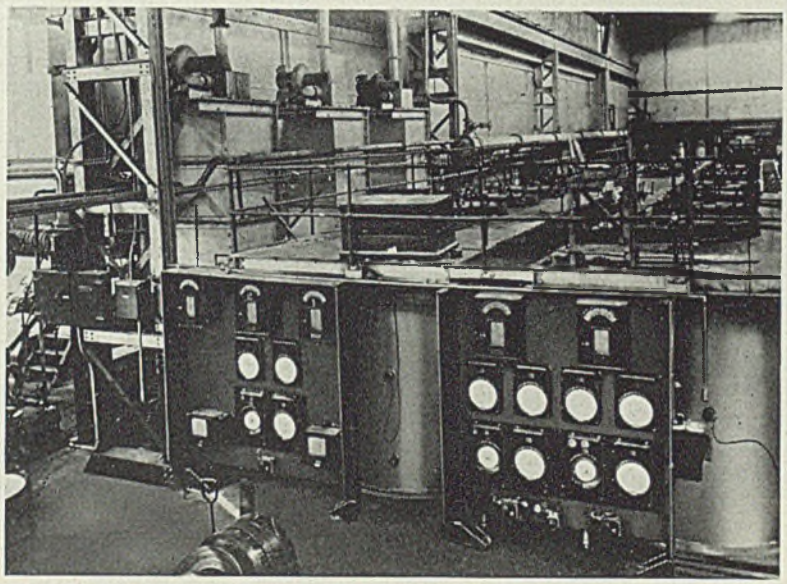
Available for both interiors and exteriors, the paint covers over calcimine or whitewash, is nonyellowing even in white, dries in an hour.

How an English Plant Obtained an

81 PER CENT INCREASE

In Annealing Furnace Output

■ MORE speed, higher quality, with utmost efficiency in utilization of fuel and materials — today more than ever these are of vital and immediate concern to British steel fabricators. How Guest, Keen & Nettlefolds of Cardiff, South Wales, elevated the output of two-cell wire and strip steel annealing furnaces by more than 80 per cent is, then, a feat of note. Too, it has important possibilities for American annealers in these days of unprecedented demand.



Three of the two-cell Grunewald wire and strip steel annealing furnaces at the Guest, Keen & Nettlefolds' plant at Cardiff, South Wales, showing instrument panels in foreground. Each individual panel carries two potentiometer recorder-controllers, one program recorder-controller (twin instrument), one cycle controller and at top a recording flowmeter

The twin furnaces are of the Morgan Construction Co. Grunewald type with two sealed pot compartments, one used for preheating the charge and the other cell for completing the annealing of the wire or steel strip. Cold blast-furnace gas fired with recuperator heated air is used to bring the pots to heat, the burners being placed in a muffle around the annealing cell, with the products of combustion led around the preheating cell compartment and thence to the stack.

The control of furnace heats was previously consummated by means of a conventional on-and-off potentiometer regulator, with the inevitable result that the length of the gas flames was constantly fluctuating—productive of variations and inefficiencies in heat input to the preheating cell and of undue thermal stresses on the refractories, thereby definitely limiting furnace output.

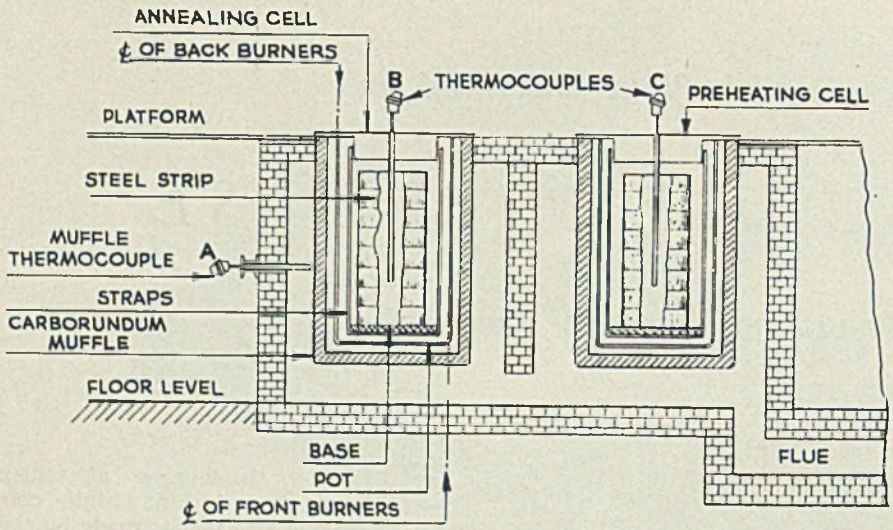
To circumvent these handicaps, Bristol's Instruments Co. Ltd., of London installed a proportional-type controller system, manipulated by a sensitive modulating valve, to maintain a reasonably constant flame length. By making the furnace instrumentation entirely automatic, all need for manual adjustments of any kind—necessarily of questionable reliability—is now eliminated.

This co-ordinated control system consists of a Pyromaster pneumatic time-program controller for governing the muffle temperature of the annealing cell by automatic adjustments of butterfly valves in the furnace gas and air supply lines; two Unitact Pyromaster controllers, serving as limiting devices; and a progress cycle controller, functioning as a resetting instrument. Operating as a regimented team, the program controller, by shifting the settings of the furnace fuel and air supply valves as necessary, holds the carborundum muffle at top heat (880 degrees Cent.) until the moment the charge in the annealing cell attains a temperature of about 600 degrees, at which instant high contact is made by the annealing pot No. 1 Unitact controller, thereby setting in rotation the regulatory cam of the program controller.

The Control Cycles: Revolving at constant speed, the program control cam then lowers the muffle temperature gradually to 780 degrees in 56 minutes, a sharp drop of several degrees taking place as the 100-degree cooling gradient ends to insure positive operation of a Burgess switch by the cam rider. Immediately, thereupon, the muffle temperature is again brought up to top heat, a 100-degree rise, in exactly two minutes and held at this peak for two minutes more, completing the first heating period. This sequence is then repeated automatically during the next 60 minutes, whereupon the program cam stops rotating and the two-hour annealing treatment is completed.

The No. 1 pot thermocouple then is promptly withdrawn from the annealing cell and as this couple cools off, No. 1 Unitact controller makes low contact, bringing the cycle controller into operation, resetting the cam of the program controller and raising the muffle temperature in preparedness for annealing the charge that has been preheated in the second cell and is, at this point, transferred to the annealing pot for the further heat treatment. The preheating cell is loaded at the same time with a fresh charge for the preliminary heating operation. The cycle controller operations are discharged automatically on an accurately predetermined and set time schedule during the relatively brief interval in which the No. 1 pot ther-

By REGINALD TRAUTSCHOLD
Engineering Consultant



Arrangement of Grunewald furnace. All illustrations show control equipment made by the Bristol Co., Waterbury, Conn.

mocouple loses heat.

No. 2 Unitact controller, connected to the preheating cell's thermocouple, while it performs no control function, safeguards the charge that is being preheated should a condition of furnace thermal unbalance develop. That is, a warning alarm is sounded automatically in the event that a relatively light load in the preheating cell attains annealing temperature before a heavier load in the annealing pot.

Improvement in Heat Utilization: The progressively timed lowering of the muffle temperature serves to reduce the temperature differential between the muffle heat and that of the load charges, thereby guarding against damaging overheating of the heat-resisting metal straps supporting the load charges in the respective pots, yet maintaining a higher, controlled heat input than can be secured by any feasible stepped lowering of the muffle temperature—as effected by the usual on-and-off potentiometer regulation previously employed. The charge in the annealing cell is brought to annealing temperature in the shortest practical time and simultaneously, the charge in the preheating cell is brought to as high a temperature as consistent with safety—that is, without damage to refractories or to the straps supporting the loads.

The relatively long and fairly steady flame secured with the co-ordinated control system, together with the fact that there is a minimum reduction of heat input when approaching annealing temperatures and the quick automatic getaway effected when the pot charges are transferred, has been productive of a truly marked speedup in annealing furnace output at the Cardiff plant. After a half-dozen sets of these control systems had been in service for some eight months, shop records showed that between identical furnaces working under similar conditions, the output of those operated under co-ordinated control was actually, during three weeks taken at random, 83.5, 68.6 and 91.2 per cent higher than the furnaces operated on the old on-and-off system—an average increase of 81.10 per cent.

This co-ordinated control system is extremely flexible and the annealing procedure may be modified at will and as experience dictates by simply changing the contour of the control cams. At Cardiff, two standardized time-tabled annealing procedures are employed, involving simply the use of differently shaped program control cams, that for the two 1-hour period cycles outlined and another in which there is a repetition of 40-minute time-tabled intervals. In the latter, the program control cam is so proportioned that the muffle temperature is first lowered from 880 to 780 degrees Cent. in 36 minutes, with a sharp switch-operated temperature drop at the end of the cooling gradient. This is followed immediately by a muffle temperature rise from 780 back to 880 degrees; and then a hold at the top heat for two minutes—which sequence is repeated twice more in the two-hour annealing treatment.

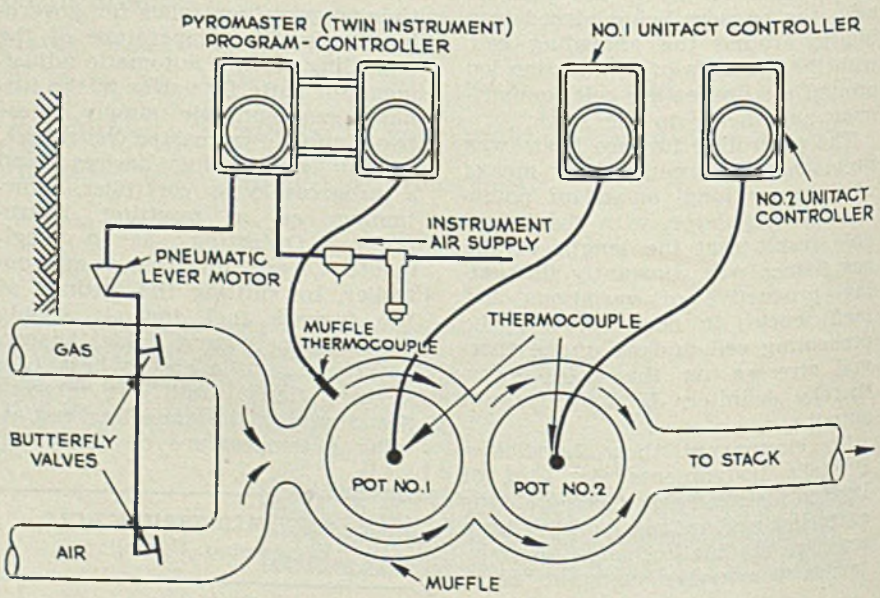
Incidentally, the contours of the control cams conform to the outlines of the continuous graphs plotted on the rotating charts of the controllers, providing visible evidence that the set heat-treating procedures are being followed. The charted records thus depict not only the critical thermal conditions as they develop in the muffles but the resulting thermal changes in the work charges as the latter occur. Hence, following the best predetermined heat-treating cycles, incorporating such refinements as extended experience may have shown to be advisable, becomes undeviating shop practice.

TABLE I—Weekly Output

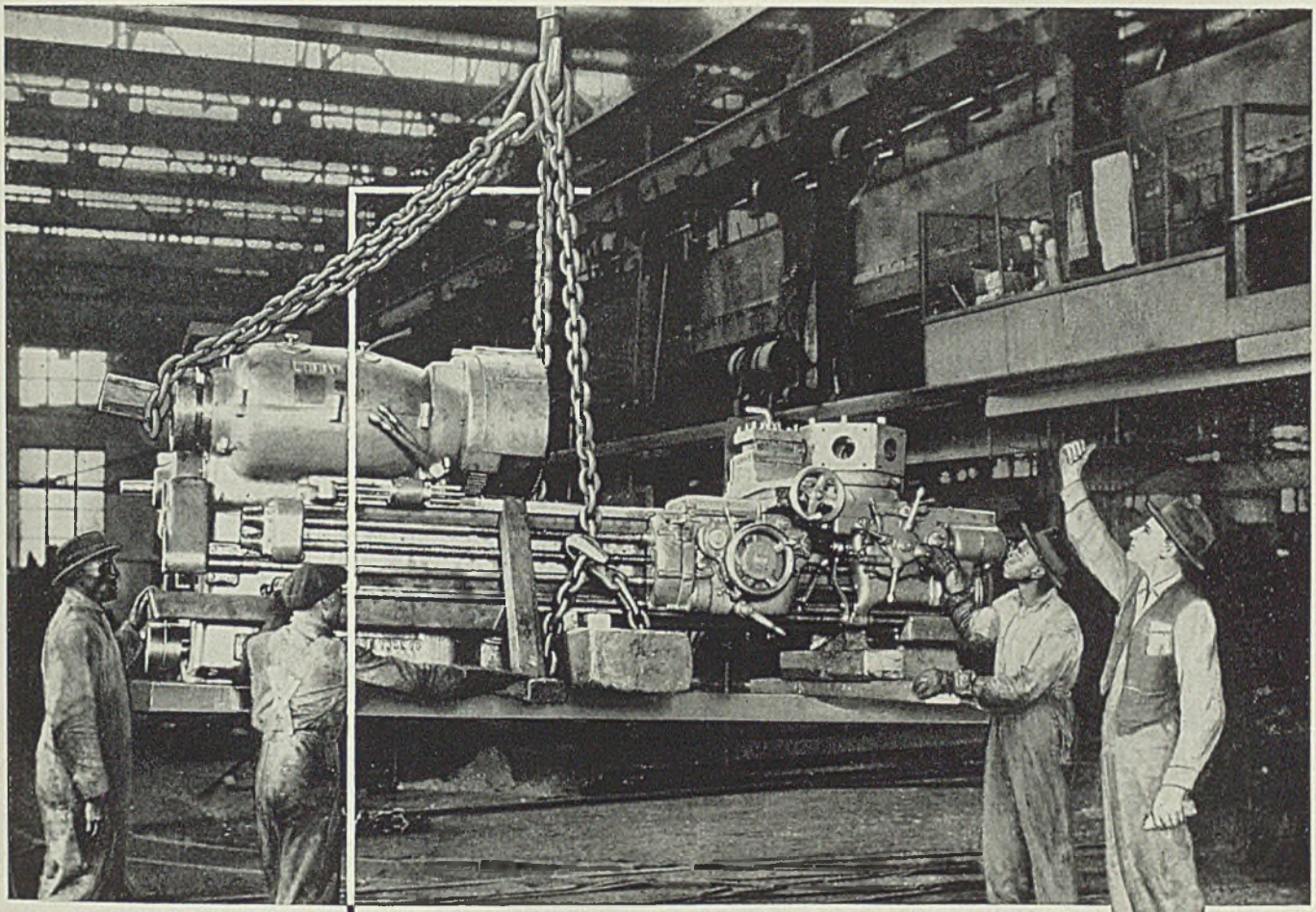
Guest, Keen & Nettlefolds, Cardiff, South Wales

Regulatory Systems*	Week A Tons	Week A Cwts	Week B Tons	Week B Cwts	Week C Tons	Week C Cwts
On/off control	61	11	54	1	59	11
Co-ordinated control	112	19	91	3	113	17
Increase	83.5%		68.6%		91.2%	

*Bristol's Instruments Co. Ltd.



Diagrammatic layout of co-ordinated control system



Men like to work with

ACCO *Registered* SLING CHAINS

★ From many years of experience we, of "American Chain," have boiled down a great deal of money-saving information on the use and care of Sling Chains into a handy booklet, a copy of which we'd like to send you.

Ordinarily chains are not given any care when not in use. But it pays well to look after chains and to use them according to recommended practices.

We have also found that men like to work with American Sling Chains. They feel safe with them, and they are very likely to take better care of them than of unknown chains. Acco Sling Chains all carry a metal identification tag because men like to be sure they are working with this chain.

This confidence has solid foundations in our fixed policies. We have never lowered quality to meet a price. Rather we have packed so much performance into each chain, that, whatever the price, the returns per dollar give you an extra dividend on your chain investment.

Where you must have sturdy resistance to bending, gouging, extreme temperatures and moderate impact loads, we recommend Endweldur Sling Chain with links welded at the end instead of the side.

What we say of our Sling Chain is equally true of all the chains we make, both welded and weldless. No pressure of rush orders could induce us to relax in our research tests to keep American Chain ahead of the most rigorous requirements of today and the future.

AMERICAN CHAIN DIVISION • YORK • PENNSYLVANIA

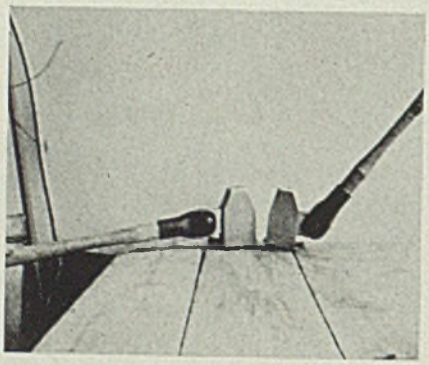
AMERICAN CHAIN & CABLE COMPANY, Inc.

ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

Industrial Equipment

Adjustable Stamp Holder

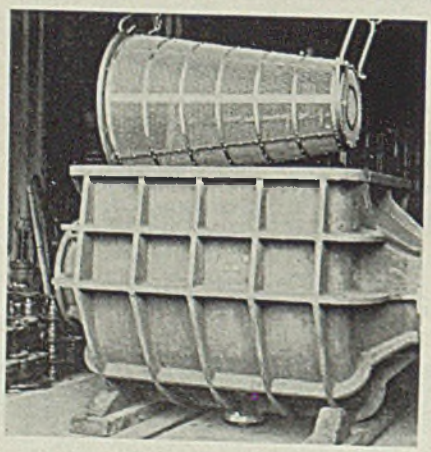
■ Pittsburgh Stencil & Tool Co., 405 Penn avenue, Pittsburgh, announces a new solid chromium



nickel holder which with its Safeloy steel type is said to take much of the back-breaking job from the stamper whether he be tall or short, or whether the work is on the floor or waist high. The unit does not contain small parts that will break or work loose. The holder is available in all sizes to take one to ten unbreakable steel type from 1/16 to 1-inch.

Water Strainer

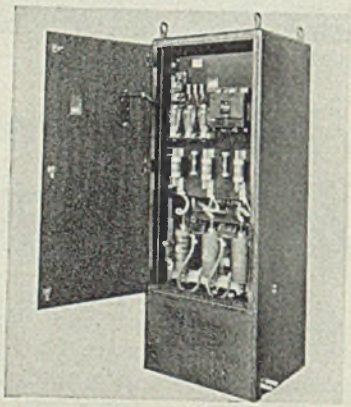
■ Glenfield & Kennedy Ltd., Low Glencairn, Kilmarnock, England, announces a new type water strainer said to be the largest made for a British water company. It con-



sists of a 5-foot metal cube or box with gun metal basket frame which fits inside the cube, and square mesh copper wirecloth reinforced with hexagonal mesh copper netting. Installation at the water company included two such boxes, together with sluice valves and 24-inch side branch pipes. The strainer wire is positioned so either could be backwashed through the other—thus discharging intercepted debris through the scour connection.

Ignitron Rectifier

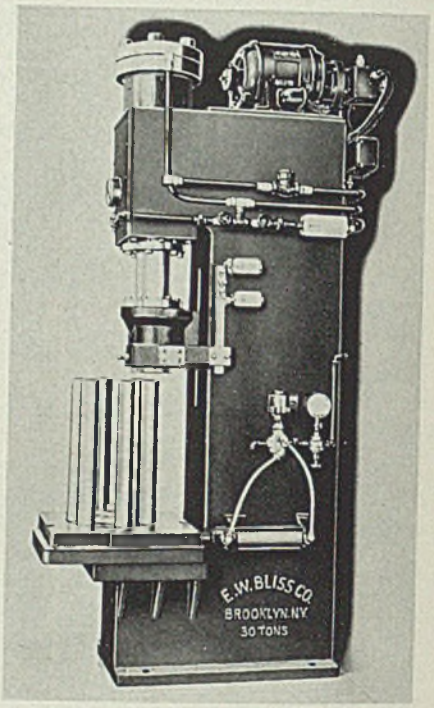
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new ignitron spot welding rectifier for supplying required direct current to magnetic energy-storage type spot welders such as are used for joining aluminum in the aircraft industry. Available in two capacities, one for use with 40 kilowatt, the other for 120 kilowatt spot welders, it will operate two welders if they are sequenced so that only one can be loaded onto the rectifier at a time. The rectifier consists of a control and protective panel, power transformer and ignitron power tubes all contained in a forced ventilated floor mounted sheet metal cabinet with a heavy welded base frame. Tubes are arranged for water cooling, and cooling is controlled by a thermo-



static water flow switch. The control and protective panel is in the top of the cabinet and the ignitron assembly in the bottom. Hinged doors provide access to the front of the cabinet and the back is removable for maintenance. A 14-inch fan, driven by a ⅛-horsepower motor cools the transformer, exhausting through a grill at the rear of the cabinet.

Hydraulic Marking Press

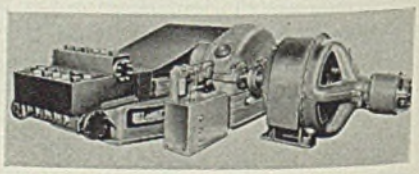
■ E. W. Bliss Co., Fifty-third street and Second avenue, Brooklyn, N. Y., has introduced a high speed hydraulic marking press featuring a dial feed and many safety and automatic devices. Capable of producing up to 20 cases per minute, it is of 30 tons capacity with 12-inch stroke. The dial feel, of the 6-station type is pneumatically operated in sequence with the press stroke to give continuous operation. Press is driven through a 5-horsepower motor, and the sequence of operation is electrically controlled with interlocks



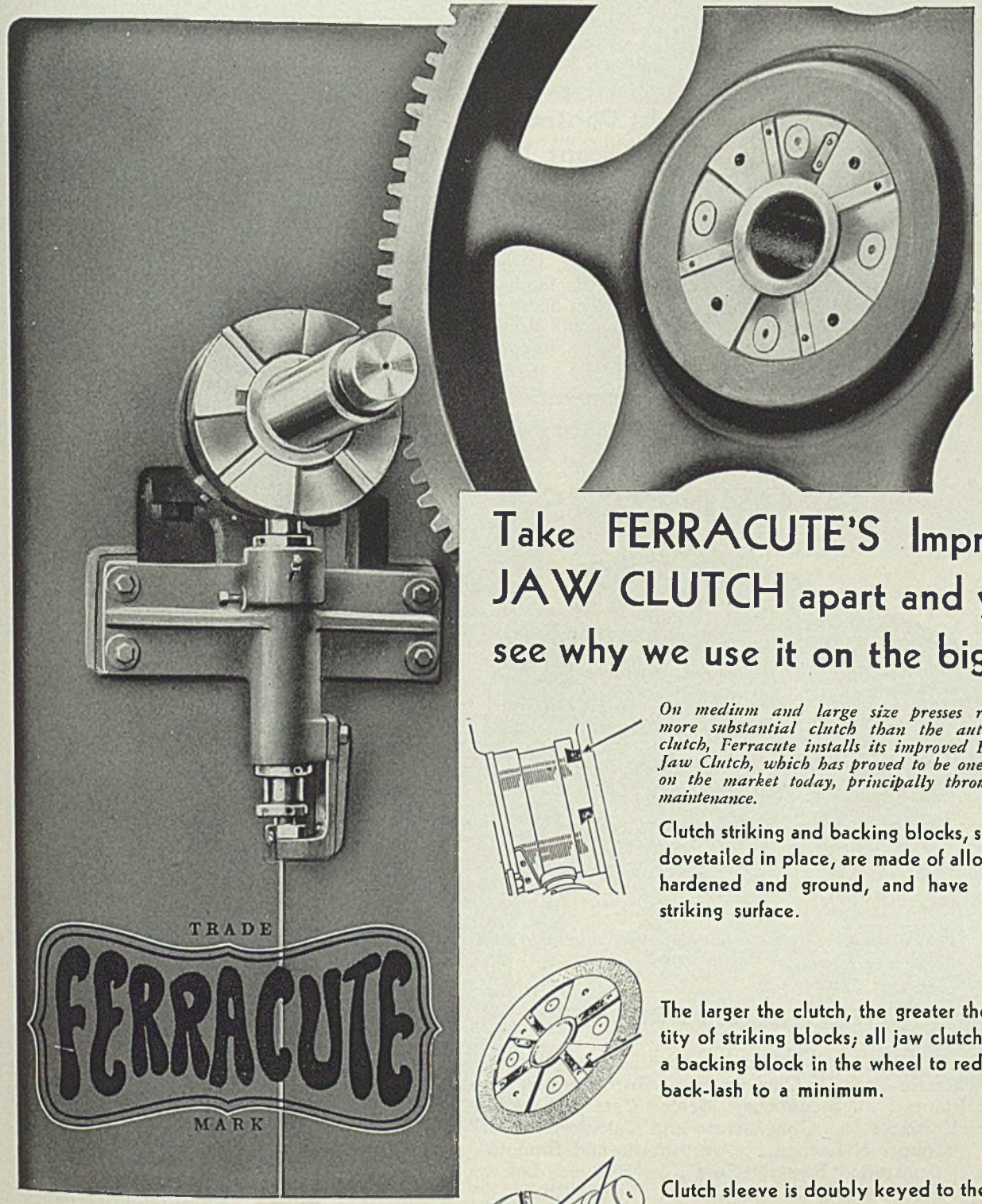
so that its ram cannot descend until the dial is properly positioned, nor can the dial rotate until its ram is in its raised position. Another safety feature of this press is the "no-work" control by which the press slide is prevented from descending if no work is placed on a given station. While the press is of 30 tons capacity, the pressure may be adjusted with accuracy to as low as 3 tons and the stroke may be adjusted as low as 1 inch if necessary.

High Pressure Pumps

■ Baldwin Southwark Division, Baldwin Locomotive Works, Paschall Post Office, Philadelphia, announces a new line of horizontal Triplez high pressure pumps to handle comparatively large volumes of water in conjunction with hydraulic press installations. As the name implies, each pump in the line employs three pistons—an arrangement which provides a 60-de-



gree overlap in discharge impulses and tends to smooth out pump pulsations. The 12-inch stroke pump discharge ranges from 23 gallons per minute at 7500 pounds per square inch to 160 gallons per minute at 1000 pounds per square inch; that of the 18-inch stroke unit from 88 gallons per minute at 7500

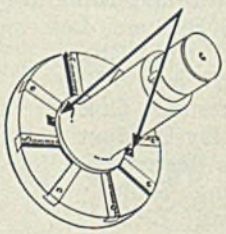


Take FERRACUTE'S Improved JAW CLUTCH apart and you'll see why we use it on the big jobs

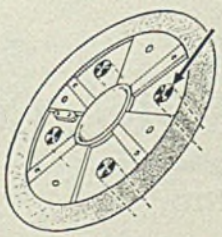
On medium and large size presses requiring a more substantial clutch than the automatic pin clutch, Ferracute installs its improved Heavy Duty Jaw Clutch, which has proved to be one of the best on the market today, principally through its low maintenance.

Clutch striking and backing blocks, securely dovetailed in place, are made of alloy steel, hardened and ground, and have a large striking surface.

The larger the clutch, the greater the quantity of striking blocks; all jaw clutches have a backing block in the wheel to reduce the back-lash to a minimum.



Clutch sleeve is doubly keyed to the crankshaft to take the driving thrust and is bushed with a super strength bronze, since it is a sliding member, to eliminate wear and prevent freezing.



Clutch disk is securely held into the wheel by large hardened and ground tapered studs, driven in and bolted on opposite side of wheel.

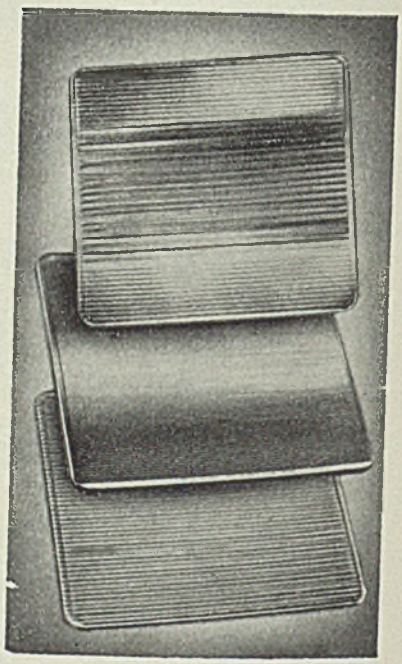
FERRACUTE MACHINE COMPANY

Bridgeton, N. J. U. S. A.

pounds per square inch to 685 gallons per minute at 1000 pounds per square inch. Other capacities and pressures are available, depending on the plunger size used. The pump frame is a one piece semi-steel casting carrying bearings for the rotating parts. Cast integrally with the frame is the gear case, containing double helical, single reduction gears. All rotating elements are carried on roller bearings, except the crank ends of the connecting rods which use steel-backed babbitt lined bearings, lubricated by force feed. The cylinder block is a large one-piece steel forging. Plungers are freely held in their crossheads to permit self-alignment with respect to the bronze bushings in the cylinder block. The pump is designed for direct coupling to 125, 250 and 500-horsepower motors.

Light Control for Fluorescent Lamps

■ Holophane Co., 342 Madison avenue, New York, is now offering three prismatic glass lenses known as Controlenses for regulating fluorescent lights. One of the lenses known as the intensive Controlens produces the distribution of light most commonly used in both commercial and industrial interiors. Another, known as concentratin Controlens, produces a rigidly co fined focusing type of light di tribution. This lens has severa common applications—accent ligh ing, general illumination fro great mounting heights, or "offse beam" lighting. The third, th extensive Controlens, is particular ly adaptable for areas where th lighting of vertical surfaces i desired or in low ceiling areas t permit wide spacing of units. Light ing fixtures using these lenses are available for three types of instal lation, recessed flush-with-the-ceil-



ing, "close-up" to the ceiling, and for suspension mounting, from nationally known fixture manufacturers. The company will gladly supply their names.

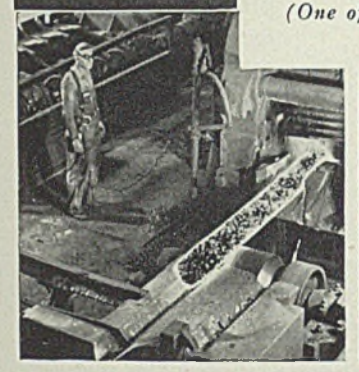
Splashproof Switch

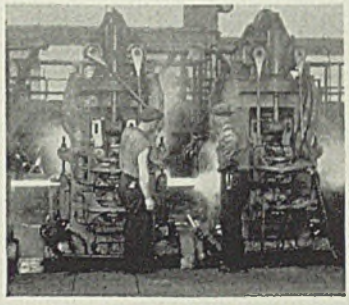
■ Micro Switch Corp., Freeport, Ill., has introduced a splashproof switch which can be mounted from any one of four sides for use as an interlock, limit, or pushbutton unit. Two tapped holes on each of its four sides makes it possible to mount the switch directly to a machine frame from practically any position whether the switch has the roller arm, cross-roller arm, or push-rod plunger type of actuation. The switching element is listed by the Underwriter's at 1200 watts up to 600 volts alternating current.

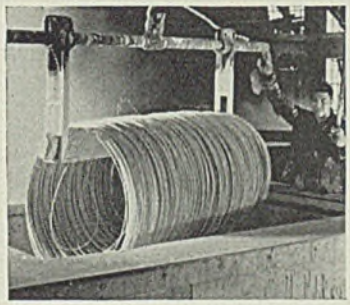
Both roller arm types are of aluminum, adjustable through 360 degrees. The roller rides on an oilless-bronze bearing. The plunger type of actuator has a bullet-nose push-rod of case hardened steel which moves in a long cadmium plated hexagonal bushing. A removable cover provides easy access to terminals. For lug or foot mounting, thick steel plates are supplied.

IT TAKES "*knowing how*" TO MAKE GOOD WIRE

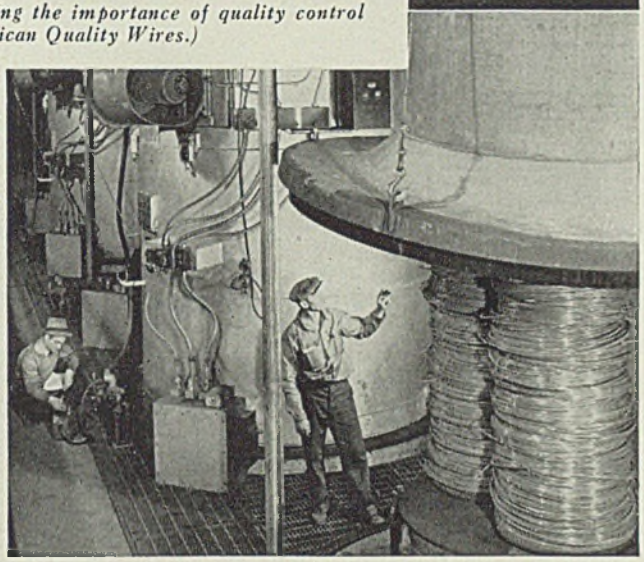
(One of a series of advertisements illustrating the importance of quality control in the manufacture of American Quality Wires.)





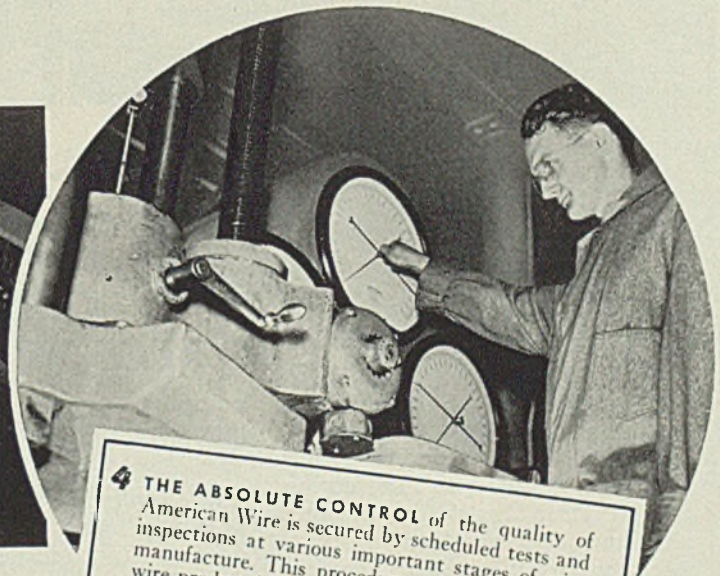


1 **FROM INGOTS TO BILLETS** and from billets to rods, every step in good wire making is guided by unvarying rules of quality control. Roll design, rolling speeds and temperatures are all the result of long technical study and "knowing how." Scientifically controlled baking and cleaning processes prepare the rods for drafting.



3 **WIRE IS SUBJECTED TO HEAT** treatments to further improve its uniformity and secure the variety of physical properties necessary for processing. Modern furnaces equipped with every control device necessary to maintain close working limits are employed in this step. The operation is performed under strict technical supervision.

2 **THE DRAFTING OF THE RODS** into wire not only reduces the cross-section to the desired shape, but also imparts to the wire many special predetermined properties. The presence of these properties in the wire enables it to meet the most exacting customer's requirements.



4 **THE ABSOLUTE CONTROL** of the quality of American Wire is secured by scheduled tests and inspections at various important stages of wire manufacture. This procedure assures that each wire produced complies with the high standards of "American Quality."

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

AMERICAN *Quality* WIRES FOR MANUFACTURING PURPOSES

UNITED STATES STEEL

Sprayed Metals

(*Continued from Page 94*)

there is a shoulder at the bottom of the bore (such as a ball or roller bearing housing), unless the corner is built up to some extent first as previously outlined.

Fly cutters mounted in a piloted bar can be used successfully and with good results. But here again, flash and overhang of sprayed metal should be removed.

Reamers, especially the large production type cannot be used unless the hole has been previously bored to within 0.005-inch of finish size.

Inside diameters can be ground readily and easily. If internal grinding equipment is availble, it is suggested that this is the best method of finishing any of the steels or alloys.

Polishing sprayed metal requires no special skill on the part of the operator other than the understanding and realization that he is polishing, not a solid piece of metal, but a thin veneer which is bonded to the base metal mechanically and not by fusion.

Employing ordinary procedure and equipment, sprayed metal can be polished and buffed to a high luster. Naturally the softer metals are easier to handle and will take a better polish. Generally speaking, the white metals (tin, babbitt, zinc and aluminum) are easy to polish. The red and yellow metals are a little more difficult due to hardness. Sprayed steels, including carbon, stainless, monel, nickel and alloys, are extremely difficult to polish and should not be considered for any use that calls for a lustrous finish.

White and yellow metals should be applied to a thickness sufficient to allow from 0.006 to 0.012-inch for removal during rough and finish polishing. Extra metal should be applied to corners and edges to allow for excessive removal which may occur at such points during roughing.

The hazards or troubles that may be experienced are:

Cutting through the coating with the edge or corner of the disk or wheel.

Roughing off too much stock.

Blistering due to local hot spots caused by too much pressure on a "loaded" wheel or disk.

Blistering due to heat generated during buffing or coloring.

In short, the troubles that may occur in polishing are due mainly to the human element, and not to the sprayed metal or its characteristics. The sequence of operations is the same as would be employed on ordinary castings. The surface of sprayed metal is similar in appearance and texture to a good casting, which means, of course, that the use of rag wheels and rough compounds must follow the use of abrasive wheels or disks.

Wire Brushing: Sprayed metals (white, yellow and red) react favorably to wire brushing. An attractive matte finish is easily obtained without any of the troubles that are common to polishing. Hand and stationary rotating brushes are commonly used for small articles, while rotary brushes mounted on flexible shafts are used for large areas.

Sprayed metal, particularly the white metals used for resistance to corrosion, should never be brushed with an ordinary steel brush because ferrous particles worn from the brush will embed themselves into the coating. The result is rust streaks and spots.

Stainless steel, nickel and monel wire brushes are recommended, and while their initial cost is high, they give good service and excellent results. Wire diameter for soft metals such as tin and zinc should be approximately 30 B&S Gage while for brasses, bronzes and copper a slightly stiffer wire of from 25 to 28 B&S Gage will give good results.

Steels and steel alloys do not react to wire brushing, and nothing is gained. Nickel and monel can be wire brushed effectively. Use last brush mentioned above.

Want improved surface finish of Hot Rolled Strip and Sheets?

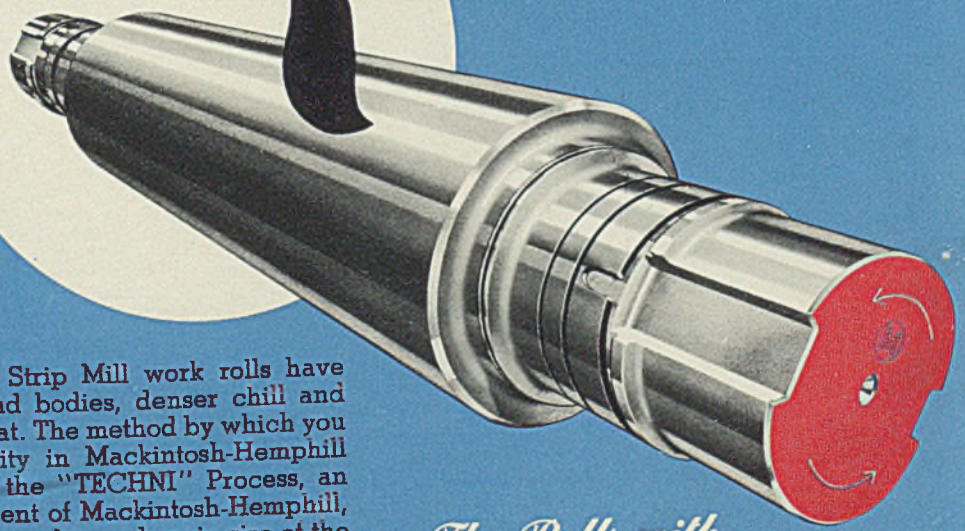
Equip your Finishing Train with . . .

"Techni"

PROCESS WORK ROLLS

"NIRONITE" for Intermediate Stands

"NICHILLITE" for Finishing Stands



"TECHNI" Process Strip Mill work rolls have fine grain necks and bodies, denser chill and ideal response to heat. The method by which you get this extra quality in Mackintosh-Hemphill Rolls is our use of the "TECHNI" Process, an exclusive development of Mackintosh-Hemphill, which regulates the quality and grain size of the rolls with as much exactness as the best modern steel practice regulates the quality of steel. Make your next rolls "TECHNI" Process.

Since 1803—Pioneers, Engineers and Builders

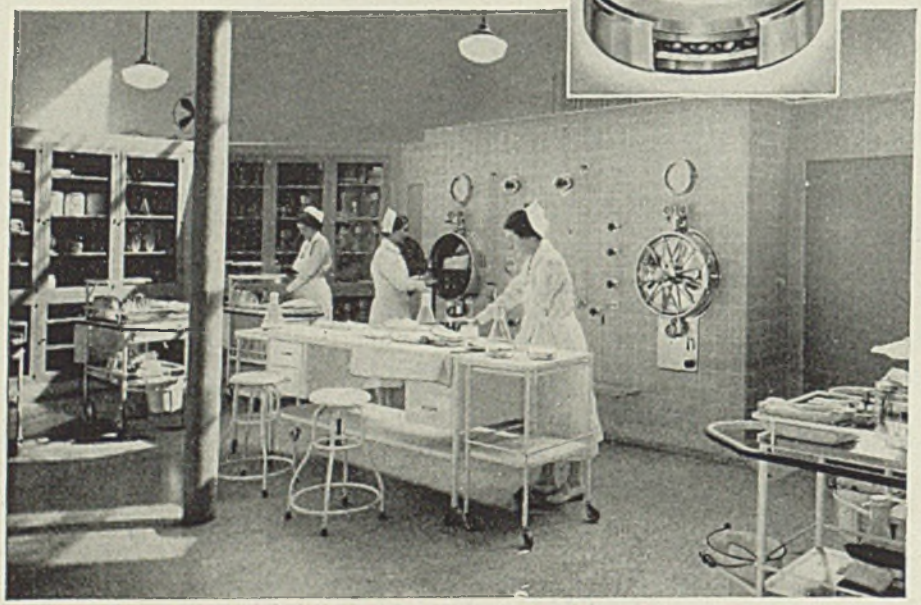
MACKINTOSH-HEMPHILL COMPANY
PITTSBURGH AND MIDLAND, PA.

OTHER MACKINTOSH-HEMPHILL COMPANY PRODUCTS:
Rolling Machinery . . . Shape Straighteners . . . Strip Coilers . . . Shears . . . Levellers . . . Pinions . . . Special Equipment . . . Iron-Steel Castings . . . The NEW Abramsen Straightener . . . Improved Johnston Patented Corrugated Cinder Pots and Supports.

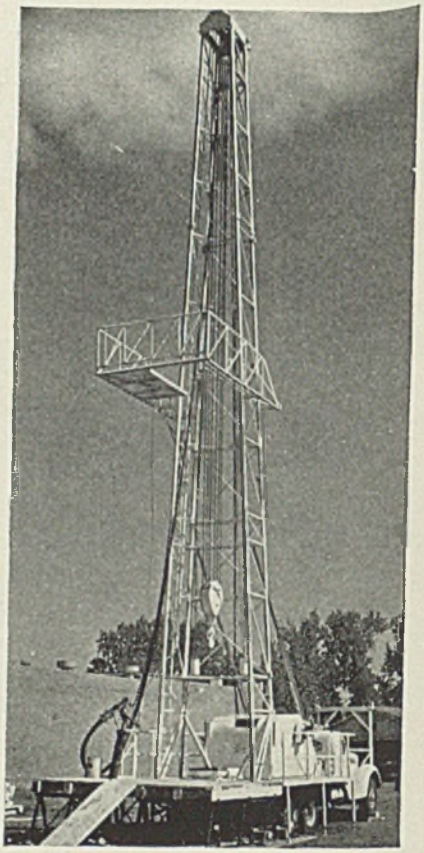
The Rolls with the Red Wabblers

THEY ROLL MORE TONS PER ROLL GRIND

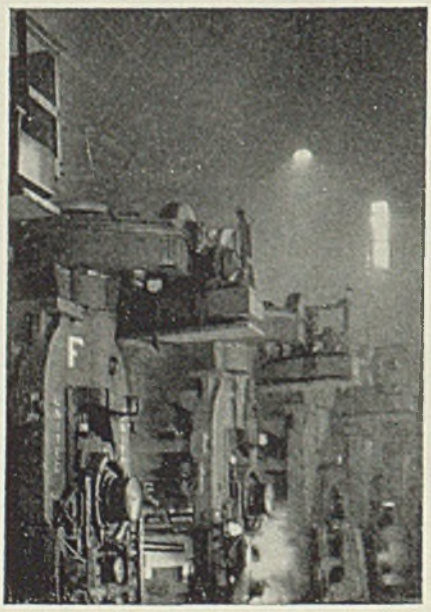
IN THE NEWS
WITH BANTAM BEARINGS



SAFETY IN SURGERY took a long stride forward when American Sterilizer Company originated the temperature-control technique for effective sterilization of instruments and supplies. These precision instruments, shown above in the Hospital of the University of Pennsylvania, embody the most modern principles in engineering design. A feature is the use of Bantam Ball Thrust Bearings in the door-locking mechanism to facilitate easy operation.

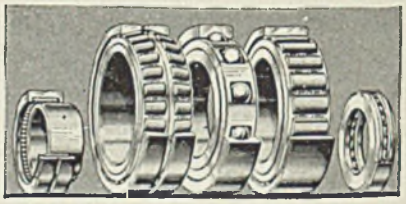


THE QUEST FOR OIL BECOMES SIMPLER as progressive manufacturers develop new equipment designed for economical prospecting. Outstanding example is George E. Failing Supply Company's new "66" portable slim hole drilling rig, equipped with Bantam Quill Bearings in crown and traveling blocks, to give efficient operation.



GIANT BEARINGS in single, double and four-row types up to 51" O.D., designed and built by Bantam for the steel industry, have made outstanding performance records. Both work rolls and back-up rolls of the continuous hot strip mill shown above are Bantam equipped for long life and successful performance in severe service.

MASSES OF METAL roll back and forth 200 times an hour in this high-speed production welding unit built by The Federal Machine and Welder Company—roll smoothly and efficiently on special ladder-type bearings designed by Bantam. Bearings of this type find many applications where friction in reciprocating motion must be kept to a minimum.



EVERY MAJOR TYPE of anti-friction bearing is included in Bantam's line—straight roller, tapered roller, needle, and ball. Bantam serves every industry with a wide range of standard bearings that meet many normal requirements. Bantam engineers offer unbiased advice on selection of standard bearings—and design custom-built bearings in large sizes or special types for unusual conditions. If you have an exceptionally difficult bearing problem, TURN TO BANTAM.

All-Out Steel Priority Order Stops Selling

Steelmakers booking no civilian orders until procedure is clear. Mandatory scrap priority order being formulated by OPM

MARKET IN TABLOID ★

Demand
Defense needs heavy; civilian buyers pressing.

Prices
All products now under ceiling.

Production
Holds at 98 per cent.

■ PLACING of steel orders has been virtually stopped until the all-out priority order can be digested and its provisions more fully understood. In practically all cases orders are being refused and steelmakers are faced with the task of reclassifying orders under the new regulations.

This is a tremendous task under best circumstances and until provisions of the order are understood clearly it cannot be undertaken effectively. Civilian users have been bombarding their usual supply sources with inquiries as to what can be done for them. In some cases mills refuse to enter orders even tentatively and in some instances suggest a waiting period of six to eight weeks before resubmitting the orders, on the theory that by that time the new plan will be working smoothly.

Further orders relating to distribution of residual steel after defense requirements are filled are expected as the original order provides that allocations or preference ratings applying to such excess shall be in accordance with such regulations as OPACS may determine.

In view of previous priority rulings it is believed material now in process for nondefense work, on which delivery would be after Sept. 1, may be allowed to proceed and be delivered after the effective date of the order. A matter of concern to mills is the effect on rolling schedules if they are not allowed to combine several orders for a single rolling. Frequent roll changes would cut into output severely. Meanwhile production is proceeding without change until reports are made and schedules revised to conform.

The program for an increase of 6,500,000 tons in blast furnace capacity is likely to go through as planned and ingot expansion of 5,000,000 tons is practically assured by additions, mainly at Homestead works of Carnegie-Illinois Steel Corp. and at Pacific coast plants. Whether the plan for further increase of 10,000,000 tons of ingots will be approved remains to be determined.

Pig iron producers have been notified by E. R. Stettinius Jr., director of priorities, OPM, to set aside 2 per cent of their September production for a pool from which allocations can be made for urgent needs. The September pool is estimated at 90,000 to 100,000 tons.

A mandatory priority order for scrap is being formulated and is expected to be issued soon, to control flow of scrap from producer to consumer, fitting into the pig iron regulations as complementary raw materials. It will not affect price regulations by OPACS.

Scrap shortage continues a threat, although some relief has been afforded by the recent revision of ceiling prices, notably by increased price on low phos grades for Pittsburgh delivery. This will aid electric furnace production. Foundries continue to lack adequate supply of cast grades and interruption of production results in many cases. Efforts to stimulate movement of scrap from household and other sources have not yielded large return. Advertisement by an eastern Pennsylvania mill seeking to uncover available supplies attests the pressing need for material to continue operations. An unusual situation has arisen in the attitude of the Navy department in its decision to entertain bids above the OPACS ceiling, on the ground it is required by law to accept the highest responsible bid.

Most important event in the steel plate market is pending allocation of close to 1,000,000 tons for construction of a 1280-mile crude oil line from Texas to the Atlantic seaboard, to deliver 250,000 barrels per day. Only four mills are able to roll the 76-inch plates required for the 24-inch main line.

First important purchase of steel rails in several weeks was placing of 20,000 tons last week by the New York, New Haven & Hartford, divided between Carnegie-Illinois and Bethlehem, for 1942 delivery.

Automobile production turned upward last week, 46,750 units being made, a gain of 4955 over 41,795 for the previous week. This compares with 20,475 a year ago.

Production last week continued at 98 per cent. New England gained 3 points to 90 per cent and Detroit 5 points to 94 per cent. Chicago receded another half-point to 100 per cent, Cincinnati 1½ points to 85½ per cent and Cleveland 3 points to 89½ per cent. The remaining seven districts were unchanged, as follows: Pittsburgh, 100; Youngstown, O., 98; Buffalo 90½; Eastern Pennsylvania, 95½; Wheeling 93; Birmingham, 90; St. Louis, 98.

Prices frozen at ceiling levels, STEEL's three composites are unchanged; finished steel at $56.60, iron and steel at $38.15 and steelworks scrap at $19.16.

COMPOSITE MARKET AVERAGES

	Aug. 16	Aug. 9	Aug. 2	One Month Ago July, 1941	Three Months Ago May, 1941	One Year Ago Aug., 1940	Five Years Ago Aug., 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.15	$37.70	$33.88
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	53.40
Steelworks Scrap..	19.16	19.16	19.16	19.16	19.16	18.71	14.66

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Aug. 16, 1941	July 1941	May 1941	Aug. 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
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
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Aug. 16, 1941	July 1941	May 1941	Aug. 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.00	24.00	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	31.34	31.09	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$18.75
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	17.75	18.35
Heavy melting steel, Chicago	18.75	18.75	18.75	18.10
Rails for rolling, Chicago	22.25	22.25	22.25	22.00
No. 1 Cast, Chicago	20.00	21.50	21.50	16.75

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$5.70	$4.75
Connellsville, foundry, ovens	7.25	7.25	6.30	5.75
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. mill, carloads.

Sheets, Strip

Hot-Rolled Sheets

Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 2.10c
Granite City base 2.20c
Detroit, del. 2.20c
Pacific ports 2.65c

Cold-Rolled Sheets

Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base 3.05c
Granite City, base 3.15c
Detroit, del. 3.15c
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
Pacific ports 4.05c

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 Base	Pacific Ports	Granite City	Base Deliv. Mahoning Valley Points
Field gr.	3.20c	3.95c	3.30c	3.275c
Armat.	3.55c	4.30c	3.65c	3.625c
Elect.	4.05c	4.80c	4.15c	4.125c
Motor	4.95c	5.70c	5.05c	5.025c
Dynamo	5.65c	6.40c	5.75c	5.725c
Transformer				
72 ...	6.15c	6.90c	.....	6.225c
65 ...	7.15c	7.90c	.....	7.225c
58 ...	7.65c	8.40c	.....	7.725c
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. 2.20c
Pacific ports 2.75c

Cold-Rolled Strip

Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c
Chicago, base 2.90c
Worcester, base 3.00c
Detroit, del. 2.90c

Commodity C.R. Strip

Pittsburgh, Cleveland, Youngstown, base 3 tons and over 2.95c
Worcester, base 3.35c

Cold-Finished Spring Steel

Pittsburgh, Cleveland, base; add 20 cents for Worcester.
.26-.50 Carbon 2.80c
.51-.75 Carbon 4.30c
.76-1.00 Carbon 6.15c
Over 1.00 Carbon 8.35c

Chromium-Nickel Steels

Pittsburgh base, cents per lb.

	302	303	304	20% Clad 304
Bars	24.00	26.00	25.00	.....
Plates	27.00	29.00	29.00	*18.00
Sheets	34.00	36.00	36.00	19.00
H. R. strip	21.50	27.00	23.50	.....
C. R. strip	28.00	33.00	30.00	.....

Straight Chromium Steels

Pittsburgh base, cents per lb.

	410	416	430	442	446
Bars	18.50	19.00	19.00	22.50	27.50
Plates	21.50	22.00	22.00	25.50	30.50
Sheets	26.50	27.00	29.00	32.50	36.50
H. R. Strip	17.00	18.25	17.50	24.00	35.00
C. R. strip	22.00	23.50	22.50	32.00	52.00

*Includes annealing and pickling.

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

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	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c
Boston, delivered	2.42c-2.57c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c-2.35c
Sparrows Point, Md.	2.10c-2.35c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c

Gulf ports 3.70c
Pacific Coast ports 4.00c

Structural Shapes

Pittsburgh 2.10c
Philadelphia, del. 2.21½c
New York, del. 2.27c
Boston, delivered 2.41c
Bethlehem 2.10c
Chicago 2.10c
Cleveland, del. 2.30c
Buffalo 2.10c
Gulf ports 2.45c
Birmingham 2.10c
St. Louis, del. 2.34c
Pacific Coast ports 2.75c

Bars

Hot-Rolled Carbon Bars

Pittsburgh, Chicago, Gary, Cleve., Birm., base 20 tons one size..... 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Duluth, base 2.25c
Philadelphia, del. 2.47c
Gulf ports, dock..... 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Rail Steel Bars

Pitts., Chicago, Gary, Cleveland, Birm., base 5 tons 2.15c
Detroit, del. 2.25c
New York, del. 2.49c
Philadelphia, del. 2.47c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pac. ports, dock 2.80c
All-rail from Chicago.. 3.25c

Hot-Rolled Alloy Bars

Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size 2.70c
Detroit 2.80c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000.....	0.35	3100.....	0.70
2100.....	0.75	3200.....	1.35
2300.....	1.70	3300.....	3.80
2500.....	2.55	3400.....	3.20

4100 .15-25 Mo..... 0.55
4600 0.20-0.30 Mo.; 1.50-2.00 Ni. 1.20
5100 80-1.10 Cr..... 0.45
5100 Spr. flats..... 0.15
6100 Bars 1.20
6100 Spr. flats 0.85
Carb., Van. 0.85
9200 Spr. flats 0.15
9200 Spr. rounds, squares 0.40
T1300, Mn, mean 1.51-2.00 0.10
Do., carbon under 0.20 max. 0.35

Cold-Finished Carbon Bars

Pitts., Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs. 2.65c
Detroit 2.70c

Cold-Finished Alloy Bars

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

Turned, Ground Shafting

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c
Detroit 2.70c

Reinforcing Bars (*New Billet*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., Sparrows Point, Buffalo, Youngstown, base..... 2.15c
Gulf ports, dock..... 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
All-rail from Chicago.. 3.25c
Detroit, del. 2.25c

Reinforcing Bars (*Rail Steel*)

Pittsburgh, Chicago, Gary, Cleveland, Birm., base. 2.15c
Gulf ports, dock 2.50c
All-rail, Houston from Birmingham 2.59c
Pacific ports, dock 2.80c
All-rail from Chicago.. 3.25c
Detroit, del. 2.25c

Iron Bars

Philadelphia, com. del. 3.06-3.50c
Pittsburgh, muck bar, .. 5.00c
Pittsburgh, staybolt 8.00c
Terre Haute com., f.o.b. mill 2.15c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails..... $2.55

(Per Pound)

Polished fence staples.. 2.55c
Annealed fence wire.... 3.05c
Galv. fence wire 3.40c
Woven wire fencing (base C. L. column) 67
Single loop bale ties, (base C.L. column) ... 59
Galv. barbed wire, 80-rod spools, base column .. 70
Twisted barbless wire, column 70

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire)

Bright bess., basic wire. 2.60c
Galvanized wire 2.60c
Spring wire 3.20c
Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg..$3.85

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Rails, Fastenings

(Gross Tons)

Standard rails, mill $40.00
Relay rails, Pittsburgh 20—100 lbs. 32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham. $40.00
Do., rerolling quality.. 39.00

Cents per pound

Angle bars, billet, mills. 2.70c
Do., axle steel 2.35c
Spikes, R. R. base 3.00c
Track bolts, base 4.75c
Do., heat treated..... 5.00c
Car axles forged, Pitts., Chicago, Birmingham. 3.15c
Tie plates, base 2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller.....65½ off
Do., ⅞ and ⅝ x 6-in. and shorter.....63½ off
Do., ¾ to 1 x 6-in. and shorter .....61 off
1⅛ and larger, all lengths 59 off
All diameters, over 6-in. long .....59 off
Tire bolts .....50 off

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.

Step bolts .....56 off
Plow bolts .....65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less.	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger..	56	..

Hexagon Cap Screws

Upset 1-in., smaller .....64 off

Square Head Set Screws

Upset, 1-in., smaller.....71 off
Headless set screws.....60 off

Piling

Pitts., Chgo., Buffalo .. 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural 3.75c
½inch and under.....65-5 off
Wrought washers. Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. .....$4.00 off

Tool Steels

Pittsburgh, Bethlehem, Syracuse, base, cents per lb.

Carb. Std.. 10.50
Carb. Reg. 14.00
Carb. Ext. 18.00
Carb. Spec. 22.00
Oil-hardening .. 24.00
High car.-chr. 43.00

High Speed Tool Steels

Tung.	Chr.	Van.	Moly.	
18.00	4	1	...	67.00
18.00	4	2	1	77.00
18.00	4	3	1	87.00
1.50	4	1	8.50	54.00
....	4	2	8	54.00
5.50	4	1.50	4	57.50

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½"O.D.	13	$ 9.72	$23.71
1¾"O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼"O.D.	13	13.79	21.68
2¼"O.D.	12	15.16	....
2½"O.D.	12	16.58	26.57
2¾"O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½"O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼"O.D.	13	9.26	10.67
1½"O.D.	13	10.23	11.79
1¾"O.D.	13	11.64	13.42
2" O.D.	13	13 04	15.03
2¼"O.D.	13	14.54	16.76
2¼"O.D.	12	16.01	18.45
2½"O.D.	12	17.54	20.21
2¾"O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½"O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½"O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Welded Iron, Steel, Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	51
¾	66½	55
1—3	68½	57½

Iron

¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel

2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½

Iron

2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28¼	12

Line Pipe, Plain Ends

Steel

1 to 3, butt weld..... 71½
2, lap weld 64
2½ to 3, lap weld..... 67
3½ to 6, lap weld..... 69
7 and 8, lap weld..... 68
Seamless, 3 pts. lower discount.

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm..$45.00-46.00
4-in., Birmingham.. 48.00-49.00
4-in., Chicago 56.80-57.80
6-in. & over, Chicago 53.80-54.80
6-in. & over, east fdy. 49.00
Do., 4-in. 52.00
Class A Pipe $3 over Class B
Stnd. fittgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point..$34.00
Duluth (billets) 36.00
Detroit, delivered 36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.. 40.00
Duluth 42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago. 34.00
Detroit, delivered 36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00
Do., over ⅜ to ⅷ-in. incl. 2.15
Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch $52.00
12-18-inch 54.00
18-inch and over 56.00

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur... $6.00- 6.25
Connellsville, fdry.. 7.00- 7.50
Connell. prem. fdry. 7.25- 7.60
New River fdry. ... 8.00- 8.25
Wise county fdry. .. 7.50
Wise county fur. .. 6.50

By-Product Foundry

Newark, N. J., del... 12.60-13.05
Chicago, outside del. 11.50
Chicago, delivered . 12.25
Terre Haute, del. .. 11.75
Milwaukee, ovens.. 12.25
New England, del... 13.75
St. Louis, del. 12.25
Birmingham, ovens. 8.50
Indianapolis, del. .. 12.00
Cincinnati, del. ... 11.75
Cleveland, del. 12.30
Buffalo, del. 12.50
Detroit, del. 12.25
Philadelphia, del. .. 12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol... 14.00c
Toluol, two degree 27.00c
Solvent naphtha 26.00c
Industrial xylol 26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.) 14.25c
Do. (1000 lbs. or over) 13.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers 7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia....$30.00

Pig Iron

No. 2 foundry is 1.75-2.25 sil.; 50c diff. for each 0.25 sil. above 2.25 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	.....	19.38	25.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	{24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	{24.00–24.50	24.00– 24.50	23.50– 24.50	24.50– 25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	.....	25.11	.....
Boston from Birmingham†	25.12	.....	.....	.....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	.....	.....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	.....
Cincinnati from Birmingham†	24.06	.....	23.06	.....
Cleveland from Birmingham†	24.12	.....	23.12	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	.....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	.....	.....
Newark, N. J., from Birmingham†	26.15	....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	...	.....
Philadelphia from Birmingham†	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.50	.....	23.62	.....
St. Paul from Duluth	26.63	26.63	.....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

Silvery

Jackson county, O., base, 6.00 to 6.50 per cent $29.50. Add 50 cents for each additional 0.25 per cent of silicon. Buffalo base $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

Manganese differentials in silvery iron and ferrosilicon not to exceed 50 cents per 0.50 per cent manganese in excess of 1 per cent.

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

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung 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	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail.	21.00
Do. barge	21.00
No. 2 lump	21.00

Ferroalloy Prices

Ferromanganese, 78-82%.
Carlots, duty paid, sbd. $120.00
Carlots, del. Pitts. 125.33
Carlots, f.o.b. Southern furn. 145.00
For ton lots add $10, for less-than-ton lots $13.50, for less than 200-lb. lots $18.

Spiegeleisen, 19-21% dom.
Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2½ per cent carbon 118.00
1½% carbon 128.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b., Washington, Pa., lb. 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. higher

Tungsten Metal Powder, 98-99 per cent, per lb., depending upon quantity $2.50-2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c
88% chrome, cont. tons 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00

35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	5.26	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	...	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	.	4.42	.	.
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	...	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	...	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	7.15	....	....
Seattle	4.00	4.00	5.20	4.75	4.75	6.50	4.75	7.25	6.00	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	5.45	7.25	4.95	4.95	7.20	5.10	7.30	6.30	....	6.60	11.35	10.35
San Francisco	4.00	5.20	6.80	4.70	4.70	6.40	4.70	7.20	6.45	....	7.05	11.60	10.60

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.65	....	8.75	8.60	9.40
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	6.05	10.60	9.60	9.45	10.10

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis; Los Angeles, bars over 4-in. wide, 1-in. thick, 4.95c.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 1 to 10 bun. in Los Angeles; 300 and over in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; any quantity in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle, 1 to 99 pounds in Los Angeles; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£	s	d
Merchant bars, 3-inch and over	£66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.79c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

	£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8 0(a)
Basic pig iron	24.28	6	0 6(a)
Furnace coke, f.o.t. ovens	7.40	1	16 9
Billets, basic soft, 100-ton lots and over	49.37	12	5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12 0††
Shapes	2.77c	15	8 0††
Ship plates	2.91c	16	3 0††
Boiler plates	3.06c	17	0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15 0
Bands and strips, hot-rolled	3.30c	18	7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00-25.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton	.....

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	.....
So. African, 48%	70.00-72.00
Brazilian, 46%	69.00-71.00
Chilean, 47%	65.00-70.00
Cuban, 50-51%, duty free	.....

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced June 18 by Office of Price Administration and Civilian Supply (Gross Tons)

	Pittsburgh, Weirton, Steubenville(a)	Youngstown, Canton, Warren, Sharon	Chicago	Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	Ashland, Ky., Portsmouth, Middletown, O.	Kokomo, Ind.
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.75	$19.50	$19.25	$19.50	$18.25
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.75	19.50	19.25	19.50	18.25
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	17.50	16.25
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	14.00	14.75	14.50	14.75	14.25
Machine shop turnings**	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	14.50
Shovel turnings	16.50	16.50	15.25	14.75	15.25	15.25	16.00	15.75	16.00	15.50
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	19.00	17.75
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	14.25	15.00	14.75	15.00	13.75
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.50	15.25	15.00	†15.25	14.00
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.75	18.50	18.25	18.50	17.25
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00	20.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50	18.50
Stove plate	19.00	.....	17.00	18.00	18.50	18.00	18.00	19.00	17.50	16.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.75	23.75	24.50	24.25	23.50	23.75
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Low phos. punch., plate scrap***	[1]23.00	23.00	21.75	21.25	21.75	21.75	22.50	22.25	21.50	21.75
Machinery cast cupola size††	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00	21.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50	21.50
Punchings and plate scrap‡‡	[1]22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.25	20.50	20.75
Punchings and plate scrap§§	[1]21.00	21.00	19.75	19.25	19.75	19.75	20.50	20.25	19.50	19.75
Heavy axle and forge turnings	[1]19.50	19.50	18.25	17.75	18.25	18.25	19.00	18.75	18.00	18.25
Med. heavy elec. furnace turnings	[1]18.00	18.00	16.75	16.25	16.75	16.75	17.50	17.25	16.50	16.75

	St. Louis	Toledo, O.	Detroit	Duluth	Birmingham	[2]Alabama City, Ala., Atlanta	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$.....	$17.85	$18.00	$17.00	$17.00	$.....	$.....	$16.50	[4]$14.50
No. 1 hyd. comp. black sheets	17.50	.....	17.85	18.00	17.00	17.00	.....	.....	.....	[4]14.50
No. 2 heavy melting	16.50	.....	16.85	17.00	16.00	16.00	.....	.....	.....	[4]13.50
Dealer No. 1 bundles	16.50	.....	16.85	17.00	16.00	16.00	.....	.....	.....	[4]13.50
Dealer No. 2 bundles	15.50	.....	15.85	16.00	15.00	15.00	.....	.....	.....	[4]12.50
Mixed borings and turnings	12.75	13.10	13.10	.....	12.25	12.25	.....	.....	.....	[4]9.75
Machine shop turnings	13.00	13.35	13.35	15.50	15.00	15.00	.....	.....	.....	[4]10.00
Shoveling turnings	14.00	14.35	14.35	16.50	16.00	16.00	.....	.....	.....	[4]11.00
No. 1 busheling	17.00	.....	17.35	17.50	16.50	16.50	.....	.....	.....	[4]14.00
No. 2 busheling	13.00	.....	13.35	13.50	12.50	12.50	.....	.....	.....	[4]10.00
Cast iron borings	13.25	13.60	13.60	13.75	12.75	12.75	.....	.....	.....	[4]10.25
Uncut structurals and plate	18.50	.....	16.85	17.00	16.00	16.00	.....	.....	.....	[4]13.50
No. 1 cupola	20.00	.....	20.35	[3]19.00	20.00	.....	20.50	21.00	22.00	18.00
Heavy breakable cast	18.50	.....	18.85	[3]17.50	18.50	.....	.....	.....	20.50	17.00
Stove plate	17.00	15.60	14.10	[3]16.00	17.00	.....	17.50	18.00	17.50	14.00
Low phos. billet and bloom crops	22.50	.....	22.85	23.00	22.00	.....	.....	.....	.....	19.50
Low phos. bar crops and smaller	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....	19.50
Low phos. punch. and plate scrap***	20.50	.....	20.85	21.00	20.00	.....	.....	.....	.....	17.50
Machinery cast cupola size††	21.00	.....	21.35	[3]20.00	21.00	.....	21.50	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	.....	21.85	[3]20.50	21.50	.....	22.00	22.50	23.50	19.50
Clean auto cast	21.50	.....	21.85	[3]20.50	21.50	.....	22.00	22.50	23.50	19.50
Punchings and plate scrap‡‡	19.50	.....	19.85	20.00	19.00	.....	.....	.....	.....	16.50
Punchings and plate scrap§§	18.50	.....	18.85	19.00	18.00	.....	.....	.....	.....	15.50
Heavy axle and forge turnings	17.00	.....	17.35	17.50	16.50	.....	.....	.....	.....	14.00
Medium heavy elec. furnace turnings	15.50	.....	15.85	16.00	15.00	.....	.....	.....	.....	12.50

*Claymont, Del., Coatesville, Conshohocken, Phoenixville, Harrisburg, Pa. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Seattle; *** ¾-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ¾-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under. **Alloy, W. Va., base $17.60. †Base price at Portsmouth and Ashland; Middletown 25 cents less. [1]Add $1.75 at Pittsburgh. [2]Atlanta base only on Nos. 1 and 2 H.M. steel, No. 1 comp. sheets and Nos. 1 and 2 dealer bundles. [3]Also base prices at Minneapolis and St. Paul. [4]Add $2 at Minnequa, Colo.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago	Kokomo, Ind.	*East. Pa.	Sparrows Pt.	Cleveland	Ashland, Ky., Portsmouth, Middletown, O.
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$19.25	$19.75	$19.75	$20.50	$20.50
Scrap rails	22.00	22.00	20.75	20.25	20.75	20.75	21.50	21.50
Rerolling quality rails (a)	23.50	23.50	22.25	21.75	22.25	22.25	23.00	23.00
Scrap rails 3 feet and under	24.00	24.00	22.75	22.25	22.75	22.75	23.50	23.50
Scrap rails 2 feet and under	24.25	24.25	23.00	22.50	23.00	23.00	23.75	23.75
Scrap rails 18 inches and under	24.50	24.50	23.25	22.75	23.25	23.25	24.00	24.00

	Buffalo	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$20.25	$18.50	$17.00	$18.85	$19.00	$18.00	$15.50
Scrap rails	21.25	19.50	18.00	19.85	20.00	19.00	16.50
Rerolling quality rails (a)	22.75	21.00	19.50	21.35	21.50	20.50	18.00
Scrap rails 3 feet and under	23.25	21.50	20.00	21.85	22.00	21.00	18.50
Scrap rails 2 feet and under	23.50	21.75	20.25	22.10	22.25	21.25	18.75
Scrap rails 18 inches and under	23.75	22.00	20.50	22.35	22.50	21.50	19.00

*Philadelphia, Wilmington, Del.; §Los Angeles, San Francisco, Seattle.

NOTE: Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such basing points shall be the maximum price at consumer's plant at any point on the railroad's line. (a) Re-laying quality $5 higher.

Sheets, Strip

Sheet & Strip Prices, Page 108

Impact of the new priority order on the sheet market has had the effect of practically stopping all non-defense bookings, though production and delivery on orders already booked will be continued the remainder of August, as far as defense priority requirements will allow. What the situation will be after Sept. 1 remains to be seen when schedules have been rearranged to conform to the new plan. It is believed material in process may be allowed to be delivered after that date.

Galvanized sheets are particularly tight, production being only about 53 per cent of capacity. Several mills are out of the market for this grade.

Stampings producers without defense contracts are nearing the end of stocks and are faced with curtailment, as little material is being shipped to them. In some cases output is being reduced already. How much sheet tonnage can be obtained after Sept. 1 is problematical.

Strip production holds at capacity but deliveries continue to recede. One producer of narrow strip, 2½ inches and under, finds deliveries now nine to ten months, contrasted with eight to nine months recently. Backlogs hold and some producers of cold strip find new orders equal to shipments, with proportion of defense work increasing. Hot-rolled strip supply to re-rollers is uncertain but in the main sufficient is received to maintain capacity production.

Plates

Plate Prices, Page 108

Deliveries of plates are being pushed further into the future in many cases, due to receipt of earlier priorities on material deemed necessary for immediate rolling for defense purposes. Such tonnages are being allocated in increasing volume and rolling schedules are being revised constantly. Effect of the full priority order is expected to intensify this situation and non-defense business will be delayed further, until pressing government orders have been filled.

A number of platemakers have been out of the market as far as civilian tonnage is concerned. Imposition of the priority order will solve some of the difficulties of sellers in dealing with regular customers seeking supplies without preference orders.

Shipyard work has been given first call on production and deliveries for most part have kept pace with ship construction. Floor plate demand is brisk and deliveries are fairly prompt, from four to eight weeks.

In addition to about 1,000,000 tons of plates, the larger part 76-inches wide, for the crude oil line from Texas to the Atlantic seaboard, allocation of which is expected to be made immediately, orders will be

placed soon for 200,000 to 250,000 tons of plates for oil and gasoline drums. Both these projects will take high priority, probably second only to shipbuilding. Deliveries are expected to begin early in fourth quarter.

PLATE CONTRACTS PLACED

200 tons, 500,000-gallon tank and tower, military airport, Victorville, Calif., to Chicago Bridge & Iron Co., Chicago.

PLATE CONTRACTS PENDING

220 tons, 51½-inch steel water supply pipe for Seattle, 5/16 to 9/16 gage; Hydraulic Supply Mfg. Co., Seattle, lone bidder at $28,666, contingent on obtaining materials.

Bars

Bar Prices, Page 109

Steel bar consumption is at a peak, this form of steel providing material for a wide variety of products, especially alloy bars, required for many defense purposes. Indications are for long continued demand for all forms of bars, with expectation of an increase under accelerated defense needs.

Heavy machinery manufacturers are operating at capacity and using every means to increase production. With an increasing number of new machine tools being put in service demand for bars is growing to provide material for them.

Deliveries of forging bars are heavy but high hammer operations absorb current deliveries and prevent accumulation of inventory. It is believed that within a month drop forgers will be producing only government work.

Bar stocks in warehouses are badly out of balance but a better priority rating is expected, around A-10, which will aid in getting better supplies and thus help in distribution for defense.

In New England small arms manufacture takes relatively the most tonnage, though machine tool builders are large users. Mills have large orders and deliveries extend well into next year.

Steelmakers are receiving many inquiries as to deliveries to commercial users in cases where material is in process on which shipments would be made after Sept. 1, when the new priority order goes into effect. Some leeway has been granted in the past in similar cases. In connection with the nickel steel priority order, effective May 1, it was provided that all contracts which had progressed beyond the ingot stage would be allowed to go through, even though shipments would be made after the effective date of the order. No clarification on this point has been made up to this time.

Pipe

Pipe Prices, Page 109

Pipe mills have heavy backlogs, mainly for defense work and for oil pipelines, considerable of which was allocated for immediate production to relieve oil shortages in the East. Production for these purposes is proceeding well and meeting schedule in most cases.

National Defense Pipelines Inc., formed by 11 leading oil-producing companies, with the approval of Harold L. Ickes, petroleum co-ordinator, will build 1820 miles of 24-inch crude oil line from Texas to the New York-Philadelphia area, capable of delivering 250,000 barrels of crude oil daily to the Atlantic seaboard. The main line would require 700,000 tons of plates, 76 inches wide, to be electric welded. The gathering lines would require close to 300,000 tons. Formal orders are expected to be issued shortly for allocation of this material.

In New England resale demand for merchant steel pipe is strong at firm prices but replacements are giving more concern. Rationing of tonnage, especially in galvanized, continues, and producers tend to follow through to the ultimate consumer and replace stock in proportion, to prevent inventory accumulation. Small diameter steel pipe is in larger demand because of difficulty in obtaining brass pipe.

Cast pipe foundries are somewhat limited by pig iron supply and in the South operations are five to six days a week according to iron shipments. Priorities for defense limit sales of cast pipe for water lines to municipalities.

STEEL PIPE PLACED

200 tons or more, 12 and 16-inch for Moscow, Idaho, water system, to Crane Co.; accessories to Hughes & Co., Spokane, Wash.

CAST PIPE PENDING

1000 tons, 4 to 16-inch, San Francisco; United States Pipe & Foundry Co., Burlington, N. J. low.

500 tons, 36-inch, San Diego, Calif.; city purchased concrete pipe.

300 tons, 8-inch, Stone Way and other improvements, Seattle; bids in Aug. 14.

Unstated, $40,000 East Marginal Way project, Seattle; bids soon.

Wire

Wire Prices, Page 109

Demand for wire continues heavy, specialties being especially required. Deliveries are further extended and proportion of defense orders is increasing. A larger part of current orders requires long processing, adding to delay in filling order.

Wire rods continue scarce and wire production suffers from steady supply. Long continued capacity operation is resulting in need for frequent replacement and repair, a further drag on full output. Jobber stocks are depleted and unbalanced and consumers depending on these distributors find difficulty in obtaining shipment.

Automobile builders and partsmakers have not reduced their requirements materially during the changeover period. Receipt of orders with high priority rating is forcing much tonnage further back on schedules.

Wire rope and cable manufacturers in New England have large backlogs, particularly of the latter, a large part of the unshipped tonnage being for defense. Buying of spring wire and screw machine stock is at continued high level.

Rails, Cars

Track Material Prices, Page 109

While freight car buying is experiencing a lull, locomotive orders continue heavy and several lots were placed last week, well distributed among builders. Diesel-electric units have the call and 21 were placed last week, with no steam units.

New York, New Haven & Hartford divided 20,000 tons of rails between Bethlehem Steel Co. and Carnegie-Illinois Steel Corp., for 1942 delivery. This is the first large rail tonnage placed within several months.

RAIL ORDERS PLACED

New York, New Haven & Hartford, 20,000 tons; 15,000 tons 131-pound and 5000 tons 112-pound; divided equally between Carnegie-Illinois Steel Corp., Pittsburgh, and Bethlehem Steel Co., Bethlehem, Pa.

CAR ORDERS PLACED

Army, 500 tank cars, to General American Transportation Co., Chicago.

Atlantic Coast Line, thirty 50-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Burlington Refrigerator Express, 300 refrigerator cars, to own shops at Platts-

mouth, Nebr.

Fruit Growers' Express, 900 refrigerator cars, to own shops.

CAR ORDERS PENDING

Chicago Great Western, 200 fifty-ton box cars; bids asked.

LOCOMOTIVES PLACED

Central of New Jersey, 10 diesel-electric; two 1000 and two 600-horsepower to Electro-Motive Corp., La Grange, Ill.; four 600-horsepower, to Baldwin Locomotive Works, Eddystone, Pa.; two 600-horsepower to American Locomotive Co., New York.

Louisville & Nashville, eight 4000-horsepower diesel-electric, to Electro-Motive Corp., La Grange, Ill.

Philadelphia, Bethlehem & New England, one 1000-horsepower, to Electro-Motive Corp., La Grange, Ill.

Wabash, two 600-horsepower diesel-electric switchers, one each to Electro-Motive Corp., La Grange, Ill., and Baldwin Locomotive Works, Eddystone, Pa.

BUSES BOOKED

A.c.f. Motors Co., New York: Thirty 31-passenger for Philadelphia Transportation Co., Philadelphia; eight 31-passenger for Community Traction Co., Toledo, O.; five 31-passenger for Pittsburgh Motor Coach Co., Pittsburgh; four 37-passenger for Penn-Ohio Coach Lines Co., Youngstown, O.; two 37-passenger for Quaker City Bus Co., Ocean City, N. J.; two 34-passenger for Mon Valley Bus Co., Clairton, Pa.; five 40-passenger trolley coaches for Wilkes-Barre Railway Corp., Wilkes-Barre, Pa.; 40 intercity coaches for Santa Fe Trailways, Chicago; 25 intercity coaches for Southeastern Greyhound Lines, Lexington, Ky.; three intercity coaches for Union Bus Co., Jacksonville, Fla.

Structural Shapes

Structural Shape Prices, Page 109

Structural fabricators have capacity orders on books and as a result of full priority on steel are devoting attention to defense projects on which high preference ratings will apply. Figuring civilian jobs which carry no priority is regarded as a waste of time as the new ruling will prevent steel being provided for them.

Some lull has been experienced in demand for structurals but defense work about to come out on inquiry will provide large tonnages shortly. Considerable steel piling for defense work on the Pacific coast is about to be distributed. A blimp base at Weymouth, Mass., and an ammunition storage base at Hingham, Mass., will require a heavy tonnage. General contracts for both projects have been awarded.

Plain material deliveries are about 14 weeks, except for ship work, which are earlier. Fabricated material deliveries are rare under four months.

SHAPE CONTRACTS PLACED

11,500 tons, assembly building, Boeing Airplane Co., Wichita, Kans., divided as follows: 10,000 tons, American Bridge Co., Pittsburgh; 1300 tons, Kansas City Structural Steel Co., Kansas City, Kans.; 200 tons, George C. Christopher & Son Iron Works, Wichita, Kans.; Austin Co., Chicago, contractor. 300 to 500 tons miscellaneous still be placed.

1400 tons, fourth portion power plant, Union Electric Co., Venice, Ill. to Stupp Bros. Bridge & Iron Co., St. Louis, Mo.

1200 tons, Fort Belvoir, Va., to Fort Pitt Bridge Works, Pittsburgh.

790 tons, power plant, West Penn Public Service Co., Ridesville, N. Y., to Fort Pitt Bridge Works, Pittsburgh.

750 tons, drum gates, specification 963, Friant dam, Friant, Calif., for Bureau of Reclamation, to American Bridge Co., Pittsburgh.

710 tons, building extension for Jones & Laughlin Steel Corp., Pittsburgh, to Fort Pitt Bridge Works, Pittsburgh.

510 tons, state bridge 5947, Sauk Rapids, St. Cloud, Minn., to American Bridge Co., Pittsburgh; bids Aug. 8.

500 tons, hangar, District of Columbia, to Fort Pitt Bridge Works, Pittsburgh.

445 tons, shipways for New York Shipbuilding Co., Camden, N. J., to American Bridge Co., Pittsburgh.

380 tons, building, Aero Products division, General Motors Corp., Vandalia, O. to Indiana Bridge Co., Muncie, Ind.

325 tons, crane bridges, Philadelphia, for

SHAPE AWARDS COMPARED

	Tons
Week ended Aug. 16	21,057
Week ended Aug. 9	11,195
Week ended Aug. 2	26,732
This week, 1940	19,467
Weekly average, 1941	29,368
Weekly average, 1940	21,250
Weekly average, July, 1941	26,273
Total to date, 1940	701,252
Total to date, 1941	1,001,928

Includes awards of 100 tons or more.

navy, to American Bridge Co., Pittsburgh.

325 tons, bridges, Sinsinawa river, Menominee, Ill., for Illinois Central railroad, to American Bridge Co., Pittsburgh.

315 tons, roof framing, Shasta power plant, specification 1520-D, Shasta dam, California, for Bureau of Reclamation, to American Bridge Co., Pittsburgh.

250 tons, grade crossing elimination over Chicago & Alton railroad, Carlinville, Ill., for state, to Bethlehem Steel Co., Bethlehem, Pa.; bids April 11.

225 tons, underpass, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa., through Wark & Co., Philadelphia.

215 tons, bridge over New York, New Haven & Hartford railroad, Northbridge, Mass., for state, to American Bridge Co., Pittsburgh.

212 tons, state bridge 1F and 1VF, Oregon, Ill., to Clinton Bridge Works, Clinton, Iowa; bids July 29.

205 tons, Stewart avenue bridge over Fall creek, Ithaca, N. Y., for city, to American Bridge Co., Pittsburgh.

200 tons, wall armor, Emsworth dam, Ohio river, Emsworth, Pa., for army engineers, to American Bridge Co., Pittsburgh.

175 tons, building, Niagara Alkali Corp., Niagara Falls, N. Y., to R. S. McMannus Steel Construction Co., Buffalo.

170 tons, Cut Bank creek bridge FAP-147-(2), Cut Bank, Mont., for state, to American Bridge Co., Pittsburgh.

140 tons, plant additions, for Onondaga Pottery Co., Syracuse, N. Y., to American Bridge Co., Pittsburgh.

115 tons, state bridge 2188, Fredericksburg, Ind., to American Bridge Co., Pittsburgh; bids July 15.

SHAPE CONTRACTS PENDING

7000 tons, assembly shop, dry docks 5 and 6, Brooklyn navy yard; bids asked.

3900 tons, Biscayne bay causeway bridges, Miami, Fla., for Dade county, Florida.

2400 tons, superstructure, Clays ferry bridge over Kentucky river, Madison-Fayette counties, Kentucky, for state.

2200 tons, upper and lower lock gates, Ft. Loudoun dam, Lenoir City, Tenn., for Tennessee Valley Authority.

2200 tons, connections between State and Dearborn street subways and Chicago Rapid Transit lines, for City of Chicago; bids Aug. 28.

1600 tons, bascule bridge for state of New Jersey, over Cheesequake creek; bids Aug. 22.

750 tons, track stringers, Manhattan bridge, New York.

650 tons, bascule bridge over Pine river, Charlevoix, Mich., for state.

360 tons, grade crossing elimination, Norwich, N. Y.; bids Aug. 27.

350 tons, St. Michael hospital, Newark, N. J., Thomas J. Hughes, New York, general contractor.

295 tons, five prefabricated bridges for Alaska road commission; bids to J. R. Ummel, purchasing agent, Seattle, Aug. 25.

175 tons, highway bridge, Steuben county, New York; bids Aug. 27.

160 tons, state underpass, Woodbury, N. J.; bids Aug. 22.

160 tons, repairs to bridges, various locations, for Chicago, Milwaukee, St. Paul & Pacific railroad.

150 tons, aprons, hinge girders, etc., for Long Island railroad, Brooklyn, N. Y.

150 tons, underpass bridge 76.2, Towner, McHenry county, N. Dak., for state; bids rejected.

140 tons, draft tube gates, Kentucky dam, Gilbertsville, Ky., for Tennessee Valley Authority.

140 tons, state bridge contract 2212, Ladoga, Ind.; bids taken Aug. 5 rejected; new bids Aug. 29.

120 tons, building extension, for Westinghouse Electric & Mfg. Co., Sharon, Pa.

110 tons, building extension, for Westinghouse Electric & Mfg. Co., Trafford, Pa.

100 tons, highway bridge, Jefferson county, New York; bids Aug. 27.

100 tons or more, two taintor gates, hoists and crane for Priest river power house of Northern Idaho REA. Sandpoint, Idaho; Olson Mfg. Co., Boise, low.

Unstated, locomotive cranes for Puget Sound navy yard; estimated cost $300,000; bids to supply officer Aug. 20.

Unstated, 175-ton traveling crane for Bonneville project; Cyclops Iron Works, San Francisco, low at $68,598.

Reinforcing Bars

Reinforcing Bar Prices, Page 109

Heavy inquiry is out for reinforcing bars but relatively few projects are being awarded, as suppliers are unable to provide material. Stocks are depleted and replacement except for defense work will prevent orders being taken except under high priority.

Substantial tonnage for direct defense, navy yards, stations and bases, are about to be bid and probably the bars will be allocated. Contractors who have taken jobs on a cost-plus basis find difficulty in obtaining bars.

Two additional housing projects

are up for bids at Providence, R. I., requiring about 1500 tons and difficulty is expected in placing the reinforcing material.

REINFORCING STEEL AWARDS

7000 tons, buildings for navy yard, Bremerton, Wash., to Bethlehem Steel Co., Seattle, Wash.

3000 tons, U. S. Rubber Co., small arms plant, Des Moines, Iowa, to Inland Steel Co., Laclede Steel Co. and Youngstown Sheet & Tube Co., through Weitz Co. Inc., contractor.

2000 tons, naval ordnance plant addition, Burns City, Ind., to Inland Steel Co., through Maxon Construction Co., contractor.

1200 tons, southwestern proving grounds, Hope, Ark.; 700 tons to Laclede Steel Co., St. Louis, 500 tons to Truscon Steel Co., Youngstown, O., through W. E. Callahan, contractor.

1100 tons, assembly plant, Boeing Aircraft Co., Wichita, Kans., divided between Sheffield Steel Corp., Kansas City, Mo., and Colorado Fuel & Iron Corp., Denver; Austin Co., Chicago, contractor.

1000 tons, Ford Motor Co. plane assembly plant extension, Dearborn, Mich., to Bethlehem Steel Co. through Bryant & Detwiler, contractor.

900 tons, propeller laboratory and test stand., Wright field, O., to Pollak Steel Co. and Ferro Concrete Construction Co.

800 tons, pier, navy yard, Bremerton, Wash., to Bethlehem Steel Co., Seattle, Wash.

584 tons, addition M-3, Abbott Laboratories, North Chicago, Ill., to Ceco Steel Products Corp., Chicago; bids Aug. 7.

500 tons, addition, Eastman Kodak Co., Rochester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., through A. W. Hopewell & Sons Co., Rochester, N. Y.

500 tons, Fort Devens, Mass., to Bethlehem Steel Co., Bethlehem, Pa., through Matthew Cummings Co., Cambridge, Mass., contractor.

440 tons, superstructure unit 17 and substructure unit 18, Fiske street station, Commonwealth Edison Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Herlihy Mid-Continent Co., Chicago, contractor.

400 tons, navy yard hospital facilities, Norfolk, Va., to Truscon Steel Co., Youngstown, O., through Richardson Co., contractor.

328 tons, connecting tunnel, Standard Oil Co., Whiting, Ind., to Joseph T. Ryerson & Son Inc., Chicago; Great Lakes Dredge & Dock Co., Chicago, contractor; John C. Tully Co., Chicago, subcontractor.

300 tons, Army Air Corps storage buildings, Patterson Field, O., to Pollak Steel Co.

300 tons, Ford Motor Co. sewage plant, Ypsilanti, Mich., to Truscon Steel Co. through Couse & Saunders, contractor.

300 tons, U. S. Army, miscellaneous warehouses, Wright Field, O., to Truscon Steel Co.. F. Messer & Sons, contractors.

300 tons, Recorder of Deeds office building, Washington, to Bethlehem Steel Co., Bethlehem, Pa., Jeffries-Dyer Inc., contractor.

250 tons, army airport projects, to Northwest Steel Rolling Mills, Seattle.

200 tons, Ford Motor Co. bomber plant power station, Ypsilanti, Mich., to Bethlehem Steel Co. through Bryant & Detwiler, contractor.

200 tons, Broadlawn hospital, Des Moines, Iowa, to Des Moines Steel Co., Des Moines, Iowa. A. H. Neumann & Bros., Des Moines, Iowa, contractor; bids July 15.

118 tons, flood wall, north unit, Ironton, O., to Jones & Laughlin Steel Corp., through Ben-Tom Supply Co., Columbus, O.; Lewis & Frisinger Co., contractor.

110 tons, housing project, Dayton, O., to Truscon Steel Co., Youngstown, O. through W. A. Sheets & Sons, contractors.

100 tons, tank plant, Chrysler Corp., Detroit, to Truscon Steel Co., Youngstown, O.

100 tons, field artillery armory, Syracuse, N. Y., to Bethlehem Steel Co. through W. E. Bouley Co., contractor.

100 tons or more, state bridge Fergus county, Montana, to unstated interest; Fred B. Dudley, Great Falls, contractor.

100 tons or more, state bridge Blaine county, Mont., to unstated interest; Walter Mackin, Billings, contractor.

100 tons, Firestone Rubber Co., gun mount plant, Akron, O., to Franklin Steel Co.

100 tons, building No. 184 extension, navy yard, Norfolk, Va., to Truscon Steel Co., Youngstown, O., Rust Engineering Co., contractor.

CONCRETE BARS COMPARED

	Tons
Week ended Aug. 16	22,430
Week ended Aug. 9	7,061
Week ended Aug. 2	21,392
This week, 1940	9,147
Weekly average, 1941	12,238
Weekly average, 1940	8,823
Weekly average, July, 1941	16,563
Total to date, 1940	291,172
Total to date, 1941	416,085

Includes awards of 100 tons or more.

REINFORCING STEEL PENDING

7000 tons, shell loading plant, Parsons, Kans., Kiewit, Paschen & Condon, contractor.

5700 tons, Lone Star ordnance plant, Texarkana, Tex.

5000 tons, sewer project, borough of Queens, New York City; bids Aug. 15.

4000 tons, army depot, Memphis, Tenn.

4000 tons, central ordnance regulating station, Momence, Ill., for government; Henry Eriesson Co., Chicago, contractor; project reported abandoned.

2000 tons, War Department warehouse, Lacarne, Ill.

1500 tons, Ninth street bridge, Richmond, Va.; bids Aug. 21.

600 tons, Sperry Gyroscope factory, North Hempstead, N. Y.; Stone & Webster, contractors.

600 tons, Potomac Electric Power Co., Washington; Stone & Webster, contractors.

590 tons, bridge over Kentucky river, Fayette county, Ky.; bids Aug. 22.

500 tons, Lyons Inc. small arms plant, Detroit.

400 tons, Connecticut river flood control dike, Hartford, Conn., A. I. Savin Construction Co., contractor.

375 tons, flood control project, U. S. engineer, Corning, N. Y.

350 tons, North American Cement Co., Catskill, N. Y., Nicholson Co., contractor.

200 tons, railroad overhead crossing, Kosmosdale, Ky.; bids Aug. 22.

200 tons, paving, Lyons county, Iowa, Western Contracting Corp., Sioux City, Iowa, contractor; bids July 29.

200 tons, Revere Copper & Brass Co., tube mill, Baltimore, Md.; Jas. Stewart Co., contractor.

180 tons, paving, Decatur county, Iowa, Booth & Olsen Co., Sioux City, Iowa, contractor; bids July 29.

125 tons, depot and office building, Anchorage, Alaska, for Alaska Railroad; J. B. Warrack Co., Seattle, contractor, $267,500.

100 tons or more, 170-foot girder bridge, Chelan county; bids in Aug. 11.

100 tons, including trash racks, stoplogs, cranes, crane rails, etc.; Tule Lake irrigation project; bids to reclamation bureau, Klamath Falls, Oreg., Aug. 25, materials by bureau.

Pig Iron

Pig Iron Prices, Page 110

Little change in the pig iron situation has taken place since the priorities order took effect and there is still considerable confusion and some delay, due to slowness in bookkeeping under the order. Some buyers without defense work still hope for supplies of iron but for the present the prospect is they can get only occasional cars.

Leeway of ten days has been granted pig iron consumers in making out forms for their September requirements and a similar extension has been given sellers in filing reports with OPM. The extended date for filing now is Aug. 25.

Pig iron producers have been instructed by OPM to set aside two per cent of their production during September for a pool from which allocations will be made to fill urgent needs. The letter of instruction stated this is a minimum compatible with defense needs and less than the amount integrated companies regularly have sold in the open market. The pool is not to be regarded as the total amount of iron to be sold in the open market and it is intended that integrated companies will continue to carry their regular merchant load as formerly.

Sellers of Buffalo iron into New England under the OPM ruling may continue to absorb part of the freight as formerly, but directed shipments may be on an f.o.b. basis. New England iron shipped outside by order will also be f.o.b., furnace. The Everett furnace is producing about 16,000 tons monthly, at capacity, and is seeking to build up some malleable reserve, this grade having been depleted in recent weeks. Textile machinery builders are engaged more than 60 per cent on defense work.

Woodward Iron Co., Birmingham, Ala., has taken one blast furnace off for repair but is expected to resume production in about a week,.

Consumers of silveries and bessemer ferrosilicon experience increasing tightness, shortage of the former being acute and requiring much substitution. Ferrosilicon has been used in some cases to replace silvery iron, thus increasing demand for the former. When plants now under construction begin production the situation in these grades may be relieved, but this will be after the close of the year.

Stovemakers at Belleville, Ill., 23

in number, have been assured of priorities on pig iron for their product going into army cantonments and defense housing. A threatened shutdown is thus averted.

Scrap

Scrap Prices, Page 112

A mandatory priority order for steel and iron scrap is expected to be issued shortly by OPM, to control flow from producing point to consumer, complementing the mandatory order on pig iron, both being similar raw materials. The order will not attempt to disrupt arrangements between steel companies and their customers involving identified material, such as alloy scrap, and will not affect prices as ordered by OPACS. Scrap from remote areas will not be covered in this order, this feature being still under study, with a further ruling expected later.

How to obtain sufficient scrap to maintain steel production is the paramount consideration in that market, prices being secondary. Although reserves are low and receipts are less than consumption steelmakers have managed thus far to avoid shutdowns, though in some instances perilously close.

Scrap yards are not holding material and shipments are made as fast as it can be prepared. A survey in one district revealed that one large yard had no scrap and another only seven tons. In some cases railroad lists are not offered for bids but are issued with maximum prices stated and distribution is made on the basis of former purchases. A current list of the Pennsylvania railroad contains 9000 tons, less than half the quantity offered in recent months.

Various expedients are being tried to increase flow of scrap. Lukens Steel Co., Coatesville, is advertising in newspapers for information where material can be obtained and households and business concerns are urged to turn in whatever they may have accumulated.

Buffalo steelmakers fear the shortage may appear sooner than expected as shipments by lake, which have been heavy, have been absorbed in current melt and the close of navigation will shut off this source. The same situation applies to barge shipments by canal from the East. Neither will provide a winter reserve.

Pittsburgh dealers believe the increased ceiling on low phos will ease the shortage in electric furnace supply.

Cast scrap presents the tightest situation, aggravated by strict control of pig iron distribution. Some foundries are operating hand-to-mouth as scrap is received, production being interrupted from time to time. In some cases badly burned iron, formerly rejected, is being used, presenting new problems to the foundry operator.

While September promises to be a good month in motor car production, providing more quick-return scrap to some extent, the swing to large scale defense production at Detroit does not offer much aid as scrap from these operations is largely alloy steel, which can not be used in open hearths because of the alloy content. As an example, scrap from the Chrysler tank arsenal is largely chrome-nickel-molydenum turnings or other alloys, difficult to break up and handle and impossible to use in regular steelmaking.

An interesting development is reported from the East relative to the attitude of the Navy department in disposing of its scrap. It is under-

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%	1.40
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, 0.50 vanadium	13.50
Turnings, millings, same basis	11.50

stood bids higher than the OPACS ceiling will be accepted, on the ground that it is legally bound to take the highest bid from responsible bidders, regardless of the ceiling regulation.

Canada

Toronto, Ont.—With no slackening of orders and inquiries for steel for war purposes and with demand well in excess of domestic supply, special government action is now being taken to turn supplies from civilian to defense channels. The steel controller has issued orders freezing supplies of sheets in the hands of consumers pending disposal for war requirements. Earlier in the year similar action was taken with regard to plates and the consumer holding this type of steel is permitted to draw on his inventories only through order from the steel controller. More extensive freezing proposals are said to be under consideration. Practically all production to the end of this year has been contracted and no further orders are being accepted. Warehouse operators find special difficulty in obtaining supplies and stocks are being depleted.

Demand for plates is rising with increasing requirements from shipbuilders and tank plants. However, the government has taken all output from Canadian mills and plate is being shipped to consumers in most need. Non-defense consumers are unable to obtain supplies and are scouring the United States market with little success.

With no sheets available from mills before the first of 1942, producers have withdrawn from the market and buyers are under the necessity of looking to the United States for supplies. Large tonnage contracts overhang the market, and are expanding rapidly as government contracts are placed for war supplies, in which sheets form a major part.

Merchant bars have experienced a rush of new buying in the past week or ten days and mills have only limited supplies available for delivery at the year-end and it is expected that books will close in the next few days. There is a possibility, however, that Steel Co. of Canada Ltd., may be able to enlarge its production later in the year and make additional supplies available.

Orders and inquiries for merchant pig iron exceed production of foundry and malleable grades. All current orders are going through the hands of the steel controller for approval, and producers are filling orders at a rate of about 4000 tons weekly. No forward delivery contracts are permitted under priority rulings.

Canadian steel controller has made effective his ruling of July 9, that all contracts on books of iron and steel scrap dealers must be cancelled by August 9, with the result that dealers now must adhere strictly to maximum prices. Demand for steel scrap is well in excess of supply, and in addition to taking all offerings from Canadian dealers, steel mills and electric furnace interests are importing large tonnages from the United States. Shipments of several thousand tons of steel scrap have been made from the Buffalo area to Hamilton mills during the past couple of weeks.

Pacific Coast

Seattle — Pressure for higher ceiling on scrap having proved unsuccessful, dealers have concluded that no concessions are likely. In consequence, larger shipments from the country are noted and receipts are expected to increase. For the last month shippers have been holding back in the hope that higher prices would be permitted. While tidewater stocks are low, rolling mills report supplies are ample for immediate needs. With the Canadian embargo lifted, British Columbia is a potential source of supply for local mills, one lot of 1200 tons, originally intended for shipment to Japan from Vancouver, having been purchased by local interests. Cast iron scrap continues scarce and in strong demand, some foundries finding it difficult to obtain sufficient tonnage.

This week brought a welcome decline in demand for concrete bars and shapes, giving fabricators opportunity to give attention to business in hand. Local rolling mills have backlogs to the end of the

year, fabricators for 90 days or more.

Concrete shipbuilding in this area is in prospect, the Olympic Ship Construction Co. having been organized at Olympia, Wash., planning to build barges and tankers on a site leased from the Port of Olympia.

Puget Sound navy yard has called bids Aug. 20 for locomotive cranes estimated to cost $300,000, tonnage unstated. Cyclops Iron Works, San Francisco, is low $68,598, to Bonneville project for fabricating a 175-ton traveling crane. Alaska road commission has called bids at Seattle, Aug. 25, for five prefabricated bridges, involving 295 tons of shapes.

Industrial expansion continues, shipyards adding ways and construction buildings. Pacific Coast Paper Mills, Bellingham, Wash., is increasing capacity 50 per cent and adding a new paper machine and other equipment, according to Victor A. Hughes, secretary.

Warehouses report steady sales, replacements, when they are obtainable, coming by rail. As a rule heavier consignments of plates and shapes for shipbuilding are still moving by water although intercoastal steamship service has been more than 50 per cent reduced by diversion of vessels to other routes.

Semifinished

Semifinished Prices, Page 109

Semifinished steel order books will be virtually closed to all business which does not carry preference ratings after the new order becomes effective. There is now such a tremendous backlog of preferred business that tonnage available for non-defense use will drop to a trickle.

Currently, to cite one item, deliveries on forging billets are running a minimum of 90 days, with highest ratings. The same product without defense rating cannot be delivered before the end of first quarter, 1942. This date will be moved back still more under the new order.

Other semifinished material is in comparable position. Wire rods and sheet bars are extremely tight, and some nonintegrated pipe mills have been forced to curtail operations for lack of skelp. Some sales of ingots have been made, an event which rarely happens in normal times.

Steel in Europe

Foreign Steel Prices, Page 111

London—(*By Cable*)—Call for special steels shows expansion in Great Britain but the general steel position is easier. Rerollers have some stocks of semifinished steel but these are not expected to last long. Demand for heavy steel scrap is persistent in all districts. The sheet trade is active. Heavy engineering foundries are fully occupied but the light casting trade is quiet.

Stettinius Suggests Priority Specialists

■ E. R. Stettinius Jr., Director of Priorities, last week suggested manufacturers and producers specifically assign special members of their staffs to handle priority matters.

A number of producers and manufacturers have already appointed priority specialists on their staffs to handle priority problems, so that all priority matters can be cleared through one central office.

Mr. Stettinius said:

"As the defense program continues, and as shortages increase in a number of scarce materials, manufacturers and producers will find themselves faced with an increasing number of procedure problems.

"The solution of these problems may be expedited if some member or members of the staff are assigned specifically to the handling of priority problems and procedures.

"If this is done, the manufacturing plant will always have available competent advice, within its own organization, on how priority problems may be handled and expedited."

Mr. Stettinius added that, when necessary, the Priorities Division will be prepared to hold training courses in priorities matters and procedures for the benefit of priorities specialists within homogeneous industrial groups.

382,876 Take Defense Plant Training Courses

■ Survey recently completed by the National Association of Manufacturers, New York, showed 659 defense industries had enrolled 382,876 men, women and youths in plant training courses to build up an "employment backlog" in anticipation of a shortage of 1,200,000 to 1,500,000 skilled and semiskilled workers in the next six months.

In addition to this reserve army of labor being trained by industry in its own plants and by its own instructors, 102,523 were enrolled in summer vocational school defense classes. The latter are being taught streamlined courses in all branches of skilled machine and assembly line labor, including technical training in engineering, metallurgy and tool design.

Located in 23 principal defense cities, the 659 plants surveyed are representative of the durable goods industries working on defense production. Emergency training program, it was reported, is particularly representative in Pittsburgh, Cleveland, and Hartford, Conn.

Training Within Industry Division of OPM surveyed 892 major defense industries in 16 of its 22 districts some weeks ago. Anticipated labor requirements of these industries for late 1941 and early 1942 were placed at 1,211,630 by the division.

Henderson Predicts Lower Mercury Prices

■ Prediction that current quotations on mercury, about $192 a flask, will be forced down in the near future by substantially augmented supplies that have been made available for civilian consumption was made last week by OPACS Administrator Leon Henderson.

"Prices quoted currently are completely out of line," said Mr. Henderson. "In my opinion there is no reason for any private buyer to pay present prices. They should be readjusted to substantially lower levels."

Anyone compelled to pay current quotations for his legitimate requirements of mercury was invited by Administrator Henderson to communicate with the price control agency immediately.

Mr. Henderson revealed the United States government has purchased the entire output of Mexico of about 2000 flasks a month and is releasing several hundred flasks for civilian consumption.

Nonferrous Metal Prices

Aug.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
9	12.00	12.00	12.25	53.00	51.25	5.85	5.70	7.25	17.00	14.00	35.00
11	12.00	12.00	12.25	53.00	51.25	5.85	5.70	7.25	17.00	14.00	35.00
12	12.00	12.00	11.75	52.90	51.50	5.85	5.70	7.25	17.00	14.00	35.00
13	12.00	12.00	11.75	53.00	51.37½	5.85	5.70	7.25	17.00	14.00	35.00
14	12.00	12.00	11.75	53.00	51.50	5.85	5.70	7.25	17.00	14.00	35.00
15	12.00	12.00	11.75	52.90	52.00	5.85	5.70	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high) 19.48
Copper, hot rolled 20.87
Lead, cut to jobbers 9.10
Zinc, 100 lb. base 12.50

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

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York 10.00-10.25
Cleveland 10.50-10.75
Chicago 9.25-9.50
St. Louis 9.50

Heavy Copper and Wire

New York, No. 1 ..... 11.25-11.50
Cleveland, No. 1 ..... 11.00-11.50
Chicago, No. 1 ..... 10.50-10.75
St. Louis 10.00-10.50

Composition Brass Turnings

New York 9.75-10.00

Light Copper

New York 9.25-9.50
Cleveland 9.00-9.25
Chicago 8.50-8.75
St. Louis 8.00

Light Brass

Cleveland 6.00-6.50
Chicago 6.50-6.75
St. Louis 6.00-6.50

Lead

New York 5.00-5.25
Cleveland 4.75-5.00
Chicago 4.75-5.00
St. Louis 4.50-4.75

Old Zinc

New York 4.50
Cleveland 4.00-4.12½
St. Louis 4.50-5.00

Aluminum

Mis., cast 11.00
Borings, No. 12 ..... 9.50
Other than No. 12 ..... 10.00
Clips, pure 13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l. 13.25
Standard No. 12 aluminum 16.00

Nonferrous Metals

New York — Fixing of ceiling prices on pig tin highlighted the nonferrous metal market news this past week. Leon Henderson, price administrator, stated the move was made to, "meet the inflationary situation in tin prices created by concern over shipments from the Far East".

Production, shipments and prices will not be affected, but a number of important developments in the metals are pending aside from the routine of Washington allocations.

Copper—It is expected that negotiations will soon be underway between the four producers and agents and the Metals Reserve Co. on contracts to cover the unsold production of Latin American copper to be produced and shipped from September through December. The MRC indicated several months ago that it would take over this unsold output. In August 80 per cent of the domestic and imported new copper is going into one kind of defense or another and only 20 per cent is left to care for consumer goods. Portion for civilian use may be even smaller in September, as amount for military use in expanding. Neither domestic output nor imports can be increased very soon.

Tin — The maximum tin price schedule as set up by OPACS was generally met with approval, al-

though some importers do not feel that imposition of maximums was necessary. Some criticised it because it made no provision of higher insurance rates; no control in the Far East and Chinese spot was seen too low.

Lead—With the naming of the industry committee to counsel with OPM, possibility of a partial priority on pig lead will be increased. Upwards of 50,000 tons of foreign lead could be distributed to consumers this month, but until the OPM feels the situation is urgent enough to release all available supplies, some lead is being held in reserve.

Zinc—The 35-man copper, zinc advisory committed brought the overall industry view to the initial meet this week at the OPM in Washington and as a body discussed the OPM allocation of the 19,000 tons of zinc the OPM is distributing in August to defense "hot spots," as urgent cases are called.

Ferroalloys

Ferroalloy Prices, Page 110

Ferroalloy sellers do not expect broad priority rulings such as have recently been announced on steel products and pig iron. They point out that general priority orders have already been issued over recent months in the individual cases of nickel, chromium and tungsten and they believe that future action may be along similar lines, as the necessity for placing additional alloys under general priority control becomes apparent. Ferrotitanium is regarded by some as one of the next items most likely to undergo such control; and possibly ferromanganese.

Shipments this month will be about on a parity with last, certainly no lower, trade leaders assert. Next month the volume should again move upward, as the seasonal dry spell in the South comes to an end and greater power can be developed.

Metallurgical Coke

Coke Prices, Page 109

Some diversion of coke from foundries to blast furnaces has created a shortage of premium grades and an important seller is seeking to place customers on a voluntary priorities basis.

Ample supply of lower grade coke is available, which can be utilized, though it increases costs somewhat. Beehive coke capacity in Pennsylvania is adequate for all needs.

Books Army Trailers

J. G. Brill Co., Philadelphia, has booked an order for 690 mobile power unit trailers for the army, to transport motor-generator sets, which actuate the electrical controls on anti-aircraft guns.

Additional Brill defense contracts include several hundred 37-millimeter howitzer gun carriages, gun forgings, wind shields for scout cars and a score of additional defense items.

Equipment

Seattle — Automotive equipment and electrical machinery continue to dominate a market that is the most active in years, handicapped by uncertain delivery and depleted stocks. Aqua Systems Inc., New York, has a $144,444 contract for gas fueling system for the army at Paine Field, near Everett, Wash. Pacific Car & Foundry Co., Seattle, is fabricating two transformer cars for the Bonneville project. Tacoma opened bids Aug. 11 for a 3500-kva. converter transformer. Kittitas county, Washington, will open bids at Ellensburg Aug. 25 for track type tractor and hydraulic angledozer.

Expansions To Double Canada's Plane Capacity

(*Concluded from Page* 49)

tion Ltd., Montreal, $29,056; Campbell Steel & Iron Works Ltd., Ottawa, Ont., $33,826; Ottawa Car & Aircraft Ltd., Ottawa, $51,090; S. & S. Aircraft Ltd., Ottawa, $37,800; Coleman Lamp & Stove Co. Ltd., Toronto, $28,006; DeHavilland Aircraft of Canada Ltd., Toronto, $5404; Dill Mfg. Co. of Canada Ltd., Toronto, $7105; McQuay Norris Mfg. Co. Ltd., Toronto, $5300; Wallace Barnes Co. Ltd., Hamilton, $13,173; Fleet Aircraft Ltd., Ft. Erie, Ont., $133,400; Bendix-Eclipse of Canada Ltd., Windsor, $48,237; MacDonald Bros. Aircraft Ltd., St. James, Man., $28,635.

Electrical equipment: War Office, England, $6000; Canada Wire & Cable Co. Ltd., Montreal, $17,803; Canadian Marconi Co., Montreal, $15,220; Canadian Pacific Railway Co., Montreal, $12,320; R. C. A. Victor Co. Ltd., Montreal, $41,480; Canadian General Electric Co. Ltd., Ottawa, $11,790; General Supply Co. of Canada Ltd., Ottawa, $19,400; Northern Electric Co., Ottawa, $57,879; R. C. A. Victor Co. Ltd., Ottawa, $5014; Amalgamated Electric Corp. Ltd., Toronto, $6151; Canada Wire & Cable Co. Ltd., Toronto, $16,243; Canadian Telephones & Supplies Ltd., Toronto, $10,700; Corman Engineering Corp. Ltd., Toronto, $64,600; Exide Batteries Ltd., Toronto, $13,566; Grimmer Wilson Engineering Co. Ltd., Toronto, $10,300; Willard Storage Batteries of Canada Ltd., Toronto, $10,350; Boston Insulated Wire & Cable Co. Ltd., Hamilton, $7480; Federal Wire & Cable Co. Ltd., Guelph, $6480.

Machinery: Pictou Foundry & Machine Co. Ltd., Pictou, N. S., $6175; Rudel Machinery Co. Ltd., Montreal, $12,301; Stephens-Adamson Mfg. Co. of Canada Ltd., Montreal, $13,370; General Supply Co. of Canada Ltd., Ottawa, $5408; Railway Power & Engineering Co. Ltd., Toronto, $20,418; A. R. Williams Machinery Co. Ltd., Toronto, $20,463; Canadian Machinery Corp. Ltd., Galt, $23,160; Waterloo Mfg. Co., Waterloo, Ont., $8150; Beaver Foundry & Furnace Co., Tilsonburg, Ont., $6044; Standard Iron Works Ltd., Edmonton, Alta., $8578.

Instruments: Air Ministry, England, $13,800; Canadian Marconi Co., Montreal, $7072; Harrison & Co., Montreal, $5408; United States Gauge Co., Montreal, $36,533; Canadian General Electric Co. Ltd., Ottawa, $25,714; Instruments Ltd., Ottawa, $232,183; Ontario Hughes-Owens Co. Ltd., Ottawa, $1,332,050; Allied Swiss Precision Instrument Corp., Toronto, $120,614.

War construction projects: Acadia Construction Co., Halifax, N. S., $80,000; Rhodes, Curry Ltd., Amherst, N. S., $145,087; Bremner, Norris & Co. Ltd., Montreal, $81,147; Thomas O'Connell Ltd., Montreal, $99,775; Redfern Construction Co. Ltd., Toronto, $70,470; Russell Construction Co. Ltd., Toronto, $400,306; Tomlinson Construction Co. Ltd., Toronto, $320,655; H. Frid Construction Co., Hamilton, $105,000; Pigott Construction Co. Ltd., Hamilton, $900,000; Bird Construction Co. Ltd., Winnipeg, Man., $191,985; Bennett & White Construction Co. Ltd., Calgary, Alta., $263,748; Northern Construction Co., and J. W. Stewart Ltd., Vancouver, B. C., $171,529.

Miscellaneous: Williams Bros., Ottawa, $35,000; Waterman-Waterbury, Regina, Sask., $51,595; Canadian Comstock Co. Ltd., Montreal, $78,117; Dominion Steel & Coal Co. Ltd., Montreal, $9960; Ainsworth Electric Co., Toronto, $48,000; Horton Steel Works Ltd., Toronto, $41,620; Toronto Iron Works Ltd., Toronto, $45,369; Regina Plumbing & Heating Ltd., Regina, Sask., $22,990; Dominion Twist Drill Co., Rock Island, Que., $6509; Northern Electric Co. Ltd., Halifax, N. S., $5855; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $5800; Empire Fire Extinguisher Corp., Ottawa, $54,925; C.-O.-Two Fire Equipment of Canada Ltd., Toronto, $5107; Hewett Metals Corp. Ltd., Windsor, $5597; Enterprise Foundry Co. Ltd., Sackville, N. B., $15,400; Moncton Plumbing & Supply Co. Ltd., Moncton, N. B., $23,832; Campbell Steel & Iron Works Ltd., Ottawa, $15,400; Metal Craft Co. Ltd., Grimsby, Ont., $5030; Beatty Bros. Ltd., Fergus, Ont., $34,344; St. Lawrence Steel & Wire Co. Ltd., Gananoque, Ont., $5103; Coulter Mfg. Co. Ltd., Oshawa, $61,241; Coulter Copper & Brass Co. Ltd., Toronto, $32,237; General Steel Wares Ltd., Toronto, $394,872; Pressure Castings of Canada Ltd., Weston, $24,317; Backstay Standard Co. Ltd., Windsor, $57,750.

CONSTRUCTION and ENTERPRISE

Ohio

ALLIANCE, O.—American Steel Foundries, J. E. Wagner, works manager, will double capacity by erection of two 225-foot buildings and 1400-foot runway for a gantry crane. City has vacated two streets crossing two-acre tract.

CARROLLTON, O.—Carroll Clay Co., recently incorporated, Robert B. Keplinger, 219 Seventeenth street N. E., Canton, O., president, will equip plant of former Mayfair Potteries for production of refractory specialties for steel mills and foundries.

CLEVELAND—Gent Machine Co., Arthur Gent, president, 5810 Richmond road, will build a 50 x 122-foot factory building and 11 x 25-foot boiler house, to cost about $40,000. Plans are by J. L. Rodrick, 1820 Euclid avenue.

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 117 and Reinforcing Bars Pending on page 119 in this issue.

CLEVELAND—Euclid Road Machinery Co., E. H. Parkhurst, president, will build a one-story 40 x 40-foot powerhouse, including two boilers and stokers, to cost about $40,000. Plans are by H. M. Morse Co., 1500 Superior avenue.

CLEVELAND—Star Machine & Tool Co., 9320 Woodland avenue, will build a one-story 30 x 60-foot plant and 20 x 60-foot office building, costing about $40,000. E. G. Hoefler, 5005 Euclid avenue, is engineer. (Noted July 28.)

CLEVELAND — Cleveland Automatic Machine Co., 2269 Ashland road, W. F. Brown, president, will build a one-story 47 x 140-foot factory addition. General contract has been given to A. M. Higley Co., 2036 East Twenty-second street. C. B. Rowley & Associates, B. F. Keith building, are architects. Cost estimated at $40,000.

CLEVELAND—Cleveland Diesel Engine division of General Motors Corp., G. W. Codrington, president, will build a one-story 100 x 250-foot plant addition. Contract has been let to the Austin Co., 16110 Euclid avenue, at about $150,000.

CLEVELAND—Allied Machine & Engineering Corp., Lee B. Green, president, 2130 Lakeland avenue, is negotiating for purchase of 54,000-square foot plant and will start manufacture of lock nut washers and bomb fuzes. Will install 20 mill-type automatic screw machines.

CLEVELAND—Cleveland Steel Products Corp., 7306 Madison avenue, John C. Hipp, president, manufacturer of automobile parts and heaters, is considering construction of new plant on site purchased last year.

CLEVELAND — Browning Crane & Shovel Co., 16226 Waterloo road, is building new welding and structural shop at cost of $35,000, and will install some additional welding equipment. Sheldon Cary is president-treasurer.

CLEVELAND—Warner & Swasey Co., Charles J. Stilwell, president, is having plans made by Osborn Engineering Co., 7016 Euclid avenue, for further plant enlargement for production of turret lathes.

CLEVELAND — Hertner Electric Co., 12690 Elmwood avenue, has let contract to E. J. Benes & Co., Terminal Tower, for new factory buildings. (Noted July 14.)

CUYAHOGA FALLS, O.—Vaughn Machinery Co., Broad street, will build a small addition to house its grinding department.

ELYRIA, O.—Perry-Fay Co., R. D. Perry, president, will build an office addition 32 x 72 feet. Silsbee & Smith, 39 Turner road, Elyria, are architects.

HAMILTON, O.—Herring-Hall-Marvin Safe Co., Grand boulevard, will build 50 x 170 and 77 x 86-foot plant additions, costing about $300,000.

Connecticut

BRIDGEPORT, CONN. — Bridgeport Hardware Mfg. Co., 461 Iranistan avenue, will build a plant addition costing about $40,000. F. Thompson Inc., 1336 Fairfield avenue, is engineer.

Massachusetts

SPRINGFIELD, MASS.—Western Elec-

tric & Mfg. Co., 633 Page boulevard, has let contract for a manufacturing building in East Springfield to T. A. Pearson & Associates, 25 Harrison avenue, to cost an estimated $40,000.

New York

ALBANY, N. Y.—Watervliet Tool Co. Inc., 1039 Broadway, will build a machine tool plant costing over $40,000. J. M. Myers, 1 Columbia place, is engineer.

BUFFALO, N. Y.—National Aniline & Chemical Co., 1051 South Park avenue, has let the contract for a plant addition to Metzger Construction Co., 429 Carlton street, estimated to cost over $40,000. (Noted April 28.)

ILION, N. Y.—Remington Rand Inc., 465 Washington street, Buffalo, has let contract to A. Friederich & Sons Co., 710 Lake avenue, for a 60 x 288-foot plant extension, to cost about $75,000. (Noted March 31.)

NIAGARA FALLS, N. Y.—Carborundum Co., Buffalo avenue, will build a 95 x 195-foot furnace building, general contract to Wright & Kremers Inc., Main and Pine streets, at about $75,000.

New Jersey

CAMDEN, N. J.—RCA Victor Co., Front street, will build a plant 216 x 516 feet, to cost about $300,000.

EDGEWATER PARK, N. J.—General Chemical Co., 40 Rector street, New York, will build a plant here costing over $100,000. United Engineers & Contractors, 1401 Race street, Philadelphia, are architects and engineers.

TRENTON, N. J.—Thermold Co., Whitehead road, has let contract to Fowler-Thorne Co., 211 North Montgomery street, for a two-story 100 x 200-foot plant addition to cost about $75,000. (Noted June 30.)

Pennsylvania

BRADFORD, PA.—S. R. Dresser Mfg. Co., Fisher avenue, will build an 80 x 100-foot plant to cost $60,000. C. A. Walmsley, care owner, is engineer.

ERIE, PA.—Zurn Mfg. Co., J. A. Zurn, president, 1801 Pittsburgh avenue, will build a foundry costing about $75,000.

YORK, PA.—York Water Co. will double filtering plant capacity, installing six filter units with capacity of 10,000,000 gallons daily, total cost of about $75,000. Defense industries and air conditioning has greatly enlarged demand for water.

Michigan

DETROIT—Frankland Mfg. Corp. has been incorporated with 250,000 shares no par value to deal in machinery, by D. E. Roberts, 2230 Buhl building, Detroit.

GRAND RAPIDS, MICH.—Survey is being made for a sewage disposal plant addition, including 200,000-cubic foot gas holder, two digester tanks and fertilizer plant addition, to cost about $125,000. Consoer, Townsend & Quinland, 211 West Wacker drive, Chicago, are engineers.

HILLSDALE, MICH.—Hillsdale Steel Products Co. is having plans prepared for additions to plant to provide for increased output.

MT. CLEMENS, MICH.—Mt. Clemens Machine & Tool Co. has been incorporated with $5000 capital to manufacture tools and dies, by Harold O. Love, 2967 Manistique avenue, Detroit.

PLYMOUTH, MICH.—Burroughs Adding Machine Co. will build a one-story plant addition 65 x 600 feet. Albert Kahn Inc., New Center building, Detroit, is architect.

SAGINAW, MICH.—Saginaw Malleable Iron division of General Motors Corp. has let contract to Austin Co. for an addition to foundry at Saginaw, to cost about $97,000.

Illinois

CARBONDALE, ILL.—War department has bought 20,000-acre site eight miles east of here for the $40,000,000 bomb and shell loading plant to be known as the Illinois ordnance plant. Giffels & Vallet Inc., 1000 Marquette building, Detroit, have completed preliminary survey and contracts will be let soon.

CHICAGO—Gary Steel Supply Co., 105 South LaSalle street, has been incorporated with 1000 shares $10 par common stock to deal in steel and other metals, by D. H. Patton and associates. Jones, Mulroy & Staub, 105 South LaSalle street, are representatives.

CHICAGO—Hollup Corp., 3357 West Forty-seventh place, manufacturer of arc welders, electrodes and supplies, will erect plant with 100,000 square feet at 4700 West Nineteenth street. Campbell-Lowrie-Lautermilch Corp., 400 West Madison street, are contractors.

CHICAGO—Wagner Brass Foundry Inc., 2020 Holly street, has been incorporated with $20,000 capital to manufacture brass, bronze and iron castings, by O. Wagner, R. O. Wagner and F. A. Wagner. Henry J. Aaron, 33 South Clark

street, is representative.

CHICAGO—American Spring & Wire Specialties Co., 816 North Spaulding avenue, manufacturer of springs, wire forms and light stamping, will build a one-story top addition, covering 24,000 square feet, to cost $50,000. Some new equipment will be installed.

EAST ST. LOUIS, ILL.—Natural Gas Pipe Line Co., 20 North Wacker drive, Chicago, plans about 400 miles of 26-inch steel welded joint loop pipe lines along its main line from Texas to Chicago at cost of about $17,500,000.

MONSANTO, ILL.—War department has contracted with Monsanto Chemical Co., 1700 South Second street, St. Louis, for operation and management of a plant to manufacture protective chemicals at Monsanto avenue and Falling Springs road, at cost of $400,000.

Indiana

EVANSVILLE, IND.—Southern Indiana Gas & Electric Co. has let contract to A. G. Ryan & Sons, Evansville, for a power plant addition costing about $188,000. (Noted March 24.)

Alabama

MOBILE, ALA.—Alabama Dry Dock & Shipbuilding Co., Pinto Island, Mobile, will build a plant for the navy department, having allotment of $4,284,000 for building and $726,000 for machinery and equipment. (Noted Aug. 4.)

Maryland

TOWSON, MD.—Bendix Aviation Corp., Bendix, N. J., has let contract for design and construction of a two-story 130 x 235-foot factory to the Austin Co., 19 Rector street, New York, estimated to cost $200,000.

West Virginia

CHARLESTON, W. VA.—Strip Steel Products Co. has been incorporated with $75,000 capital to manufacture steel products by T. S. Clark, Charleston, and associates. Offices will be at Charleston and works at Wheeling, W. Va.

Missouri

KANSAS CITY, MO.—Black, Sivalls & Bryson Inc., 7500 East Tenth street, manufacturer of tanks, pressure vessels and foundry flasks, will start construction soon on a one-story addition to cost $60,000, with equipment.

ST. LOUIS—Federated Metals division of American Smelting & Refining Co. has tentatively awarded contract to J. S. Alberici Construction Co., 1718 Boatmens Bank building, St. Louis, for a one-story 82 x 120-foot addition to its warehouse building at 4041 Park avenue. Murphy & Wischmeyer, 208 Board of Education building, are architects. (Noted Aug. 4.)

ST. LOUIS—Terminal Railroad Association of St. Louis has let contract for a one-story diesel engine house, 49 x 105 feet, at 63 Bremen avenue to H. B. Deal & Co. Inc., 1218 Olive street.

ST. LOUIS — War department will erect $150,000 addition to plant of Carter Carburetor Corp., 2840 North Spring Avenue.

ST. LOUIS—Shell Oil Co. is building a plant at its Wood River, Ill., refinery for production of toluene, an ingredient of TNT. It will have capacity for 4,000,000 gallons annually and cost about $3,000,000.

ST. LOUIS—War department has allotted $1,725,000 additional for the armor-piercing core plant now being erected adjacent to the small arms ammunition plant near Birchar and Goodfellow boulevards. It will be operated by the McQuay-Norris Mfg. Co., 2320 Marconi street, St. Louis.

Arkansas

BAUXITE, ARK. — Government will erect a $21,000,000 alumina plant on a 500-acre site, 1½ miles east of here on Hurricane creek, to be operated by Aluminum Co. of America, Gulf building, Pittsburgh. Will have capacity of 400,000,000 pounds of alumina annually.

MAGNOLIA, ARK.—Shell Oil Co. plans expenditure of $200,000 to enlarge capacity of its casinghead plant near El Dorado, Ark., from 15,000,000 to 20,000,000 cubic feet daily.

Oklahoma

LAWTON, OKLA.—Western Electric Co-operative of Cyril has placed orders for six 7500-kw. steam turbines and six boilers for proposed generating plant near Lawton. REA has given $500,000 loan to start work on project estimated to cost $5,000,000.

TULSA, OKLA.—Texas Pipe Line Co. will build 100-mile pipe line, 8-inch diameter, with daily capacity of 25,000 barrels.

Wisconsin

APPLETON, WIS.—Valley Iron Works, manufacturer of castings, paper and pulp mill machinery, has let contract to Koepke Construction Co. for a one-story plant addition.

MANITOWOC, WIS.—Manitowoc Shipbuilding Corp. is having plans made for a one-story plating shop.

MILWAUKEE—Middle States Foundry & Mfg. Co. has let contract to Lupinski

Inc. for a one-story plant addition 50 x 121 feet.

RACINE, WIS.—J. I. Case Co., manufacturer of agricultural implements, has let contract to Nelson & Co. Inc. for a one-story warehouse addition 241 x 447 and 51 x 136 feet. Frank J. Hoffman is architect.

WAUKESHA, WIS.—Waukesha Foundry Co. has let contract to Leo P. Bauer, Wauwatosa, Wis., for a one-story plant addition to be used as cleaning room. C. W. Valentine, Milwaukee, is architect.

Minnesota

ST. PAUL, MINN.—Minnesota Mining & Mfg. Co., manufacturer of abrasives, has let contract to William M. Murphy & Son, New York building, for two one-story factory buildings to cost about $400,000. Toltz, King & Day Inc., Pioneer building, are architects and engineers.

Texas

HOUSTON, TEX.—Sinclair Refining Co. plans an aviation gasoline plant at its refining plant here on the Ship channel.

Kansas

WICHITA, KANS.—Cardwell Mfg. Co., manufacturer of oilfield winches, backfillers, etc., will build a one-story addition 109 x 178 feet.

Iowa

AMES, IOWA—City council will take bids soon on boiler unit and auxiliaries for the municipal power plant.

CEDAR RAPIDS, IOWA—Collins Radio Co., 2920 First avenue N. E., has let contract for a plant addition to A. L. Jackson Co., 161 East Erie street, Chicago, at about $500,000.

DAVENPORT, IOWA—Deere & Co., manufacturers of agricultural implements, has given contract to J. H. Hunzinger & Co., Security building, for a two-story foundry to cost about $150,000.

PELLA, IOWA—F. N. DeWitt, city clerk, will take bids soon for steel water tank on tower and connecting pipes, to cost about $15,000.

Arizona

PHOENIX, ARIZ.—Goodyear Aircraft Corp., subsidiary of Goodyear Tire & Rubber Co., Akron, O., is having plans prepared for an airplane parts factory at Litchfield Park, to cost about $500,000, exclusive of equipment.

Wyoming

CHEYENNE, WYO.—Union Pacific railroad, Omaha, Nebr., will build a railway shop to house woodworking mill, wheel shop and tank shop to cost about $350,000. About $150,000 will be spent for tools and equipment.

GILLETTE, WYO.—Wyodak Coal & Mfg. Co. is building an addition to its power house and will install 500-horsepower boiler and other equipment, at total cost of about $100,000.

Idaho

LEWISTON, IDAHO—Victor Van Dyke, owner of Clearwater foundry, recently burned, will rebuild and re-equip plant as soon as equipment can be obtained.

California

BURBANK, CALIF.—General Controls, 801 Allen street, will build an addition to its factory at 1320 South Flower street, 40 x 300 feet, to cost $10,000.

BURBANK, CALIF.—Lockheed Aircraft Corp., 1705 Victory place, will build a two-story office building, 110 x 295 feet at 2021 Empire avenue, costing $90,000.

LOS ANGELES—Steel Forming Corp., Lee T. Sepin, president, has bought additional site adjoining its plant at 1619 South Alameda street and will build a warehouse and factory with 4600 square feet floor space, to cost about $65,000. Company manufactures metal forms for airplane plants and the construction industry.

LOS ANGELES—Alva Nut & Bolt Co., 2313 East Eighth street, will build a warehouse 80 x 132 feet, to cost $15,000.

LOS ANGELES—Montebello Tool & Mfg. Co. has been formed by W. M. Hamon and will be established at 6110 Ferguson drive.

LOS ANGELES — Mercury Aircraft Corp. has been organized with $200,000 capital Henry C. Rohr and associates, 650 South Spring street.

LOS ANGELES—Keystone Tool & Supply Co., 7720 Male avenue, will build a plant addition costing $3500.

SAN PEDRO, CALIF.—Consolidated Steel Corp. Ltd., which has been building ships for the maritime commission at Long Beach, Calif., has been awarded $3,000,000 for a shipyard at San Pedro, on which four ways will be constructed at once and an equal number early next year.

SANTA MONICA, CALIF. — Douglas Aircraft Corp. will build a warehouse and storage yard near Clover Field boulevard, including warehouse 300 x 320 feet, storage shed 24 x 2400 feet, office 30 x 100 feet and paving of eight acres of open air storage, to cost about $500,000.

Oregon

CATHLEMET, OREG.—City has sold $30,000 bond issue and will call bids soon for a proposed waterworks system.

Washington

OLYMPIA, WASH.—Olympia Ship Construction Co. has been incorporated with $110,000 capital to fabricate ships of reinforced concrete, especially tankers and barges. E. O. Fitzpatrick is president. Lease is being negotiated for 41 acres at the Port of Olympia.

SEATTLE—Todd Seattle Dry Docks Inc., 1801 Sixteenth avenue S. W., will take bids soon for a 90 x 410-foot dry dock costing about $1,000,000. Defense Plant Corp. will finance.

Canada

VANCOUVER, B. C.—Vancouver Engineering Works Ltd., 519 West Sixth avenue, will build a 60 x 130-foot plant addition, costing about $60,000, with equipment, including 20-ton traveling crane. Hodgson, King & Marble, 1401 Main street, have the contract.

BRANTFORD, ONT.—Canadian Durex Abrasives Inc., 154 Pearl street, Toronto, Ont., will build a plant addition here for manufacture of abrasives, to cost about $300,000, with equipment.

LEASIDE, ONT.—Sangamo Co. Ltd., 185 George street, Toronto, Ont., manufacturer of electric meters, etc., has given contract to Anglin-Norcross Ontario Ltd., 57 Bloor street, for plant here to cost about $150,000. Harkness & Hertzberg, Bloor building, Toronto, are engineers.

OWEN SOUND, ONT.—William Kennedy & Son, First avenue, makers of steel castings, will build an addition costing about $700,000, with equipment. Plans are by E. A. Leigh, 859 Second avenue.

TORONTO, ONT.—Hastings Mfg. Co., Hastings, Mich., maker of piston rings, mufflers and other automotive equipment, has acquired premises at 217 Richmond street West, which will be equipped to supply the Canadian market.

TORONTO, ONT.—Small Electric Motors (Canada) Ltd., subsidiary of Small Electric Motors, Beckenham, Eng., is building the second unit of its plant on Vanderhoof avenue, to cost about $60,000, with equipment.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, is taking bids for an addition to its aircraft plant, to cost about $100,000, with equipment. Spence, Mathias & Burge, 2063 Union street, are architects.

USED and REBUILT EQUIPMENT MATERIALS

RAILS
AND ACCESSORIES

RELAYING RAILS — Super-quality machine-reconditioned—not ordinary Relayers.

NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates, and all other Track Accessories.

Although our tonnages are not as large as heretofore, most sizes are usually available from warehouse stocks.

Every effort made to take care of emergency requirements. *Phone, Write or Wire. . .*

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

FOR SALE

No. 1 Standard Forging Hammer, 100 lbs.
500 Ton Bethlehem Steel Shell Presses
No. 3 Williams, White Bulldozer
18" Canton Portable Alligator Shears
No. 3 Canton Alligator Shears

Address Box 490
STEEL, Penton Bldg., Cleveland

Another
MORECO BARGAIN

SAND VIBRATOR

Jeffery - Traylor, shaker type CVS-8, 6" hand deck capacity 7 to 8 tons per hour with 1 KW, 15 cycle vibrator Motor Generator Set.

THE MOTOR REPAIR & MFG. CO.
1558 HAMILTON AVE. • CLEVELAND, O.

For Sale

UNUSED 1650 GALLON STORAGE TANK

⅜ inch Flange Quality Steel Shell—ellipsoidal heads—18" Manhead. Weight 6000 lbs. Address Box 542, STEEL, Penton Bldg., Cleveland.

WANTED—CRANE

20 to 30 Ton
71' Span or Longer

Prefer with auxiliary hoist. Motors 230 volts direct current. Mail specifications with price. Address Box 544, STEEL, Penton Bldg., Cleveland.

WESTINGHOUSE Electric Baking Oven

Inside dimensions 22' long; 10' wide; 8' high. 60 cycle, 440 volts; Temperature rating 400. Sectional construction. With complete Indicating equipment. Today's price: about $6200.

Selling price: $2500.

FALK MILL SUPPLY CO., INC.
18 Ward Street Rochester, N. Y.

Mai Mult Pentru Dollarul Tau!

IRON & STEEL PRODUCTS, INC.
36 Years' Experience
13462 S. Brainard Ave., Chicago, Illinois
"*Anything* containing IRON or STEEL"
SELLERS — BUYERS — TRADERS

WANTED—GUILLOTINE TYPE SHEAR to shear 20" x 12" x 1" and smaller. Cash Sale or have for trade two 6" Newbold Pipe Roller Cutting-off Machines—Two each 10" and 12" Wieland Pipe Threading machines. P. O. Box 60, Chester, Pa.

—REBUILT—
BLOWERS - FANS - EXHAUSTERS

Connersville-Roots positive blowers.
Centrifugals for gas and oil burning.
Sand blast, grinder and dust exhausters.
Ventilating fans and roof ventilators.

GENERAL BLOWER CO.
404 North Peoria St. Chicago, Ill.

DIE SINKER, E-3 Keller, M.D.
GEAR CUTTER, Spur, 84" Newark, M.D.
GEAR PLANERS, Bevel, 54" Gleason, M.D. (3)
HORIZ. MILL, Fl. Type, 3½" bar D & H
VERTICAL MILL, 8' Betts, 2 Hds., Grd. Fds.
LATHES, 48"x22-1/2' & 48"x26-1/2' Johnson.
TURRET LATHE, 26" Libby, H.S. 7-1/2", S.P.D.
TURRET LATHE, 18" Libby, H.S. 3-9/16", M.D.
PLANERS, 30"x30"x8', 36"x36"x11' .54"x54"x10'
SHEAR, 10'x3/16" Obi Squaring, M.D.

LANG MACHINERY COMPANY
28th Street & A. V. R.R. Pittsburgh, Pa.

WANTED

Galvanized, shop-worn, salty or waster sheets, sides, ends and shearings, 26 gauge and lighter. 16 gauge soft hot rolled shearings 1-1/2 and wider. Also sheets.

State sizes, quantities, location and price.

Address Box 531, STEEL
Penton Bldg., Cleveland

For Sale

McMYLER, COAL BURNING, LOCOMOTIVE CRANE—1919

Serial No. 3177—Magnet Equipment Immediate delivery. F.O.B. Erie, Pa.

Address Box 519
STEEL, Penton Bldg., Cleveland, O.

WANTED—CRANE

One five-ton A.C. overhead traveling crane with about 45 to 50 feet of span, or, if a shorter crane is available, we can rebuild same to suit. Current three phase, 60 cycle, 220 volts, A.C.

DOVER TANK AND STACK CO.
Dover, N. J.

IF YOU WANT TO BUY OR SELL

good used or rebuilt equipment or materials—Place an advertisement in this section. Write STEEL, Penton Bldg., Cleveland, Ohio

---

HOT-DIP GALVANIZING PRACTICE

By W. H. SPOWERS JR.

- 200 Pages 6 x 9
- 45 Illustrations
- 4 Tables
- 7 Charts

Price $4.00 Postpaid

Note: Orders for delivery in Ohio add 3% for compulsory Sales Tax.

GIVES full and carefully reasoned explanations of the why and wherefore of galvanizing. All the latest methods and processes are described and very copiously illustrated by a large number of diagrams and photographs.

Highly recommended to the man on the kettle, the designer of galvanizing plants, the metallurgist, as well as to those who zinc coat steel commodities and containers, etc.

THE PENTON PUBLISHING COMPANY, *Book Department,* **Penton Building, Cleveland, O.**
350-S

CONTRACT WORK

CLASSIFIED

Help Wanted

WANTED: SALES REPRESENTATIVE BY a large manufacturer of welded mechanical tubing for New York-Philadelphia Territory. Tubing experience and acquaintance with trade necessary. All replies strictly confidential. Address Box 541, STEEL, Penton Bldg., Cleveland.

WANTED: STRUCTURAL ENGINEER FOR research exclusively. Must be thoroughly educated and experienced in design, progressive with view of discarding old for new and better ways. Prefer man now employed. Give references and salary in first letter. Large established company. Address Box 540, STEEL, Penton Bldg., Cleveland.

WANTED

PATTERN RIGGER for foundry in Massachusetts, familiar with rigging patterns for Tabor, Johnson-Jennings and SPO molding machines. Excellent opportunity for man who knows his business. State all qualifications—former connections—and salary in reply. Address Box 529, STEEL, Penton Bldg., Cleveland.

Castings

OHIO

THE WEST STEEL CASTING CO., Cleveland. Fully equipped for any production problem. Two 1½ ton Elec. Furnaces. Makers of high grade light steel castings, also alloy castings subject to wear or high heat.

PENNSYLVANIA

NORTH WALES MACHINE CO., INC., North Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys, Semi-steel. Superior quality machine and hand molded sand blast and tumbled.

Opportunities

FOUNDRY-MACHINE SHOP

Foundry 48 x 109; machine-pattern shop 120 x 147; brick buildings; fully equipped; operating electric travelling crane; railway siding; large lot; manufacturing castings, high grade alloys; complete price $20,000, terms. MANY OTHER SHOPS, MFG. PLANTS.

THE APPLE COMPANY
ESTABLISHED 1905
INDUSTRIAL BROKERS CLEVELAND, O.

Employment Service

SALARIED POSITIONS
$2,500 to $25,000

This thoroughly organized advertising service of 31 years' recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details. R. W. Bixby, Inc., 110 Delward Bldg., Buffalo, N. Y.

Accounts Wanted

EXPERIENCED WISCONSIN REPRESENTATIVE with well established contacts in the foundry and metal manufacturing industries desires additional lines. Address your proposition to; Fred H. Prescott, 225 E. Michigan St., Milwaukee, Wisconsin.

Positions Wanted

ADVERTISING MANAGER

now and for past 15 years manager of advertising department of $13,000,000 manufacturer of machinery and tools, is available for similar position preferably in New York City or nearby locality. Has complete charge of trade paper advertising, preparation and production of catalogues, booklets, sales material, etc. Address Box 536, STEEL, 110 E. 42nd St., New York, N. Y.

STEEL PLANT EXECUTIVE — METALLURGICAL engineer—training in purchase and inspection of raw materials—melting supervisor—experience acid and basic open hearth—all grades steel—large experience alloy grades—large ingots—ordnance work etc. Considerable research coordinating mill and laboratory. Wide acquaintance among open hearth men. Will consider sales work—particularly ferro alloys where practical melting experience is of value. Reply Box 538, STEEL, Penton Bldg., Cleveland.

SUPERVISOR OF STRUCTURAL STEEL and general plate work fabrication, 15 years' experience, seeking connection with first class organization as shop superintendent or general foreman. Address Box 543, STEEL, Penton Bldg., Cleveland.

EXECUTIVE—SALES ENGINEER

Broad experience as sales engineer, former president and manager of a large manufacturing plant, desires engineering and sales position with headquarters in the east. Would consider exclusive sales on commission basis. Financially responsible. Now employed in highly responsible position in the West. Reply Box 545, STEEL, Penton Bldg., Cleveland.

ADVERTISING INDEX

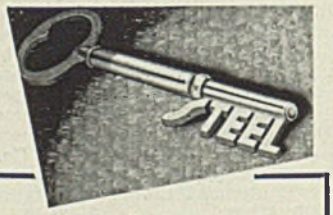
Where-to-Buy Products Index carried in first issue of month.

ADVERTISING INDEX

Where-to-Buy Products Index carried in first issue of month.

"Look Bill,— *this* Market Selector is going to *Save* us a lot of time!"

Yes, and you'll find it makes planning next year's campaign a lot easier. This is no rehash of census figures. It is new information dug up by STEEL's statisticians and presented in a unique way that is being heartily welcomed by advertising men and sales minded executives. If you want to see the Metalworking Market X-rayed, and dissected for your examination, drop us a line and ask to see the Market Selector. Some surprising sales opportunities are revealed by it. You'll get a new slant on where your products can be used—and how many worthwhile prospects you have. It's a swell way to discover those important future markets that you'll be needing one of these days. Take a look at the Market Selector now!



. . . . Like a master key, STEEL magazine opens for you the doors to important contacts in the Metalworking and Metal Producing industries. Through its advertising pages, you can *reach* and *keep alive* those important contacts, shut off from your salesmen by defense barriers.

"Steel" is Modern

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

CLEVELAND

NEW YORK • PITTSBURGH • CHICAGO

WASHINGTON • LONDON