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# STEEL

ESTABLISHED 1882

## Contents

Volume 110—No. 2 January 12, 1942



**PRODUCTION • PROCESSING • DISTRIBUTION • USE**


YOUR finished product is your customer's raw material —the first step in mass-production that measures accuracy in *thousandths.*

Morgan Four-Strand Rod Mills are producing rod at four-fifths of a mile per minute *per strand,* within ± .005 inch specified diameter. Uniformity such as this is a Morgan characteristic. It will hold your customers—as it has ours—both now and also *after* the Emergency.

MORGAN
WORCESTER
ENGINEERS AND
MANUFACTURERS

**MORGAN CONSTRUCTION COMPANY • WORCESTER, MASSACHUSETTS**

R-98

# HIGHLIGHTING THIS ISSUE OF STEEL

■ INDUSTRY already is in the throes of making good on its promise to manufacture armament (p. 21) on the huge scale requested by President Roosevelt last week. It is apparent that great hardship and dislocation will be encountered during the changeover period. First major group to be affected (p. 39) is the automobile industry which, incidentally, does not see a place for CIO leaders in its management. The potentialities of many other industries as manufacturers of armament now are under active study and their mobilization into the war effort is expected to materialize rapidly. . . . To enable its readers to function effectively under rulings of the OPM and the OPA, STEEL this week is published in two sections; Section Two, folded into the main section, is entitled "Priorities, Allocations, Prices."

• • •

**168-Hour Week**

A new system for increasing production of plates is in operation and is expected to prove successful (p. 24); consumers are asked to cooperate by using strip instead of plates wherever possible. . . . Steel production declined 1 point last week (p. 27) because of the scrap shortage and further drops are feared. . . . A 10 to 20 per cent reduction in manganese consumption (p. 43) is held possible. . . . Interchange of goods between the United States and Canada (p. 45) is to be expedited. . . . Local antitrust officers have been empowered (p. 47) to approve the formation of groups of manufacturers to engage in war production through pooling their facilities.

• • •

**Latest Orders**

Producers of power-driven lift trucks have greater priority assistance (p. 34); adequate supplies of plumbing, heating and electrical supplies will be available; makers of hoists, cranes and derricks, also ceramics equipment builders, are under price ceilings. . . . Priorities have been set for material for new cars and locomotives (p. 35); similar action has been taken on mining machinery and on repair parts for heat treating furnaces. . . . Rigid restrictions will conserve our tin supply (p. 36). . . . Prices on brass and bronze ingots have been revised (p. 37); aluminum priority orders have been extended. . . . Tin and lead scrap are under priorities (p. 32); vending machine production will be cut; OPA will discuss prices with the drop forging industry. . . . Vacuum cleaner output (p. 31) is ordered cut. . . . Segregation of aluminum scrap (p. 25) is mandatory.

• • •

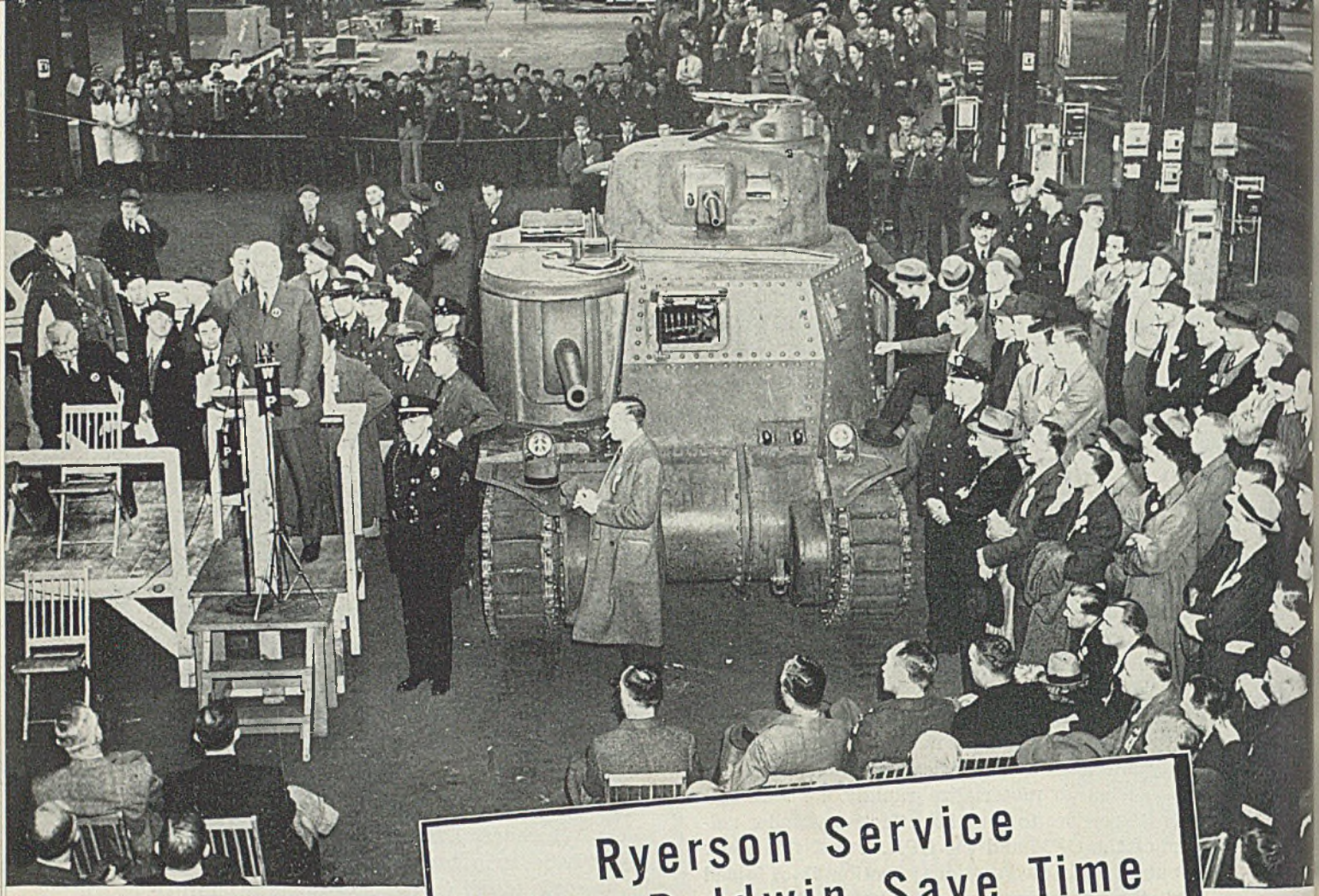
***"Let's Speed Tooling"***

Guy Hubbard, STEEL'S machine tool editor, says "Let's strip tooling for action" and then he proceeds to tell (p. 54) how to do it, information especially timely with the present need to speed production by every possible means. . . . Edwin Bremer describes (p. 62) how two sizes of steel mortar shell are being cast at the foundry of Auto Specialties Mfg. Co., St. Joseph, Mich. . . . Cooling of certain parts of open-hearth furnaces by circulating water through them, combined with proper use of insulation, can increase life up to 250 heats, according to J. B. Luckie who details (p. 70) many designs of this type of equipment.

• • •

***Galvanizing Substitutes***

To show how to conserve zinc for urgent war requirements, a section of OPM recently asked National Bureau of Standards to prepare a discussion of suitable alternative finishes that could be used instead of metallic zinc coatings. E. F. Hickson presents the results of this study (p. 74). . . . A. R. Smith and E. S. Thompson explain one of the latest types of mercury-boiler power-generation constructions and give details (p. 52) of welding procedure that was employed to make 5000 pipe welds in the boilers without a single leak. . . . H. H. Slawson tells how (p. 58) mechanical handling equipment helped to increase plant output from 700 to 1800 units per day.



*Mr. Charles Brinley, President of the Baldwin Locomotive Works speaking at ceremonies when Baldwin's first M-3 tank was turned over to the Army.*

# Ryerson Service Helps Baldwin Save Time on Tank Schedule

● Baldwin needed steel *immediately* for a model tank to be constructed quickly as a guide to future production. *Speed* was the important factor, so Baldwin turned to Ryerson stocks for immediate shipment of the necessary steel. Ryerson alloy and carbon steels were shipped from stock the same day permitting work to begin at once.

Through this quick cooperation and the help of many other suppliers, Baldwin was able to beat the official schedule. This illustration is typical of the service Ryerson is rendering daily to manufacturers working on the National Defense Program.

Thousands of emergency calls have cut down our large stocks of steel, however, we are still serving thousands of customers in accordance with the OPM plan and believe we will be able to continue this service even if on a restricted basis, for the duration of our national emergency.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

**RYERSON** *Certified* **STEELS**

RYERSON CERTIFIED STEELS

# Industry Marshals Resources To Meet Call for Doubled Arms Program



***Conversion of present production facilities studied as President asks for a plane every four minutes and a tank every seven minutes . . . Automobile producers to be first to make all-out changeover***



*WASHINGTON*

■ MOBILIZING industrial resources at a rate previously considered fantastic—to meet the greatest war production goal in world history—got under way with a flourish last week.

When the President called for the production of 185,000 airplanes, 120,000 tanks, 18,000,000 tons of merchant ships and 55,000 antiaircraft guns within the next two years, industry responded: "It shall be done."

This response was no mere outburst of patriotic fervor. It was the considered promise of men cognizant of the tremendous difficulties involved—of the necessity for speeding up the rationing system, still further cuts in consumers durable goods production, shortages in almost every line of business, shifts and dislocations in both labor and industrial concentration, increasing government controls over business, and stupendous monetary cost.

Conversion of virtually all manufacturing capacity to war production will be required. And this, as it proceeds, will bring problems as yet largely unexplored.

Guinea pig in the conversion effort is the automobile industry, ideal for the purpose and an industry that already has made great progress in that direction.

Representatives of the major automakers and parts suppliers have been given the shopping list of the Army and Navy and asked to begin immediate plans for producing the materials to the limit of their capacities.

The industry principally will be used to manufacture machine guns and other light pieces of ordnance, gun carriages and tanks, and will play a larger role in aircraft construction.

Facilities may be pooled. Automakers may supply parts for machine tool builders. No machines will be idle if they can be used productively.

The auto industry has been asked to assume a five billion dollar slice of the increased arms program. That, however, will be a relatively small part of the total program, estimated by the President in his budget message to cost more than 52 billions in fiscal year 1943 and about 24 billions in the current fiscal year—for war production alone.

### 168 Hours Per Week

To execute such a program—entailing production of an airplane every four minutes and a tank every seven minutes—will require the marshaling of all the resources and all the materials that can be utilized. Details are yet to be worked out, but at week's end OPM was attacking the problem along these lines:

1. Converting additional facilities of the durable goods industries from peace-time production to weapons of war.

2. Getting more of the existing arms plants to work 168 hours a week, "farm out" jobs or parts of jobs that they cannot do promptly, and increase their output in other ways.

3. Shifting more of the capacity of consumer goods industries, like textiles and food products, from civilian to military use. By and large, this does not involve conversion of facilities.

4. Expansion of all types of training for workers in war industries.

Meetings with many industry committees have been held or are being planned, and committees will be organized for some additional industries to work with the OPM, the armed services, and other government agencies on conversion and other problems.

Members of the rubber industry, whose total production was ordered curtailed about 53 per cent after the flow of rubber from the East Indies was interrupted by the outbreak of war, are conferring individually with OPM engineers and other officials to offset curtailed civilian production by increased war work. Approximately 37½ per cent of the industry's present output is for war, and its nonmilitary output is composed chiefly of truck tires necessary to maintain vital transportation.

Military production by the industry has been scheduled to rise beginning in January, until in June it reaches about 50 per cent of the total. Many of the small companies in the industry are currently converting to the manufacture of gas

**NEW DAY, NEW PURPOSE: Sunrise silhouettes blast furnaces, foundry and power house at Ford's River Rouge plant—"mightiest industrial unit." Last week as the government announced its war-time plans for the automobile industry this plant was reported working "24 hours a day for the Army and Navy." NEA photo**

masks, and the Civilian Defense Administration is seeking funds with which to order 50,000,000 masks for civilians in areas near the coasts.

Possibilities of placing additional war orders with manufacturers of farm equipment are being explored, but this field is limited by the demand for farm equipment to maintain food supplies.

The pulp and paper industry is nearing completion of a survey of the facilities of that industry suitable for war work. This survey, which is being made by the industry itself, is to be turned over to the OPM as soon as it is completed.

Another field in which additional conversions are under study is industrial and office machinery.

Still another involves electrical appliances and consumer durable goods.

OPM officials have had exploratory discussions with manufacturers of cooking appliances and domestic refrigerators, regarding the advisability of concentrating civilian production in some plants and freeing the remainder for conversion to war work.

Manufacturers of radio tubes are trying to find substitute materials with which to maintain civilian production until expected increases in military requirements are definitely known.

Through group meetings and conferences with individual manufacturers, immediate increases in war production are being sought in existing arms plants.

In the machine tool industry, for example, some manufacturers are now working 160 hours a week while others are considerably short of that goal. The latter are being urged to man their machines to the maximum, leaving them idle only long enough for necessary maintenance and repairs. Machine tool manufacturers are also being asked to enlist facilities of other industries, under subcontracts, when they can speed up production by doing so, and to report facilities of their own that are partially idle and could be brought into production by the addition of a minimum of equipment.

Similar steps to speed up production are being taken in the greatly expanded aircraft and shipbuilding industries, and in factories already making tanks, guns, and ammunition.

In the field of consumer goods, further shifts from production for civilian use to military use are in prospect. Items involved, for example, are cotton duck for uniforms, drill for lining, and osnaburg (a loosely-woven cloth) for sandbags.

It also is planned to convert some additional plants in industries turning out small metal items. Such capacity can be used in manufacturing equipage—that is, a soldier's individual equipment, such as mess kits, helmets, and bayonets.

In addition, many plants are expected to devote the major part, if not all of their capacity, to the manufacture of field equipment. For example, a plant that formerly made kitchen ranges for the home will now make tent stoves and field bakeries.

Some shifting of output in the food canning industry is contemplated, mainly because of the shortage of tin for cans. For instance, canners of luxury items will be asked to switch over the major part

## "Who Wants Them?"

*WASHINGTON*

■ Addressing the automakers, Mr. Knudsen said: "We want to know where some of these things will flow from. We want to know if you can make them or want to try to make them."

As he announced the list of items wanted the OPM chieftain acted somewhat in the role of an auctioneer. "We want more machine guns. Who wants to make machine guns?"

And so on through the list, with the automobile men occasionally indicating they would produce the material named.

of their plants to Army rations and foods needed by America's allies.

The container industry is another where the war's impact will be felt increasingly. For instance more plants formerly used in the manufacture of folding boxes for civilian use will be devoted to the manufacture of boxes for small ammunition.

### Kanzler Becomes Chief of OPM Automotive Branch

The Automotive, Transportation and Farm Equipment Branch of OPM has been divided and Ernest Kanzler, president, Universal Credit Corp., has been appointed chief of the Automotive Branch. Andrew Stevenson continues a chief of the Transportation and Farm Equipment Branch.

The change was made because of the broadened programs for both branches.

## Buick's Aircraft Engine Program Is Doubled

■ Army Air Corps has authorized doubling of the Buick aviation engine production program, under terms of which employment on aircraft motors alone in the new Chicago plant and in the Buick plants at Flint, Mich., will range between 25,000 and 30,000. This is exclusive of other war material programs already undertaken for the production of major assemblies for M-1 and M-4 tanks, gun mounts, shells, cartridge cases, etc.

Tooling for the various programs is now under way at Flint plants, while additional defense work is being negotiated.

Ground has been broken for the General Motors tank plant on the west side of U. S. 10 near Grand Blanc, Mich., and will involve expenditure of several million dollars in plant, equipment and tooling.

The Melrose Park, Ill., aviation engine plant built by Buick has been completed ahead of schedule and operations have been under way for several weeks. The facilities were completed in a period of eight months from the time ground was broken. Equipment includes better than 3000 new machines and about 20,000 tools, jigs, fixtures and gages.

Two major plants at the Flint division have been converted for manufacture of major parts and subassemblies going into the Pratt & Whitney 1200-horsepower engine which is being assembled at the Illinois plant.

Meanwhile, it is reported studies are being pushed aggressively relative to the conversion of the Buick gray iron foundry to the production of aluminum alloy castings.

### Tripling at Tank Arsenal

Production at the Chrysler Tank Arsenal this year will be tripled from the present rate. Officials are looking forward to turning out a trainload of 28-ton tanks a day. Employment at the arsenal will be greatly increased. Engineers, tool experts and mechanics now are engaged in pushing the expansion program.

## Cold Wave Closes Plants

■ Natural gas shortage affected industrial operations in the Pittsburgh district as a result of the cold wave. Shenango works, Carnegie-Illinois Steel Corp., New Castle, Pa. was shut down when the public utility company supplying the plant was unable to maintain supplies. About 2000 men were out of work while the plant, which produces hot rolled tin plate, was down. Another hot tin mill was also forced to suspend, the Canonsburg works of Carnegie-Illinois at Canonsburg, Pa.

## Coke Plants Awarded

■ A contract for building a 75-oven by-products coke at the Warren, O., plant of Republic Steel Corp. has been awarded to Semet Solvay Co. The same builder was awarded the new coke plant at Gadsden, Ala., for Republic. Koppers Co., Pittsburgh, has been awarded the company's new plant at Cleveland. The Warren plant will supply coke to the new blast furnace being built at Youngstown, O., by Defense Plant Corp.

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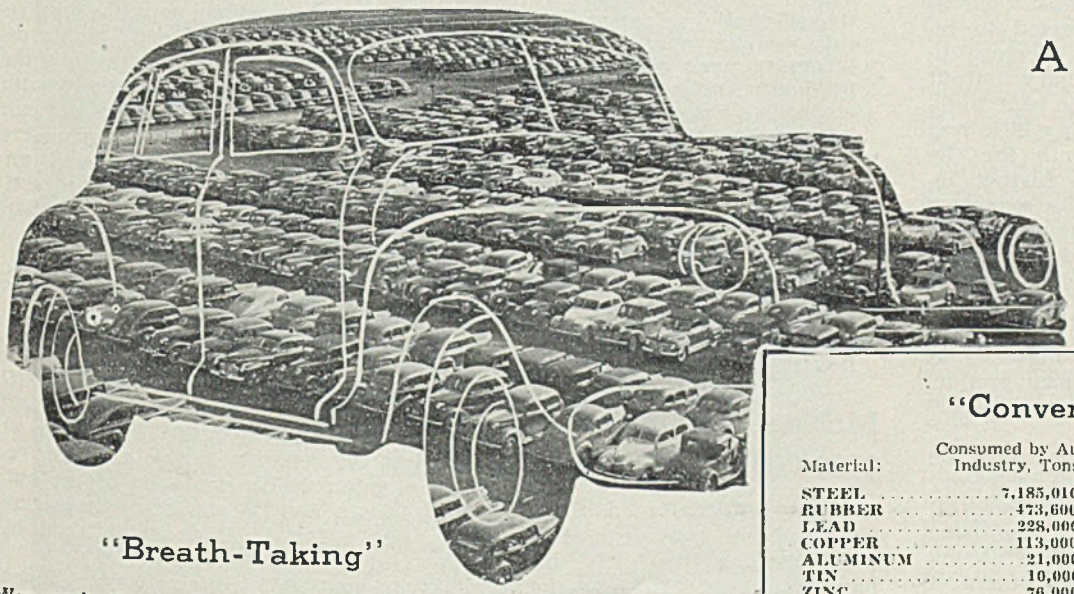
# A Week for History's Pages



## "Breath-Taking"

War production goal, outlined by the President to Congress:

60,000 planes, including 45,000 combat planes this year; 125,000 planes, including 100,000 bombers and fighters, in 1943.
45,000 tanks this year; 75,000 in 1943.
20,000 antiaircraft guns this year, 35,000 in 1943.
8,000,000 deadweight tons of merchant shipping this year, 10,000,000 tons in 1943.
Commensurate production of all other munitions of war.

(For editorial comment, see page 48.)

## "Conversion"

| Material: | Consumed by Automobile Industry, Tons, 1940 | Per cent of Total U.S. Supply |
|---|---|---|
| STEEL | 7,185,016 | 15.7 |
| RUBBER | 473,600 | 80.0 |
| LEAD | 228,000 | 34.2 |
| COPPER | 113,000 | 13.7 |
| ALUMINUM | 21,000 | 9.7 |
| TIN | 10,000 | 11.4 |
| ZINC | 76,000 | 12.1 |
| NICKEL | 20,000 | 23.0 |

| | |
|---|---|
| Employes, 1941 | 450,000 |
| Output, cars and trucks, U. S., 1940 | 4,469,354 |
| Output, cars and trucks, U. S., 1941 | 4,818,000 |
| Cumulative defense orders to automobile industry, January, 1942 | $5,000,000,000 |

(For Detroit's interpretation of Conversion-to-War order see Mirrors of Motordom, Page 39.)

# Continuous Operations for Plate Mills; Consumers Urged To Use Strip

*WASHINGTON*

■ A COMPREHENSIVE program to increase the production of steel plates, vital for shipbuilding, was announced last week by C. E. Adams, chief, Iron and Steel Branch, Office of Production Management. These steps have been taken:

1. All steel companies are requested to operate platemaking facilities 168 hours a week.
2. Daily reports on plate shipments to the Army, Navy and Maritime Commission will be made to the branch.
3. Weekly reports on total production will be made.
4. A plan for greater use of continuous strip mills for the production of plates has been adopted. Consumers are asked to co-operate, to use strip in place of plates where practical.
5. Each producer has been asked to name a liaison man to keep in contact with the branch on plates.
6. Steps are being taken to improve and simplify plate orders so that greater production may be achieved.
7. Conferences are being scheduled with individual producers to iron out local problems that interfere with greater production.

**December Was Record Month**

The program is expected to result in an appreciable increase in plate production. January output is expected to be 12 per cent higher than December, 1941, which was an all-time record month for the industry. By March a further increase of 10 per cent is expected. These increases are on present facilities and do not take into account any new facilities now being constructed.

Plates are under complete allocations system, the first material to be so handled. December production was slightly under 600,000 tons.

The plans were reviewed with the Iron and Steel Defense Advisory Committee at a meeting Dec. 31, and all details and forms have been sent to platemakers. In an accompanying letter Mr. Adams stated:

"No problem has been brought more forcibly or more often to my attention than that of the need for a greater tonnage of steel plates.

"Dependent on the supply of this product are such important phases of our war effort as our two-ocean navy and our great shipbuilding program. . . .

I. Instructions under "General Allocation Order No. 1—Plates" have been revised in an effort to clarify procedure and effect better control. Copies of the revised instructions are enclosed. I should like to call your particular attention to two of the changes we have made:

1. We are requesting all companies to operate their plate-producing facilities as close to 168 hours per week as possible. Please note Paragraph 2.
2. We are providing for a daily report of plate shipments for the Army, Navy and Maritime Commission. The demands for plates for these needs are so urgent that it is imperative that we be informed regarding this situation on a day-to-day basis. Please note Paragraph 8 (A).

II. A plan for the greater use of continuous strip mills for plate production has been adopted. (Copies enclosed.) This, we believe, is a very important part of the overall program. Kindly advise whether your company will take immediate action to place this plan in effect in connection with your operations.

III. Individual conferences with producers on the subject of plate production are being scheduled. These will be completed by the end of January.

IV. Steps are being taken to improve the character of the plate orders issued in connection with the shipbuilding program so that this tonnage may be rolled on a larger number of mills and plate production on all mills can be increased. Progress has already been made along these lines.

V. We have asked each producer to name a man in his company as the contact with the Iron and Steel Branch in respect to plates. Please be sure that the man selected by your company is well qualified by experience and has been given adequate authority to assure proper and prompt action on these matters.

## McKee Has Contracts for $100,000,000 Construction

■ Arthur G. McKee & Co., Cleveland, has paid a dividend of 75 cents per share as the initial disbursement for 1942. In 1941 five dividends were paid, aggregating $4.50 per share the largest in the history of the company. Unprecedented activity marked the year, especially during fourth quarter. Cost of plants under design and construction totals more than $100,000,000 and all contracts now on books cannot be completed before the end of 1944. Most 1941 business was in the iron and steel division.

Foreign business is confined to the Western hemisphere. Construction of a complete steel plant in Brazil will start early this year and probably require about two years. Recent contracts in Canada will run for at least a year.

## Armco Will Fight Proposed NLRB Order

■ National Labor Relations Board last week announced a proposed order, which, if made final, would require the American Rolling Mill Co. to disestablish the Armco Employes Protective Association and to cease discouraging membership in SWOC of its employes at its Ashland, Ky., plant. Proposed order also directs the company to restore 22 employes, allegedly discriminated against for union activity, to their former positions and to give back pay to all except one.

C. H. Murray, assistant to the president of Armco, said the company would oppose the entering of the proposed order. If the board enters the order, company will fight the case through the courts.

"The case was completed two and one-half years ago," Mr. Murray said. "In the meantime, the public lost confidence in the fairness of the former board to such an extent that a house-cleaning was effected as a result of a congressional investigation. None of those who were members of the labor board when the case was tried are members of the present board. The trial examiner who heard the case has been relieved from participating in its decision. The board's attorneys in the case are no longer associated with the board. It is therefore difficult to understand how the new members of the board could have a clear understanding of the case, the testimony of which covered more than 40,000 typewritten pages."

## Harvester Lays Off 1475, Awaiting Arms Work

*CHICAGO*

■ International Harvester Co. last week laid off about 1475 employes at its three plants in this area, the reduction being made to adjust output to the 83 per cent production quota for 1942, as established by OPM.

About 1000 workers were dropped at the McCormick works, 175 at the Tractor works, and 300 at the West Pullman works. None of these employes has had more than 18 months of service with the company.

It is stated that the workers will be re-employed just as rapidly as the company is able to acquire additional arms work.

# Restrictions on Flow of Copper, Brass Mill Scrap Are Extended

■ TO KEEP a constant flow of copper scrap and copper alloy scrap into and through war industries, OPM has revised Order M-9-b to provide that no deliveries of copper or brass scrap may be made except to a scrap dealer, or, in the case of brass mill scrap to a brass mill, without specific authorization of the director of priorities.

The amended order revokes P-61, which assigned an A-10 rating to certain users of copper and brass scrap and changes the provisions of M-9-b which permitted deliveries on such ratings. Under the new rulings deliveries may be made only as specifically authorized, with the exception of dealers and brass mills. Form PD-130 is provided for applications for such authorization.

All military requirements will be filled first and authorizations for the residual supply will be made at the discretion of the director of priorities.

Fabricators, with the exception of railroads and utilities, may not use or remelt scrap generated in their own operations, or dispose of it except by sale, without specific authorization.

No fabricator may keep on hand more than 30 days' accumulation of scrap unless the total is less than 5 tons. Those who generate more than 2000 pounds in a month must report complete scrap inventories by the 15th of the following month.

Other provisions of the order are unchanged.

OPM copper officials described the order as "tapping a huge new copper mine above ground" because of the importance of scrap in the production of brass. Not only is better brass made from copper scrap than from pure copper, but it may be used over and over without any deterioration in quality.

The order does not apply to retail sales of copper or brass junk by an individual to a collector, who will sell it in turn to a scrap dealer.

### Privately-Imported Copper Under Full Priority Control

Privately-imported copper, heretofore not subject to specific regulation, has been placed under full priority control in a revision of General Preference Order M-9-a.

Other steps to tighten copper control were taken in the revision, which extends the order to June 30. The original M-9-a was due to expire Jan. 1 and was extended until publication of the revision.

Other main changes in the order are:

Toll agreements relating to the processing of copper must now be approved by the director of priorities.

The exception permitting unregulated delivery of less than 50-pound orders of copper in any one month is revoked.

A rating of A-9 is assigned to warehouses to permit replenishing of stock sold for war orders. A quota basis, on 1941 sales, is set up as an additional check on the application of this preference rating.

### Segregation of Aluminum Scrap Made Mandatory

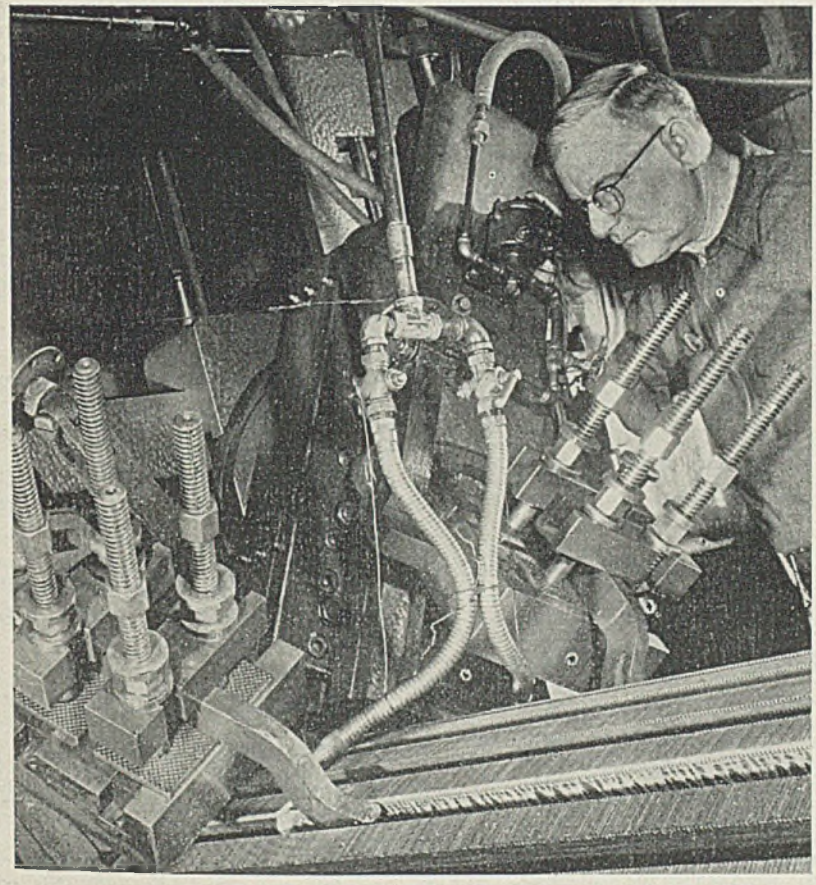
Segregation of aluminum scrap, by alloy content and form, is made mandatory by Supplementary Order M-1-d, issued by the Priorities Division.

Importance of the new segregation program is indicated by OPM estimates that 100 per cent segregation of sheet scrap alone will provide, at the rate of production next July, enough high-grade aluminum each month for several hundred airplanes, and at the same time save enough magnesium for the manufacture of thousands of incendiary bombs.

Strict segregation by type of aluminum scrap has not in the past been a general practice in the industry. Much of the scrap generated was formerly lumped and sold for use in products not requiring high-grade material.

The comprehensive order, clamping air-tight controls over the treatment and disposition of all types of aluminum scrap, requires that, beginning March 1, every plant generating 1000 pounds or more of such scrap per month, segregate at the machine, the types resulting from its operations.

## 62—and His Suggestion Speeds Production 40 Per Cent



■ A 62-year-old machinist's idea for doing his job 40 per cent faster has earned for him $750, largest award presented by Westinghouse Electric & Mfg. Co. for 2186 suggestions accepted in 1941 from East Pittsburgh Works employes. Albert Bachofer, winner, is shown operating a steel cutting tool as it grooves slots in a rotor. He suggested a compressed air device to lift the tool while the 14-ton rotor glides back in position for another stroke. Formerly the tool was dragged through the fresh cut on the backward stroke. The suggestion "Speeds production of rotors 40 per cent. eliminates tool breakage"

# Daily, Monthly, Yearly Records Set by December and 1941 Pig Iron Output

■ PIG IRON output in December and in 1941 shattered all previous daily, monthly and yearly records.

Total output for the year was 55,918,086 net tons. This was an increase of 19.24 per cent over the 46,894,676 net tons that flowed from the stacks in 1940 and of 58.36 per cent over 35,310,042 tons of 1939.

December output was 5,014,995 net tons, up 6.97 per cent from the 4,707,194 net tons produced in the 30-day November period. The rate of operations in December averaged 104.1 per cent daily, up 5.1 points from November, and the highest daily operating rate in history.

Daily production in December averaged 161,774 net tons, a new record. The previous all-time high was the 157,378-ton mark of last September.

Stacks active on Dec. 31 numbered 218, compared with 215 (a corrected figure) on Nov. 30.

Of the December output 14.26 per cent of the total was accounted for by merchant iron, including ferromanganese and spiegeleisen; during the year merchant iron, including ferromanganese and spiegeleisen, averaged 14.58 per cent. December output of merchant iron, including ferromanganese and spiegeleisen, was 714,925 net tons, while the year's output came to 8,151,427 net tons.

Five furnaces were brought into production in December. One of these was the new 850-ton stack of Weirton Steel Co. at Weirton, W. Va., which took the blast Dec. 19. Youngstown Sheet & Tube Co. blew in its Brier Hill No. 2 stack on Dec. 1 instead of on Nov. 28 as had previously been reported. Great Lakes Steel Corp. blew in a stack on Dec. 9. Woodward Iron Co. blew in its Woodward No. 3 stack on Dec. 6 and its No. 2 stack on Dec. 11; both are on merchant iron. Furnaces going out of production included a Sharon Steel Co. stack on Dec. 17 and Duquesne No. 3 stack of Carnegie-Illinois Steel Corp. on Dec. 24. Another stack on the idle list is Bethlehem Steel Co.'s Lackawanna "A" which went out on Nov. 30.

■ Captains and chief engineers of Great Lakes ore carriers, and vessel operators were honored at a civic luncheon in Cleveland last week for their accomplishment in shipping 80,116,360 tons of iron ore during 1941, an increase of 15,000,000 tons over the prior record.

That an even greater effort will be required this season was indicated by Charles E. Adams, chief of the OPM Iron and Steel Branch, who said 4,700,000 tons of additional pig iron capacity would be completed by May 1. This, steel men said, would necessitate the movement of 83,000,000 tons of ore.

## PIG IRON STATISTICS

### RATE OF FURNACE OPERATION

(Relation of Production to Capacity)

| | 1941[1] | 1940[2] | 1939[3] | 1938[4] |
|---|---|---|---|---|
| Jan. | 95.5 | 85.4 | 51.0 | 33.6 |
| Feb. | 95.3 | 75.0 | 53.5 | 33.6 |
| March | 96.3 | 69.5 | 56.1 | 34.2 |
| April | 91.8 | 68.9 | 49.8 | 33.4 |
| May | 94.1 | 74.2 | 40.2 | 29.4 |
| June | 95.7 | 83.6 | 51.4 | 25.5 |
| July | 97.0 | 86.1 | 55.0 | 28.2 |
| Aug. | 97.4 | 89.9 | 62.4 | 34.8 |
| Sept. | 99.3 | 91.5 | 69.7 | 40.5 |
| Oct. | 98.9 | 94.2 | 85.2 | 48.0 |
| Nov. | 99.0 | 96.4 | 90.3 | 55.0 |
| Dec. | 104.1 | 96.4 | 88.5 | 51.4 |

[1] First six months are based on capacity of 57,503,030 net tons, Dec. 31, 1940—last six months on capacity of 57,830,610 net tons, June 30, 1940; [2] capacity of 55,628,060 net tons, Dec. 31, 1939; [3] capacity of 56,222,790 net tons, Dec. 31, 1938; [4] capacity of 56,679,168 net tons, Dec. 31, 1937. Capacities by American Iron and Steel Institute.

### DECEMBER IRON PRODUCTION

Net Tons

| | No. in blast last day of Dec. | No. in blast last day of Nov. | —Total Tonnages— Merchant | Non-merchant |
|---|---|---|---|---|
| Alabama | 19 | 17 | 124,483 | 204,292 |
| Illinois | 20 | 20 | 121,136 | 372,154 |
| Indiana | 19 | 19 | 21,759 | 537,934 |
| New York | 15 | 15 | 133,145 | 210,756 |
| Ohio | 46 | 46 | 148,190 | 981,129 |
| Penna. | 70 | 71 | 131,921* | 1,416,102* |
| Colorado | 3 | 3 | | |
| Michigan | 5 | 4 | | |
| Minnesota | 2 | 2 | 13,347* | 218,191* |
| Tennessee | 3 | 3 | | |
| Utah | 1 | 1 | | |
| Kentucky | 2 | 2 | | |
| Maryland | 7 | 7 | | |
| Mass. | 1 | 1 | 20,944* | 359,512 |
| Virginia | 1 | 1 | | |
| West Va. | 4 | 3 | | |
| Total | 218 | 215 | 714,925* | 4,300,070* |

*Includes ferromanganese and spiegeleisen.

### MONTHLY IRON PRODUCTION

Net Tons

| | 1941 | 1940 | 1939 |
|---|---|---|---|
| Jan. | 4,666,233 | 4,024,556 | 2,436,474 |
| Feb. | 4,206,826 | 3,304,368 | 2,307,405 |
| March | 4,702,905 | 3,270,575 | 2,680,446 |
| April | 4,340,555 | 3,139,043 | 2,301,965 |
| May | 4,596,113 | 3,497,157 | 1,923,625 |
| June | 4,551,040 | 3,813,092 | 2,373,753 |
| July | 4,766,216 | 4,060,513 | 2,638,760 |
| Aug. | 4,784,639 | 4,234,576 | 2,979,774 |
| Sept. | 4,721,337 | 4,172,551 | 3,218,940 |
| Oct. | 4,860,033 | 4,437,725 | 4,062,670 |
| Nov. | 4,707,194 | 4,397,656 | 4,166,512 |
| Dec. | 5,014,995 | 4,542,864 | 4,219,718 |
| Total | 55,918,086 | 46,894,676 | 35,310,042 |

### AVERAGE DAILY PRODUCTION

Net Tons

| | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|
| Jan. | 150,524 | 129,825 | 78,596 | 52,201 |
| Feb. | 150,244 | 113,943 | 82,407 | 52,254 |
| March | 151,707 | 105,502 | 86,465 | 53,117 |
| April | 144,685 | 104,635 | 76,732 | 51,819 |
| May | 148,262 | 112,811 | 62,052 | 45,556 |
| June | 151,701 | 127,103 | 79,125 | 39,601 |
| July | 153,749 | 130,984 | 85,121 | 43,827 |
| Aug. | 154,343 | 136,599 | 96,122 | 54,031 |
| Sept. | 157,378 | 139,085 | 107,298 | 62,835 |
| Oct. | 156,775 | 143,152 | 131,053 | 74,697 |
| Nov. | 156,906 | 146,589 | 138,883 | 85,369 |
| Dec. | 161,774 | 146,544 | 136,119 | 79,543 |
| Ave. | 153,200 | 128,128 | 96,740 | 57,962 |

# December Ingots Within 1% of Best Month in History

■ CLOSE to 83,000,000 tons of steel were produced by the American steel industry during 1941, or nearly 25 per cent more than the previous peak output achieved in 1940, the American Iron and Steel Institute reported last week.

The industry ended the year with a production rate that brought output in December within 1 per cent of the best monthly total on record, despite a growing shortage of certain of raw materials, principally scrap. Output in the last quarter of the year was ahead of any prior quarter on record.

The total of 82,927,557 net tons of open-hearth, bessemer and electric furnace steel ingots and castings produced in 1941 compares with output of 66,981,662 tons in 1940. The 1941 tonnage exceeds by 65 per cent the peak output during World War I, 50,467,880 tons in the year 1917.

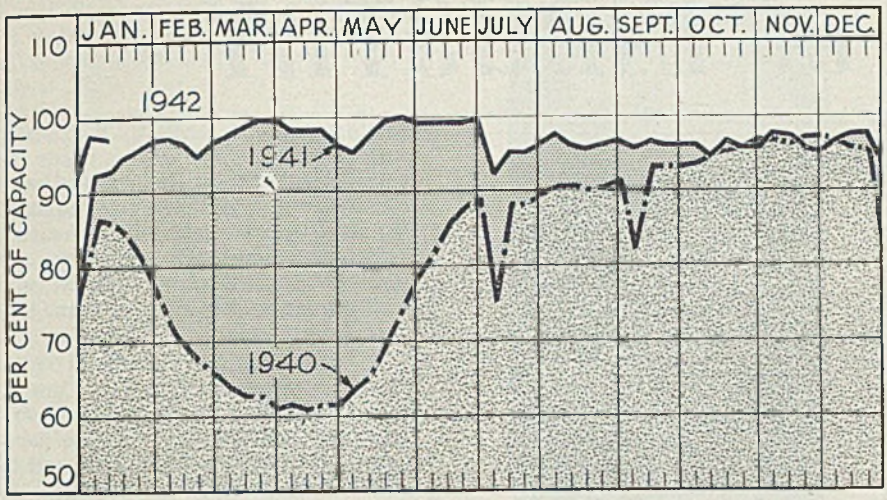
During 1941, the industry's plants operated at an average of 97.4 per cent of capacity, which compares with a rate of 82.1 per cent in 1940, and 90.8 per cent in 1917.

Production in December totaled 7,163,999 tons, as against output of 6,969,987 tons in November, and 6,495,357 tons in December, 1940.

## Bethlehem Exceeds All Prior Output Records

■ Bethlehem Steel Co., Bethlehem, Pa., made an all-time record in 1941, producing 12,155,476 net tons of steel ingots, it is announced by E. G. Grace, president. This compares with the prior record of 10,704,741 tons in 1940.

December output was the largest for any single month in the company's history, reflecting continued operations through the holidays. The month's record was 1,067,499 tons.




# CURRENT PRODUCTION . . . Down

■ PRODUCTION of open-hearth, bessemer and electric furnace ingots last week declined 1 point to 96½ per cent. Two districts made slight gains, six lost ground and four were unchanged. A year ago the rate was 93 per cent; two years ago it was 86 per cent.

**Cleveland**—Addition of one open hearth by Republic Steel Corp. was partially balanced by two small furnaces taken off late in the week by Otis Steel Co., giving a net gain of 1 point to 95 per cent.

**Youngstown, O.**—Dropping of open hearths by three producers and addition of one by another caused a net loss of 2 points to 90 per cent. Ten open hearths in condition to operate are idle for want of scrap. Sharon Steel Corp., Youngstown Sheet & Tube Co. and Carnegie-Illinois Steel Corp. each took off one furnace and Republic Steel Corp. added one.

**Central eastern seaboard**—Held at 89 per cent despite light scrap supplies.

**Cincinnati**—Continued at 91½ per cent.

**Birmingham, Ala.** — Twenty-two open hearths in production, the rate remaining at 90 per cent.

**Detroit**—Scrap shortage resulted in four open hearths being taken off by one producer, cutting the rate 8 points to 82 per cent.

**Chicago**—Gained ½-point to 102 per cent, despite scrap shortage. Three plants increased production, one dropped and two were unchanged.

**St. Louis**—Producers unable to put on additional open hearths, production held at 76 per cent for the third week.

**Buffalo**—Dropped 2 points to 79½ per cent as Republic Steel Corp. took off one open hearth for repairs.

**New England**—Loss of 8 points to 92 per cent resulted from an open hearth being taken off for repair.

**Pittsburgh**—Down 1 point to 95 per cent as several shifts were made in producing units.

**Wheeling**—Dropped 1 point to 90 per cent.

## District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

| | Week ended Jan. 10 | Change | Same week 1941 | Same week 1940 |
|---|---|---|---|---|
| Pittsburgh | 95 | — 1 | 95.5 | 88 |
| Chicago | 102 | + .5 | 100 | 90.5 |
| Eastern Pa. | 89 | None | 95 | 82 |
| Youngstown | 90 | — 2 | 94 | 80 |
| Wheeling | 90 | — 1 | 91 | 89 |
| Cleveland | 95 | + 1 | 92.5 | 85 |
| Buffalo | 79.5 | — 2 | 90.5 | 72 |
| Birmingham | 90 | None | 100 | 94 |
| New England | 92 | — 8 | 86 | 83 |
| Cincinnati | 91.5 | None | 88.5 | 74.5 |
| St. Louis | 76 | None | 87.5 | 75 |
| Detroit | 82 | — 8 | 94 | 93 |
| Average | 96.5 | — 1 | 93 | 86 |

## STEEL INGOT STATISTICS

| | Estimated Production—All Companies | | | | | | | | Calculated weekly production, all companies | Number of weeks in month |
|---|---|---|---|---|---|---|---|---|---|---|
| | —Open Hearth— | | —Bessemer— | | —Electric— | | —Total— | | | |
| | Net tons | Per cent of capacity | Net tons | Per cent of capacity | Net tons | Per cent of capacity | Net tons | Per cent of capacity | Net tons | |
| **Based on Reports by Companies which in 1940 made 92.91% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production** | | | | | | | | | | |
| 1941 | | | | | | | | | | |
| Jan. | 6,276,429 | 99.1 | 451,637 | 76.0 | 200,019 | 91.0 | 6,928,085 | 96.9 | 1,563,902 | 4.43 |
| Feb. | 5,673,289 | 99.2 | 378,330 | 70.5 | 186,281 | 93.9 | 6,237,900 | 96.6 | 1,559,475 | 4.00 |
| Mar. | 6,461,936 | 102.0 | 460,169 | 77.4 | 209,536 | 95.4 | 7,131,641 | 99.7 | 1,609,851 | 4.43 |
| 1st quar | 18,411,654 | 100.1 | 1,290,136 | 74.8 | 595,836 | 93.4 | 20,297,626 | 97.8 | 1,578,353 | 12.86 |
| Apr. | 6,135,941 | 100.0 | 395,009 | 68.6 | 225,999 | 106.2 | 6,756,949 | 97.6 | 1,575,046 | 4.29 |
| May | 6,365,172 | 100.5 | 444,361 | 74.8 | 243,705 | 110.9 | 7,053,238 | 98.7 | 1,592,153 | 4.43 |
| June | 6,103,767 | 99.5 | 458,242 | 79.6 | 238,721 | 112.2 | 6,800,730 | 98.2 | 1,585,252 | 4.29 |
| 2nd qtr | 18,604,880 | 100.0 | 1,297,612 | 74.3 | 708,425 | 109.8 | 20,610,917 | 98.2 | 1,584,237 | 13.01 |
| 1st half | 37,016,534 | 100.1 | 2,587,748 | 74.5 | 1,304,261 | 101.6 | 40,908,543 | 98.0 | 1,581,312 | 25.87 |
| July | 6,089,859 | 96.6 | 489,239 | 85.0 | 242,584 | 87.4 | 6,821,682 | 93.4 | 1,543,367 | 4.42 |
| Aug. | 6,243,100 | 96.6 | 495,523 | 85.9 | 262,334 | 94.4 | 7,000,957 | 95.7 | 1,580,351 | 4.43 |
| Sept. | 6,058,731 | 97.0 | 500,687 | 89.8 | 260,288 | 96.9 | 6,819,706 | 96.4 | 1,593,389 | 4.28 |
| 3rd qtr | 18,391,690 | 96.0 | 1,485,449 | 86.8 | 765,206 | 92.9 | 20,642,345 | 95.2 | 1,572,151 | 13.13 |
| 9 mos. | 55,408,224 | 98.7 | 4,073,197 | 78.6 | 2,069,467 | 98.2 | 61,550,888 | 97.0 | 1,578,228 | 39.00 |
| Oct. | 6,427,977 | 99.4 | 532,862 | 92.3 | 281,843 | 101.4 | 7,242,683 | 99.0 | 1,634,917 | 4.44 |
| Nov. | 6,198,368 | 99.0 | 488,986 | 87.5 | 282,633 | 105.0 | 6,969,987 | 98.3 | 1,624,706 | 4.29 |
| Dec. | 6,395,387 | 99.2 | 481,706 | 83.6 | 286,906 | 103.4 | 7,163,999 | 98.1 | 1,620,814 | 4.42 |
| 4th qtr | 19,021,732 | 99.2 | 1,503,555 | 87.8 | 851,382 | 103.2 | 21,376,669 | 98.5 | 1,626,839 | 13.14 |
| Total | 74,429,956 | 98.8 | 5,576,752 | 80.9 | 2,920,849 | 99.6 | 82,927,557 | 97.4 | 1,590,479 | 52.14 |
| **Based on Reports by Companies which in 1940 made 98.43% of the Open Hearth, 100% of the Bessemer and 85.82% of the Electric Ingot and Steel for Castings Production** | | | | | | | | | | |
| 1940 | | | | | | | | | | |
| Jan. | 5,356,444 | 85.7 | 285,447 | 56.1 | 122,832 | 77.0 | 5,764,723 | 83.4 | 1,301,292 | 4.43 |
| Feb. | 4,208,249 | 72.1 | 205,458 | 43.2 | 112,090 | 75.2 | 4,525,797 | 70.0 | 1,093,188 | 4.14 |
| Mar. | 4,078,843 | 65.3 | 191,568 | 37.6 | 118,772 | 74.5 | 4,389,183 | 63.5 | 990,786 | 4.43 |
| 1st quar | 13,643,536 | 74.4 | 682,473 | 45.7 | 353,694 | 75.6 | 14,679,703 | 72.3 | 1,129,208 | 13.00 |
| Apr. | 3,808,031 | 62.9 | 176,419 | 35.8 | 116,024 | 75.1 | 4,100,474 | 61.2 | 955,821 | 4.29 |
| May | 4,583,771 | 73.4 | 258,741 | 50.8 | 125,270 | 78.5 | 4,967,782 | 71.8 | 1,121,395 | 4.43 |
| June | 5,222,120 | 86.3 | 305,115 | 61.9 | 130,208 | 84.3 | 5,657,443 | 84.5 | 1,318,751 | 4.29 |
| 2nd qtr. | 13,613,922 | 74.2 | 740,275 | 49.5 | 371,502 | 79.3 | 14,725,699 | 72.5 | 1,131,875 | 13.01 |
| 1st half | 27,257,458 | 74.3 | 1,422,748 | 47.6 | 725,196 | 77.4 | 29,405,402 | 72.4 | 1,130,542 | 26.01 |
| July | 5,269,701 | 84.5 | 322,567 | 63.5 | 132,357 | 83.2 | 5,724,625 | 83.0 | 1,295,164 | 4.42 |
| Aug. | 5,670,932 | 90.8 | 369,770 | 72.6 | 145,681 | 91.3 | 6,186,383 | 89.5 | 1,396,475 | 4.43 |
| Sept. | 5,535,198 | 91.7 | 365,289 | 74.2 | 155,759 | 101.1 | 6,056,246 | 90.6 | 1,415,011 | 4.28 |
| 3rd qtr. | 16,475,831 | 89.0 | 1,057,626 | 70.1 | 433,797 | 91.7 | 17,967,254 | 87.7 | 1,368,412 | 13.13 |
| 9 mos. | 43,733,289 | 79.2 | 2,480,374 | 55.1 | 1,158,993 | 82.2 | 47,372,656 | 77.5 | 1,210,339 | 39.14 |
| Oct. | 6,059,792 | 97.0 | 408,317 | 80.2 | 176,433 | 110.6 | 6,644,542 | 96.1 | 1,499,897 | 4.43 |
| Nov. | 5,872,162 | 97.1 | 420,448 | 85.3 | 176,497 | 114.2 | 6,469,107 | 96.6 | 1,507,950 | 4.29 |
| Dec. | 5,907,840 | 94.8 | 399,434 | 78.6 | 188,083 | 118.2 | 6,495,357 | 94.1 | 1,469,538 | 4.42 |
| 4th qtr. | 17,839,794 | 96.3 | 1,228,199 | 81.3 | 541,013 | 114.3 | 19,609,006 | 95.6 | 1,492,314 | 13.14 |
| Total | 61,573,083 | 83.5 | 3,708,573 | 61.7 | 1,700,006 | 90.3 | 66,981,662 | 82.1 | 1,281,210 | 52.28 |

The percentages of capacity operated in the first six months of 1941 are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Dec. 31, 1940 as follows: Open hearth 74,565,510 net tons, bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on weekly capacities of 1,459,132 net tons open hearth, 130,292 net tons bessemer and 62,761 net tons electric ingots and steel for castings, total 1,652,185 net tons; based on annual capacities as of June 30, 1941 as follows: Open hearth, 76,079,130 net tons, bessemer 6,793,400 net tons, electric 3,272,370 net tons.

■ Brown & Sharpe Mfg. Co., Providence, R. I., has been presented the Navy "E" pennant and the flag of the Bureau of Ordnance, in recognition of its effort in production of ordnance material essential to defense. Employes are entitled to wear a special lapel button with the name of the company, insignia of the bureau and the "E".

# MEN of INDUSTRY

■ **MAX W. BABB,** president, Allis-Chalmers Mfg. Co., Milwaukee, has been elected chairman of the board, and **W. C. Buchanan,** a director and member of the executive committee, has been elected to succeed Mr. Babb as president. Mr. Babb joined Allis-Chalmers in 1904 as attorney; from 1913 to 1932 was vice president and in 1932 became president.

The past six years Mr. Buchanan has devoted a substantial part of his time to the Globe Steel Tubes Co., Milwaukee, of which he is president, and in which capacity he will continue.

♦

**George B. Beitzel** has been promoted from manager of sales, Pennsylvania Salt Mfg. Co., Philadelphia, to vice president in charge of sales.

♦

**Thomas E. Hughes,** superintendent of maintenance, Carnegie-Illinois Steel Corp., Duquesne, Pa., has been elected president, Association of Iron and Steel Engineers.

♦

**Ralph H. Deihl,** since May, 1940, associated with the advertising department, Falk Corp., Milwaukee, has been named advertising manager.

♦

**H. F. Dunbar,** general manager, McConway & Torley Corp., Pittsburgh, has been elected vice president. He has been with the company over 20 years.

♦

**John B. DeWolf,** since January, 1940, district sales manager in New York for Jones & Laughlin Steel Corp., Pittsburgh, has been appointed district sales manager in Washington. He has been succeeded at New York by **S. A. Fuller,** heretofore district sales manager in Chicago.

**Earnest W. Harwell,** district sales manager at Memphis, Tenn., has been transferred to Chicago as district sales manager, and has been succeeded at Memphis by **E. E. Hoehle,** formerly assistant district sales manager there.

Max W. Babb

**R. J. Woods Jr.** has been made district sales manager of the newly created office at Tulsa, Okla. He has been a sales engineer in the Memphis district office since 1935.

♦

**W. L. Kennicott,** previously Los Angeles sales manager of McKenna Metals Co., is now at the main office and factory at Latrobe, Pa., in the management of sales and engineering of Kennametal tools.

♦

**H. Mansfield Horner,** general manager, Pratt & Whitney Aircraft division, has been elected a vice president, United Aircraft Corp., East Hartford, Conn. He will continue as general manager of Pratt & Whitney. Associated with the company since graduation from Sheffield Scientific School of Yale University in 1926, he has served successively as a clerk in the purchasing department, assistant treasurer, assistant secretary, secretary, assistant sales manager, assistant general manager, and general manager.

♦

**F. H. Lindus,** associated with Timken Roller Bearing Co., Canton, O., since 1935, serving as Los Angeles branch manager of the service division, has been transferred to Canton and will be engaged in sales promotion work.

♦

**Dana Chase,** the past 12 years associated with Chicago Vitreous Enamel Product Co., Cicero, Ill., has been appointed general sales manager. He formerly was assistant to the vice president and general manager.

♦

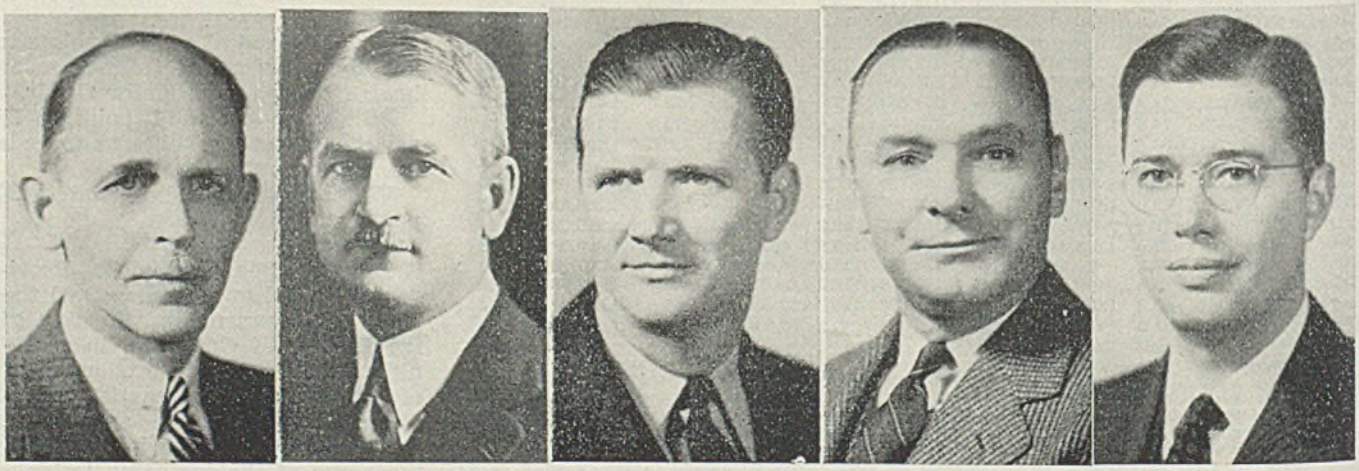
**J. D. Colyer** has resigned as a director and vice president in charge of sales, Wolverine Tube Co., Detroit. Supervision of all sales will continue under direction of **Otto Klopsch,** vice president and general manager, with **Robert Moody** as special assistant.

♦

**J. Harry Jackson,** the past five years metallurgist and welding engineer, Caterpillar Tractor Co., Peoria, Ill., has been appointed a research engineer, Battelle Memorial Institute, Columbus, O., and has been assigned to research in metallurgy.

♦

**Charles R. Miller Jr.,** formerly director of purchases, has been elected vice president - purchases, United States Steel Corp. of Delaware, and a member of its executive committee and board of directors. Mr. Miller has been associated with United



S. A. Fuller | John B. DeWolf | Earnest W. Harwell | E. E. Hoehle | R. J. Woods Jr.

States Steel subsidiaries more than 44 years, first entering the employ of Carnegie Steel Co. as an office boy in 1897.

♦

**Henry A. Roemer** has been elected chairman of the board, Pittsburgh Steel Co., Pittsburgh, and will continue as chief executive officer. **Joseph H. Carter,** heretofore operating vice president, has been elected president, succeeding Mr. Roemer, while **Albion Bindley,** vice president, has been made executive vice president.

♦

**J. B. O'Connor,** manager of the operating division and a director, Lyon Metal Products Inc., Aurora, Ill., has been made vice president in charge of development, to succeed **J. E. Bales,** who has retired after 40 years' service. Mr. Bales will continue as a director.

♦

**George P. Passmore** has been appointed works manager in charge of manufacturing, Wellsville, N. Y., works, Worthington Pump & Machinery Corp. Until recently Mr. Passmore had been manager of manufacturing, South Philadelphia works, Westinghouse Electric & Mfg. Co.

♦

**H. H. Barnes Jr.** and **E. P. Waller,** officials of General Electric Co., Schenectady, N. Y., have retired. Mr. Barnes, commercial vice president in charge of the company's activities in the New York district since May, 1928, has completed 40 years of service, while Mr. Waller, assistant to **E. O. Shreve,** vice president in charge of apparatus sales, has completed 41 years of service.

♦

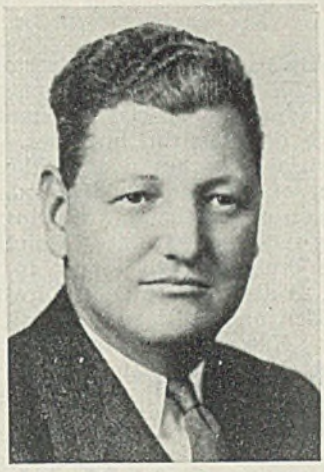
**Chester S. Ricker,** the past eight years technical counsel on the Ford Motor Co. account for McCann-Erickson Co., Detroit, has been named editor of *The Tool Engineer,* official monthly organ of the American Society of Tool Engineers, and published by the Bramson Publishing Co., Curtis building, Detroit.

♦

**Richard H. Grant,** vice president in charge of sales, General Motors Corp., Detroit, has been assigned to Washington where he will have charge of contacts between General Motors and the government for war materials. He succeeds **James D. Mooney,** vice president, who has been called to active duty in the Navy Department, heading the production engineering section of the Bureau of Aeronautics. Mr. Grant will continue general supervision of General Motors sales organizations.

General Motors further has organized a new war emergency committee as a means of stimulating production of war materials by the corporation's divisions. The committee which supersedes the defense material relationships committee set up in June, 1940, includes **Donaldson Brown,** vice president; **Alfred P. Sloan Jr.,** chairman; **C. E. Wilson,** president; **John Thomas Smith,** vice president and general counsel; and **Albert Bradley, Frederick G. Donner** and **O. E. Hunt,** all vice presidents.

Henry A. Roemer



Joseph H. Carter

Richard H. Grant

♦

**George E. Markley** has been appointed sales manager, Radiant-Combustion Inc., Warren, O. He formerly was sales engineer, North American Mfg. Co., Cleveland.

**Thorn Pendleton,** president, Warren Tool Corp., has also become president of Radiant-Combustion Inc., succeeding **Clarence Moran,** resigned.

♦

**Dwight A. Bessmer** has been appointed assistant director of purchases, Timken Roller Bearing Co., Canton, O. Joining Timken shortly after graduation from Michigan School of Mines in 1929, Mr. Bessmer served as automotive sales engineer in the Detroit territory for six years, following which he entered the purchasing department as a buyer.

♦

**J. Rogers Davis** has been named supervisor of branches, Chicago Pneumatic Tool Co., New York. Mr. Davis joined the company in December and will assist in the sales activities of Chicago Pneumatic's 21 district and sub-district offices. He will standardize sales office procedure and co-ordinate sales plans and quotas with branch and division managers.

♦

**Bert M. Brock** has been appointed manager of industrial relations, John A. Roebling's Sons Co., Trenton, N. J. The past year he has been director of industrial relations, Pittsburgh district, Carnegie-Illinois Steel Corp., and prior to that was assistant director of industrial relations, United States Steel Corp. of Delaware, Pittsburgh.

**J. Nelson Hicks** has been named manager of John A. Roebling's Boston branch, to succeed **Prescott H. Vose.**

♦

**Dean Rollans** has been elected vice president in charge of sales, Wickwire Spencer Steel Co., New York, while **William H. Husted** has been appointed assistant to the president. In addition to his new duties, Mr. Husted will be given leave of absence for three days a week to serve as consultant to the Raw Materials Division, Iron and Steel Branch, Office of Production Management. Formerly general sales manager, Mr. Rollans is a member, Wire Products Subcommittee, Iron and Steel Defense Advisory Committee, OPM.

♦

**H. G. Welsford** has been elected a director, Dominion Bridge Co. Ltd., Montreal, Que., to succeed the late Sir Herbert Holt.

♦

**William T. McKelvey** has been named district manager in charge of the Erie Bolt & Nut Co.'s new branch sales office, room 616, Williamson building, Cleveland, and

his territory will include the state of Ohio. Mr. McKelvey has been associated with the company ten years and previously had headquarters at the home office in Erie, Pa.

♦

**F. J. Carr** has been elected vice president, finance, American Steel & Wire Co., Cleveland, subsidiary of the United States Steel Corp. He has been associated with the company since 1938 as assistant to the president and more recently as comptroller. **C. S. Morris** has been appointed supervisor of accounting and **Ogden Ashley** named assistant to Mr. Carr.

♦

**R. E. Stavert** has been elected a director, Dominion Engineering Works Ltd., Montreal, Que., subsidiary of Dominion Bridge Co. Ltd., succeeding the late Sir Herbert Holt.

♦

**John M. Franklin,** president, International Mercantile Marine Co., and United States Lines Co., has been elected a director, Worthington Pump & Machinery Corp., Harrison, N. J.

♦

**M. B. Antrim,** until August, 1941, sales engineer, Steel Mill Division, Westinghouse Electric & Mfg. Co., Philadelphia, has joined Lukens Steel Co., Coatesville, Pa., as assistant to the electrical superintendent.

♦

**Byron L. Casey,** the past 24 years in the sales department, Ilg Electric Ventilating Co., Chicago, has been appointed sales manager, northern district, to supervise sales in Illinois, northern Indiana, western Michigan, Wisconsin, Minnesota, North and South Dakota. He will make his headquarters in Chicago.

♦

**John E. Frederick,** chairman of the board, Continental Steel Corp., Kokomo, Ind., has been elected chairman of the board, Indiana State Chamber of Commerce. **Louis Ruthenburg,** president, Servel Inc., Evansville, Ind., has been elected president of the chamber, while **Louis J. Borinstein,** president, Institute of Scrap Iron and Steel Inc., has been named treasurer.

♦

**Joseph B. Graham,** president and one of the founders, Graham-Paige Motor Corp., Detroit, has retired from active management although he will retain his large-scale financial interest and also will remain as a director. He is being succeeded as president by **Ray Hodgson,** until recently manager of the Detroit office, Reconstruction Finance Corp.

♦

**William S. Richardson** has been appointed general manager, mechanical goods sales division, B. F. Goodrich Co., Akron, O., succeeding **J. H. Connors,** who has resigned because of ill health.

F. J. Carr

♦

**Philip D. Reed,** deputy director of the OPM Materials Division, has been appointed special assistant in charge of industrial branches. All industrial branches now in the Division of Civilian Supply and the Division of Purchases are being set up as independent units. Chiefs of these branches will report to Mr. Reed as assistant to OPM Directors Knudsen and Hillman.

Mr. Reed is chairman of the board, General Electric Co., and has been connected with OPM since its inception.

## Bessemer Gold Medal Awarded to E. G. Grace

■ E. G. Grace, president, Bethlehem Steel Co., has been awarded the Bessemer Gold Medal for 1942 by the British Iron and Steel Institute in recognition of his achievements in "fostering collaboration between the steel industries of two leading nations in a great world crisis."

E. G. Grace

Founded in 1874, in honor of Sir Henry Bessemer, the medal has been awarded previously to only three other Americans, Andrew Carnegie, Charles M. Schwab, and Albert Sauveur.

Mr. Grace was notified of the award in Washington by Ian Elliot, member of the Council of the British Iron and Steel Institute. Characterizing him as the "acknowledged leader of the steel industry in America," Mr. Elliot said the award was an "appropriate symbol of the pooling of the technical skill as well as the resources of the United States and Great Britain in an anti-Axis world."

## Small Tool Producers Asked To Hold Prices

*WASHINGTON*

■ OPA has requested manufacturers of portable power-driven tools to maintain net sale prices prevailing Oct. 1 and to meet with OPA officials in Washington Jan. 17 for discussion of the industry's place in the war production program.

### General Preference Order E-1-a, Machine Tools, Suspended

General Preference Order E-1-a covering machine tools, which was to have become effective Jan. 10, has been suspended pending announcement of a new effective date. Supplementary Order No. 1, which would have been superseded by E-1-a, will remain effective until revoked together with the master preference list which was attached to this order.

### December War Expenditures Approach $2,000,000,000

War expenditures were nearly $2,000,000,000 in December, according to estimates by the OPM Bureau of Research and Statistics. The total of $1,997,000,000 for the month includes checks paid by the Treasury and by the Reconstruction Finance Corp. for war purposes.

This brought total war expenditures for 18 months, July, 1940, through December, 1941, to $15,252,000,000. An increase in expenditures during December over November of $465,000,000 was reported, compared with a decline of $126,000,000 in November from October. This was virtually double the largest monthly increase previously reported.

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■ Canada's mineral production in 1941 attained the highest record in history, according to preliminary estimate issued by the Dominion Bureau of Statistics. Total value of mineral output was $553,941,000, an increase of 4.6 per cent over the 1940 total of $529,825,000.

# Washing Machine Industry To Get Relief "Consistent with War Work"

*CHICAGO*

■ HOPE for all possible relief consistent with the nation's war effort was held out to the washing machine and ironer industry, Jan. 7, by W. K. Chapman, manager of the washing machine industry division, OPM, Washington.

Speaking before the twenty-seventh annual meeting of the American Washer and Ironer Manufacturers' association in Morrison hotel, Mr. Chapman said OPM plans to set up an industry advisory committee which will study the needs of manufacturers. Materials not entirely essential in war industries will be made available to enable the manufacturer to complete his product, he stated.

He emphasized, however, that any relief will have to be consistent with war work. The industry recently was awarded a $12,000,000 government contract for machine gun parts, with nearly all members participating in it. Contract was awarded to relieve hardships resulting from OPM's curtailment of washers and ironers.

J. M. Wicht, manager of home laundering equipment, General Electric Co., Bridgeport, Conn. was elected president of the association. Retiring President W. Neal Gallagher, president and general manager, Automatic Washer Co., Newton, Iowa, was named executive secretary and treasurer to succeed Joseph R. Bohnen, who died Jan. 4.

Walter K. Voss, general manager, Voss Bros. Mfg. Co., Davenport, Iowa, was elected first vice president; Oscar Lenna, president and general manager, Blackstone Corp., Jamestown, N. Y., second vice president; and Judson Sayre, president, Bendix Home Appliances Inc., South Bend, Ind., third vice president.

Named to posts on the executive committee were: I. W. Merritt, president, Meadows Corp., Chicago; L. C. Upton, president, 1900 Corp., St. Joseph, Mich.; George M. Umbreit, vice president, Maytag Co., Newton, Iowa; Del Rizor, vice president in charge of sales, Dexter Co., Fairfield, Iowa; and R. J. Simmons, vice president, Birtman Electric Co., Chicago.

### Vacuum Cleaner Production Curtailed 25 to 40 Per Cent

Cuts ranging from 25 per cent to 40 per cent in production of domestic vacuum cleaners during the first quarter of 1942 have been ordered.

During January, February and March, Class A manufacturers whose average monthly factory sales in the 12 months ended June 30 were 5200 or more units, will be required to curtail output 40 per cent below the monthly average. Class B manufacturers, whose average was less than 5200 units, must cut production 25 per cent.

Under the original curtailment program, which ran from Oct. 1 to Dec. 31, 1941, Class A firms were cut only 10 per cent, while Class B companies were restricted merely to 100 per cent of their base year production rate.

Another order excludes from existing production quotas any domestic mechanical refrigerators produced for United States government agencies, allied governments, lend-lease requiremens, and for defense housing projects where contracts involved were obtained as the result of competitive bidding.

A third order provides similar exemptions and extends through the first quarter of 1942 the curtailment program on use of steel in the manufacture of domestic (non-mechanical) ice refrigerators. During January, February and March, steel consumption is cut 40 per cent below the monthly average used in the 12 months ended June 30, 1941, or in the three years ended June 30, whichever is the fairer base period.

### Priority Orders for Airplane Equipment Extended to Jan. 31

Preference Rating orders granting priority assistance in obtaining materials entering into the production of airplanes, airplane engines and equipment, electrical relays and solenoid assemblies, radio receiving, transmitting and directional equipment have been extended to Jan. 31.

New orders are being prepared to replace those which are now extended, but the extension is necessary because the new orders are not ready for issuance.

Orders extended and the materials covered are as follows:

P-3—materials entering into the production of airframes.

P-4—materials entering into the production of airplane engines and propellers.

P-9-a—materials entering into the production of heavy bombers.

P-9-b—materials entering into the production of engines for heavy bombers.

P-9-c—materials entering into the production of propellers for heavy bombers.

P-9-d—materials entering into the production of airframes for heavy bombers.

P-9-e—materials entering into the production of gunsights, bombsights, and gunfire controls for heavy bombers.

P-9-f—materials entering into the production of turbo-superchargers for heavy bombers.

P-9-g—materials entering into the production of specified airplane engines by the Packard Motor Car Co.

P-15—materials entering into the production of electrical relays and solenoid assemblies.

P-16—materials entering into the production of radio receiving, transmitting, and directional equipment.

In each case, the ratings are applicable only to materials to be used in filling defense orders.

### Railroad Equipment Builders Rescind Price Increases

Three manufacturers of railroad equipment accessories have withdrawn October price increases at the request of OPA.

Companies and the products which have been restored to their former price levels follow: Westinghouse Air Brake Co., Pittsburgh, air hose and hose with fittings, gaskets, seats, and packing cups; Youngstown Steel Door Co., Cleveland, steel doors for freight cars; and Edna Brass Mfg. Co., locomotive specialties. A fourth concern, Electric Service Supplies Co., Philadelphia, which had made minor advances in certain industrial supplies also has rescinded the increases.

### Broaden Priority Aid to Steel Drum Manufacturers

General Preference Order M-45 has been amended to extend priority assistance for obtaining steel sheets of any gage to manufacturers of steel drums for overseas shipments. Original order applied only to 16 and 18-gage sheets. Amended order also provides the priority aid for drums for all overseas shipments, while the original order restricted such aid to drums used for shipping gasoline, oil and other petroleum products.

Expiration date of the order has been made indefinite.

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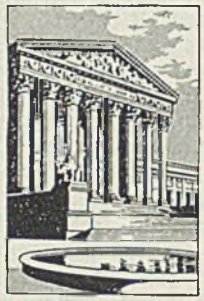
■ An air raid precaution and military exhibition was staged last week by Ohio Crankshaft Co., Cleveland, to stimulate employes enthusiasm for the current Red Cross and defense bond campaigns. An air raid shelter loaned by the American Rolling Mill Co., Middletown, O., was a part of the exhibition, which also included a demonstration on control of thermite bombs, and a display of fire fighting and mechanized military equipment.

# Windows of WASHINGTON

***Tin and lead scrap placed under priority control . . . Vending machine production limited . . . Drop forgers to discuss price schedule with OPA officials . . . Office of Civilian Defense offers program to protect plants in case of air raids . . . "Adequate" heating and plumbing supplies promised by OPM . . . Priority assistance granted for materials for spare parts for lift trucks***



By L. M. LAMM

Washington Editor, STEEL

*WASHINGTON*

■ TIN and lead scrap, essential for war production, have been placed under priorities control by the Director of Priorities with the issuance of General Preference Order M-72.

The order makes Priorities Regulation No. 1 applicable to all transactions in tin and lead scrap and provides for monthly reports by scrap dealers and consumers.

A scrap dealer is forbidden to accept deliveries unless, during the preceding 60 days, he has disposed of scrap in an amount equal to his inventory on the date of delivery.

Provision is also made for direct allocation of tin or lead scrap if this is necessary in the interests of the war program.

### Use of Critical Materials in Vending Machines Restricted

Sharp curtailment in the use of critical materials for manufacture of popular types of vending machines, which dispense cigarettes, food, candy, nuts, chewing gum and beverages, has been ordered by the Priorities Division.

Restrictions do not apply to United States postage stamp machines, nor to automatic restaurants.

Order became effective Jan. 1, and covers production during January and February.

Using as a base period the monthly average consumption for the 12 months ended June 30, 1941, the following curtailments were ordered:

Iron and steel, 25 per cent during January and 50 per cent during February and thereafter.

Alnico magnets (slug-rejector mechanism), 25 per cent during January and 75 per cent during February and thereafter.

"Prohibited metals"—aluminum, stainless steel, chromium, copper, lead, nickel, tin, and copper base alloys—100 per cent after Feb. 1, with certain exceptions.

Metals other than those on the "prohibited list," chiefly zinc used in coin mechanism, 50 per cent during January and 75 per cent February and thereafter.

The "prohibited metals" may be used in the manufacture of the curtailed number of alnico magnets, and for refrigerator units and electricity conduction at sharply curtailed rates.

Roughly, it is estimated that the program will save between 5000 and 10,000 tons of steel annually under a continuing 50 per cent cut. Between 500 and 750 tons of zinc might be saved on the same basis.

The industry, largely concentrated in the Chicago area, employs approximately 3000 workers.

### Drop Forgers To Meet with OPA Officials in Cleveland

The initial meeting between members of an advisory panel for the drop forging industry and officials of the Office of Price Administration to discuss a program looking toward price stability has been called for Wednesday, Jan. 14, in Hotel Statler, Cleveland.

Invitations to membership on the panel have been extended to 14 representative manufacturers.

In November, Mr. Henderson requested drop forging producers not to raise prices above the levels of Oct. 10. Members of the Machinery Section of OPA met with a cross section of the industry Nov. 18 and formation of an advisory panel was decided upon as result of this industry meeting.

### Limitation Order Covering Metal Furniture Extended

Three-month extension until March 31 of Limitation Order L-13, curtailing the use of steel in the manufacture of metal office furniture, has been ordered by the Priorities Division.

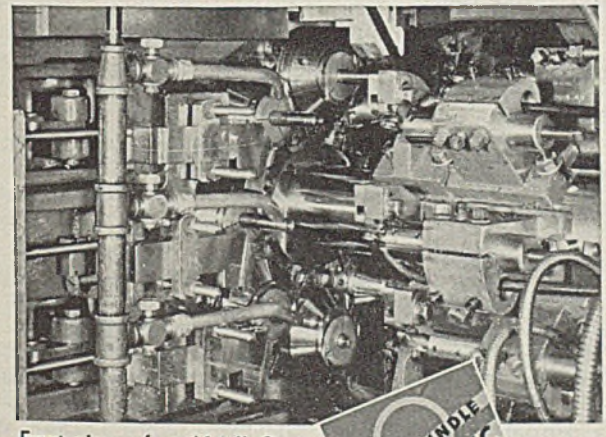
The same average monthly reduc-

## Highspots in the Week's Washington News

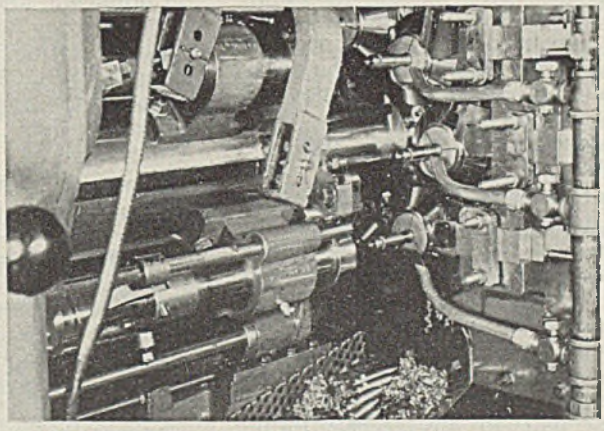
Spare parts for lift trucks assigned A-1-g rating (p. 34).
Plumbing, heating and electrical supplies to be granted priority rating (p. 34).
Hoist, crane and derrick manufacturers asked to maintain Oct. 1 prices (p. 34).
Locomotive, freight car materials to be provided (p. 35).
Heat treating furnace parts assigned A-1-c rating (p. 35).
Mining machinery manufacturers granted A-3 rating (p. 35).
Tin consumption restricted to save estimated 15,000 tons annually (p. 36).
Tin can salvaging planned; detinning plants to be erected (p. 36).
Lead pool continues at 15 per cent for January (p. 36).
Zinc pool in January to be 31 per cent of October production (p. 37).
Brass, bronze alloy ingot price ceiling revised (p. 37).
Copper manufacturers warned to adhere to M-9-c (p. 37).
Aluminum, scrap orders extended (p. 37).
Local antitrust offices empowered to approve war production groups (p. 47).
Aluminum scrap segregation ordered (p. 25).
Privately-imported copper placed under full priority control (p. 25).
Tin and lead scrap rationed (p. 32).
Vending machine production restricted (p. 32).
Vacuum cleaner output curtailed (p. 31).

# Unlimited Supply of Ammunition

## WITH CONOMATICS



Front view of a 1 1/2" 8 spindle Conomatic, showing tool-up for machining a 20 mm. shell body.



Rear view of a 1 1/2" 8 spindle Conomatic, showing tool-up for machining a 20 mm. shell body.


Write **NOW** for particulars and catalog.

**CONE AUTOMATIC MACHINE CO., INC., WINDSOR, VERMONT, U. S. A.**

## Priorities, Allocations, Prices

■ THIS WEEK STEEL inaugurates a new service in the form of a separate Priorities, Allocations and Price Section which accompanies this issue.

In it will be found a complete index by materials and equipment of all OPM and OPA orders, digests of the orders and instructions for filing the proper allocation and preference forms. Also included is a cross index of the allocation and preference forms with reference to the orders under which they are used, and a personnel directory of the Office of Production Management, Contract Distribution Field Offices, Priority Specialists, Priority Field Service, and the Office of Price Administration.

This new service will be kept up to date in STEEL each week and all readers are urged to follow the regular weekly news feature which will be entitled "Priorities, Allocations, Prices". Changes and revisions of all OPM and OPA orders will be carried in such form that corrections and additions may readily be made to this week's special section. Completely revised sections will be published from time to time as the changes accumulate to warrant it.

Additional copies of this week's Allocations, Priorities and Price Section of STEEL may be obtained by regular subscribers by addressing STEEL, Readers Service Department, Penton Building, Cleveland.

tion that was applied during the first four months of the program—40 per cent below the monthly average of steel used in the 12 months ended June 30, 1941—was ordered during January, February and March.

The program contemplates savings of approximately 100,000 tons of steel a year for war industries.

Some changes were made in the original order, principally the addition of a provision granting some relief to manufacturers who receive contracts from the Army, Navy and certain other war agencies, allied governments and lend-lease agencies.

### Preference Rating Order P-11-a Extended to March 15

Manufacturers of machine tools and other metalworking equipment who have been securing the necessary materials with the assistance of the A-1-a, A-1-b and A-1-c ratings authorized by Preference Rating Order P-11-a, will continue to receive this help until March 15, under the terms of an extension of the order, announced by the Priorities Division. The original order would have expired on Jan. 15, 1942.

### Grant Priority Aid for Spare Parts for Lift Trucks

Producers of power-driven industrial lift trucks are granted the assistance of an A-1-g rating in the acquisition of materials to be used in the manufacture of spare parts for these essential machines, in an amendment to Preference Rating Order P-40.

The order, issued on Oct. 14, 1941, originally covered only materials for the production of complete units. At the end of 1940, there were approximately 23,400 of these trucks in operation around industrial plants and many of them have been operating for as much as 10 years. Consequently the maintenance and repair problem has become acute, particularly because of the heavy burden placed upon manufacturers owning these trucks in filling war orders.

Benefit of the rating may now be applied to deliveries of material for the manufacture of electric storage batteries and gas-electric units, designed and manufactured solely for replacement purposes in maintaining and repairing existing trucks of the types covered by the order, and to repair parts designed and manufactured for use in the same way.

Another paragraph of the amendment requires that a manufacturer operating with the benefit of the order may make deliveries only when he is convinced from the nature of the articles ordered that they are for the maintenance and repair of the types of trucks covered. If reasonable doubt exists he should obtain from his customer an affidavit stating that the parts ordered will be used solely for maintenance and repair.

The affidavit should be obtained in duplicate, and the producer must file one copy with the Automotive, Transportation and Farm Equipment Branch, OPM, before, or at the time of, the application of the preference rating.

### "Adequate" Plumbing, Heating Supplies Assured

Assurance that adequate quantities of plumbing, heating and electrical supplies will continue to be available through usual wholesale and retail channels, is given in a program announced by the Priorities Division.

Manufacturers of essential types of supplies will be given priority assistance in obtaining the necessary materials, within the framework of the Production Requirements Plan. They will not, however, be required to prove deliveries under rated orders, where the supplies are to be sold to ultimate users not customarily assigned preference ratings.

A manufacturer wishing to qualify for the preference ratings available under the program should make application on form PD-25-a, addressed to the Production Requirements Branch, OPM. If approved, he will be granted priority assistance in obtaining materials in amounts which will be determined after consideration of the importance of the particular product, amounts previously manufactured, the recommendations of the appropriate industry branches of OPM, and other similar factors.

Also a part of the program is Suppliers Order M-67, addressed to retailers, wholesalers, jobbers and all other distributors of these supplies. To assure an equitable distribution of these items, essential to public health and welfare, it establishes maximum inventory levels and prevents the accumulation of excess stocks at any stage of the distribution process.

New program does not affect the provisions of Preference Rating Orders P-100, P-46, P-56, P-68.

### Equipment Manufacturers Asked To Maintain Prices

OPA last week requested manufacturers of various types of equipment to maintain prices at recent levels pending conferences on cost increases and other factors.

Makers of hoists, cranes and derricks were asked not to exceed prices prevailing Oct. 1, and to meet in Washington, Jan. 15. A similar request was made to manufacturers of construction equipment, who conferred with OPA officials in Chicago, Jan. 10.

Ceramic machinery builders also were asked to hold prices at the Oct. 1 levels to prevent reaction on building materials, refractories for industrial furnaces, kilns and other products. Ceramic equipment manufacturers have been asked to attend a meeting in Washington, Jan. 10.

### OCD Issues Suggestions for Protecting Plants in Air Raids

Pamphlet outlining a preparedness program for protection of plants and personnel in case of possible air raids has been issued by the Office of Civilian Defense.

The office advises the appointment of a plant defense co-ordinator and the organization and equipment of fire, police, health and maintenance services, suggests type of material needed by all the services.

"Even though the possibility of enemy air attack upon industrial plants and public buildings in the United States may be remote, it is essential that protective organization be developed at once to guard against the disruption of normal activities and for the safety of personnel in an emergency," the pamphlet states.

# Priority Aid for New Locomotive, Freight Car Materials Assigned

■ SUPPLY Priorities and Allocations Board has moved to provide materials for as much new car and locomotive construction as possible without interfering with the production of military goods.

SPAB has authorized OPM to grant priorities and other help during the first quarter of 1942 for:

Repair of passenger and freight cars and locomotives.

Production of 36,000 freight cars in February, March and April, with preference given to types needed to transport military equipment. (It is estimated that 9000 cars will be built in January.)

Continued production in February, March and April of locomotives now on order or now scheduled for production for stock, consisting of 248 steam locomotives, 58 electric locomotives and 620 diesel locomotives. It is provided that those built for stock be of a type and size suitable for military or foreign use, and that diesel locomotive production must not interfere with deliveries of diesel engine crankshafts for military use.

### Carloadings To Reach Million

SPAB estimated that weekly carloadings will reach a level of about one million as early as May of this year, and that building of the 36,000 cars provided in this program would just permit the roads to meet this peak at full operating efficiency. Since most of the steel plate required will come in widths no greater than 48 inches, it can be rolled on strip mills whose capacity will be available due to curtailment of auto production; hence the provision of plates will not interfere with production of plates for military uses.

The program runs but for the first quarter of 1942 and implies no commitment for additional new equipment later in the year. SPAB held that the new war program will presently create shortages in steel castings, and that it is hence advisable to get the railroads' essential requirements produced as soon as possible, before the heavier military demand begins to be felt.

Recognizing the necessity of keeping railroad ways and structures in serviceable condition, SPAB requested OPM to present within two weeks estimates of the materials that would be needed for this purpose during the first quarter of 1942. It also asked OPM to present at the same time estimates of the material required for rolling stock needed for military, lend-lease and other exports.

Director of Defense Transportation Joseph Eastman was asked to present a report on the materials which the entire transportation industry will need in the last nine months of 1942 after all possible economies and conservation measures have been taken.

It is estimated that the materials required for the first-quarter building and repair program would include 1,413,893 tons of steel, 353,637 tons of cast iron, 19,985 tons of various nonferrous metals, and 570 tons of rubber.

## Railroad Equipment Orders Extended Three Months

Producers of railroad equipment who have been operating under the assistance provided by Preference Rating Orders P-8, P-20 and P-21, will continue to receive the same help during the coming three months.

These three orders, which would have expired Dec. 31, have been extended through March 31.

Preference Rating Order P-8 covers material and equipment entering into the construction of freight cars for railroad, industrial and mining use. P-20 extends priority assistance in securing the materials to the filling of certain specified orders for new locomotives. P-21 provides priority assistance in the repair and rebuilding of steam, electric and diesel locomotives, whether for railroad, mining or industrial use.

Each of the orders extends a preference rating of A-3.

## Truck, Bus Inventory To Be Completed by Jan. 31

Jan. 31 has been set as the completion date for the national truck and bus inventory, Assistant Federal Works Administrator Baird Snyder III, acting for Administrator Philip B. Fleming, announced today. He stated that due to the war early completion of the inventory is urgent.

Purpose of the inventory is to set up detailed central and regional records for all trucks, freight trailers and buses. These facts will be for use in emergencies in organizing highway transportation for more effective service in the assembly of defense industry materials, delivery of military and civilian supplies, relief of dock and terminal congestion, and movement of passenger traffic.

About 40 states have already received inventory returns from more than two-thirds of their truck and bus owners, and 11 of these states have practically completed inventories.

## Mining Machinery Manufacturers Granted Priority Assistance

Priorities Division has issued an order on behalf of manufacturers of mining machinery, which should greatly facilitate their acquisition of necessary scarce materials, and permit them to plan their purchases in advance.

The new order, P-56-a, replaces P-23, which expired Dec. 31. Application for its assistance should be made on form PD-25-a, the form used in connection with the Production Requirements Plan. It is pointed out, however, that this is a special use of this form, and the filing of it by mining machinery producers does not place them under the terms of the Production Requirements Plan. A letter of instruction will accompany each copy of the order sent to a manufacturer. The value of PD-25-a lies in its provision for rating approved deliveries for an entire calendar quarter. Assistance will be limited to manufacturers of the types of machinery specified in Schedule A of the new order.

In addition to the manufacturer's needs for the first three months of 1942, application may be made at once for similar assistance for the quarters April 1-June 30, and July 1-Sept. 30, 1942, if orders from mines already on a manufacturer's book for shipment in those periods warrant such application. Material requirements for each quarter must be filed on separate forms.

A preference rating of A-3 will be assigned to deliveries of specified types and quantities of materials.

Benefits of the rating may be extended by a producer to his suppliers, and they in turn may extend them to subsuppliers, if necessary to assure ultimate delivery of the rated order.

## Priority Aid Extended for Heat Treating Furnace Parts

Material for the production of repair and replacement parts to fill defense orders may now be acquired under Preference Rating Order P-74, issued to manufacturers of furnaces for the heat treatment of metals, according to an interpretation by the Priorities Division.

As originally issued on Nov. 22, the A-1-c rating authorized by the order was applicable only to the acquisition of materials for complete units.

# Tin Consumption Restricted; Will Save Estimated 15,000 Tons in 1942

■ SWEEPING and rigid restrictions on the use of tin, except in cans and containers, have been announced by the Priorities Division.

Twenty-nine items for which tin cannot be used after March 31 are listed in Conservation Order M-43-a. Consumption of tin in the items specified between Jan. 1 and March 31, 1942, is limited to 50 per cent of the amount used in the corresponding period of 1940.

No restriction is placed upon the use of tin for cans and containers other than those already in force. A conservation order to be issued shortly will limit the production and use of cans and containers.

All manufacturers using tin, except for containers and for the uses listed in the order, must limit their consumption in any calendar quarter, starting Jan. 1, to 50 per cent of the amount used in the corresponding quarter of 1940.

Exceptions to the order, to the extent that substitutes are impractical, are items produced on ratings of A-1-j or higher, items produced for certain governmental agencies, or to comply with underwriter or other safety regulations.

The order covers tin, tin alloys and scrap, with the exception of tin in type-metal for re-use in the printing and publishing trades.

The list of prohibited articles includes foil, which is expected to result in the formal revocation of Order L-25, due to become effective Jan. 15.

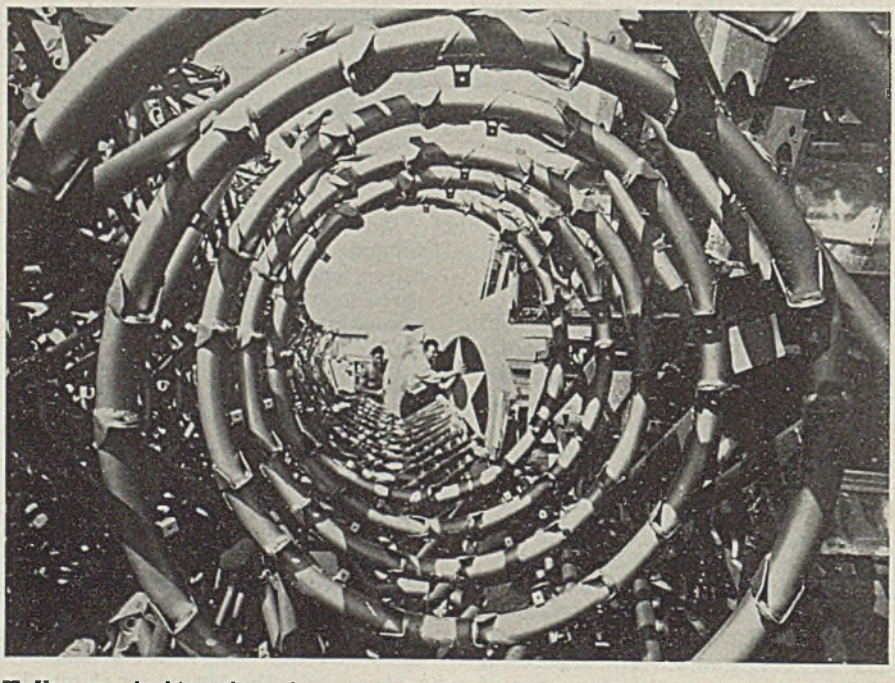
Other items on the prohibited list are: Advertising specialties, toys, art objects, automobile body solder, band and musical instruments, beverage dispensing units, Britannia metal, buckles, certain building supplies, buttons, chimes and bells, emblems and insignia, eyelets, fasteners, household furnishings, jewelry, novelties and souvenirs, ornaments and fittings, pewter, decorative plating, decorative powder, refrigerator trays, seals and labels, slot, game and vending machines, tin-coated paper, tin oxide in enamelware, and white metal.

Manufacturers' inventories are limited to the minimum practicable working stocks.

Reason for the order is the stoppage of shipments from British Malaya, source of more than 80 per cent of the United States normal tin consumption of 100,000 tons a year. No other source can supply more than a part of our needs. Tin-lined cans, 17 billion of which were manufactured in this country in 1940, consume more than 60 per cent of our yearly supply.

It is expected that the new order will eliminate a potential demand for 15,000 tons of tin in 1942.

## Tubular Steel Engine Mounts in "Futurism"



■ You are looking through scores of tubular steel engine mounts ready for installation on Army bombers, being rushed to completion at the plant of North American Aviation. In the background is a bomber wing bearing the Army Air Forces' insigna. Aeronautical Chamber of Commerce's news committee titles the picture "Futurism"

### OPM Planning Campaign To Salvage Tin Cans

Intensive campaign to salvage tin cans will be announced soon by OPM's Bureau of Industrial Conservation, according to reports here last week. Officials of the Metal & Thermit Corp. and the Vulcan Detinning Co. conferred with OPM officials here recently and as a result it has been decided to build six new detinning plants, to be located near large cities as yet unannounced.

According to tentative plans, it is said, 1,000,000 tons of tin cans will be handled annually; 12,000 tons of tin will be recovered, in addition to steel scrap.

Heretofore tin cans have been considered practically worthless, because the tin coating has been considered injurious to steel and the solder in seams injurious to both steel and furnaces. Now, it is understood, some steelmakers are considering the possibility of utilizing the steel from detinned cans, feeding the scrap into the furnaces slowly.

### World Tin Production and Consumption Increased

Tin Research Institute, Greenford, England, reports world production of tin for ten months, 1941, as 209,500 gross tons, compared with 187,600 tons in the comparable period in 1940. This is a revision of the 1941 figures from 205,000 tons previously reported and contains additional definite figures. Production figures for November are not available.

United States deliveries in November totaled 8355 tons, compared with 8000 tons in October. For 11 months of 1941 United States deliveries were 135,642 tons, against 106,139 tons in the like period of 1940. Tin consumption in the United Kingdom for ten months was 24,879 tons, compared with 24,904 in the corresponding period in 1940.

World stocks of tin, including smelters' stocks and carryover, increased 4736 tons during October, to 51,465 tons at the end of the month. At the end of October, 1940, such stocks were 53,890 tons.

### January Lead Pool To Continue at 15 Per Cent

January lead pool will remain unchanged at 15 per cent of November production.

Producers are required to set

aside this amount for allocation, which is expected to aggregate 6500 to 7000 tons. Lead remaining in the pool after allocation is added to the government stockpile.

The lead pool has been fixed at 15 per cent for the past several months under the provision of General Preference Order M-38.

### January Zinc Pool Increased 2 Per Cent

An increase of 2 per cent in the January zinc pool and resumption of the zinc oxide pool have been announced by the Priorities Division.

Producers will be required to set aside an amount equal to 31 per cent of their October production of metallic zinc for allocation by the director of priorities in January. This is expected to approximate 23,000 short tons.

The January zinc oxide pool will be 10 per cent, based on October. There was no zinc oxide restriction in December, as a surplus had been piled up in the pool since its inception last July. This now has been used.

No zinc dust will be set aside in January.

### Warns Copper Manufacturers To Adhere to Order M-9-c

Manufacturers of copper and copper alloy articles must adhere exactly to the provisions of Copper Conservation Order M-9-c, the Priorities Division warned last week.

The order, as amended Dec. 8, permits manufacture of copper articles until March 31, provided the material was on hand Dec. 1 and was in a form or stage of fabrication so it could not be used for other purposes.

Director Nelson said the concession was made from the original order, which stopped the use of copper in a long list of civilian items on Jan. 1, in order to permit manufacturers to get rid of inventories of partially-fabricated material.

"The amendment is in no sense an 'open door' to wide use of copper," he said, "and I am confident that the great majority of copper fabricators will respond patriotically to the terms of the order.

"For the few who do not, the penalties provided will be invoked immediately."

### Maximum Prices for Brass, Bronze Alloy Ingots Revised

Specific maximum prices covering over 95 per cent of all brass and bronze alloy ingots have been submitted to producers for their individual approval by the OPA.

As compared with prevailing prices, the OPA-approved list contains some revisions downward and a few upward. The net effect is to leave the general ingot price level substantially unchanged. The new prices are intended to become effective Feb. 1. Until that time, it is expected that present prices will be maintained. When sale is made of any ingot of an alloy composition other than those listed, application must be made to OPA, which will then determine a maximum price for that transaction.

OPA's first public action on brass ingot prices took place on April 25 when it suggested that 85-5-5-5 ingot (85 per cent copper, 5 per cent tin, 5 per cent lead, and 5 per cent zinc) be sold at 13 cents a pound and that customary price differentials for other grades be continued. In July, because of changes in the availability of various scrap materials and the need to use virgin metals in some cases, OPA approved an advance in the prices of certain alloys.

The maximum prices now proposed reflect re-examination of the situation in the light of current conditions. Studies will continue in order to determine whether the general level of ingot prices can be lowered.

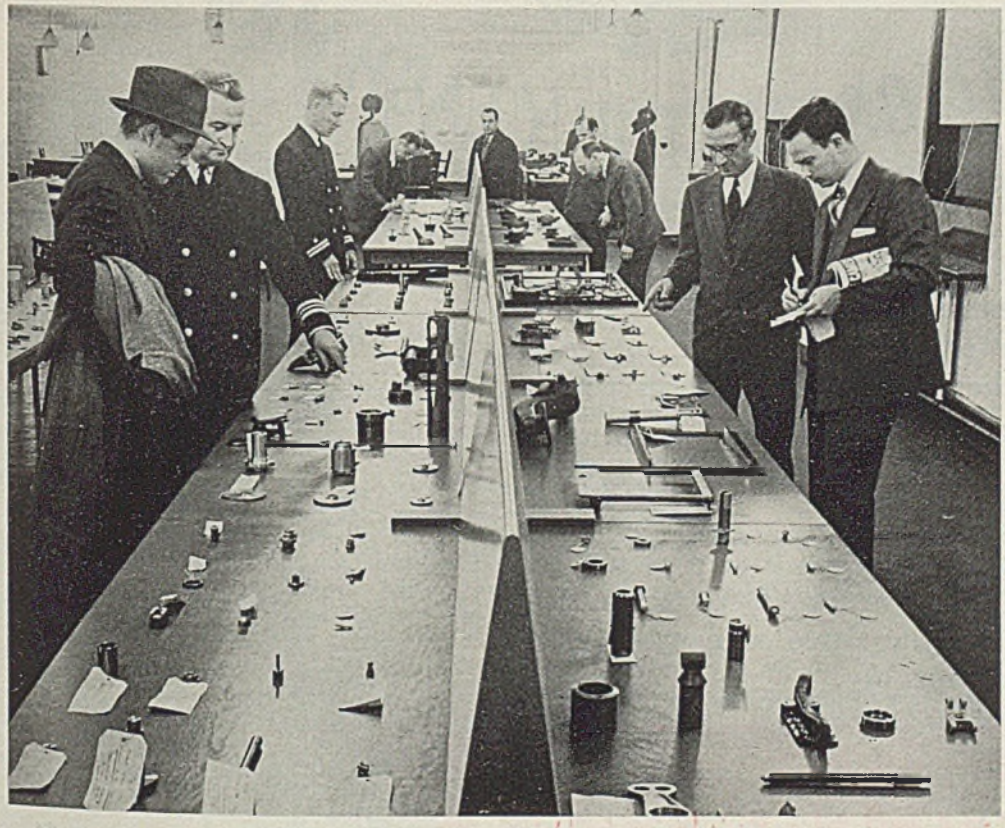
### Priority Orders Covering Aluminum Are Extended

Priority orders covering aluminum and aluminum scrap have been extended to Jan. 31.

Two new supplementary orders, which will be designated M-1-d and M-1-e, are now in course of preparation, and when issued will revise existing controls over production and distribution of aluminum.

The extension of General Preference Order M-1, Supplementary Orders M-1-a and M-1-c, and Preference Rating Order P-12 will maintain the existing controls over aluminum until the new orders are issued.

Order M-1-b was previously revoked.



## Can You Manufacture?

■ Wide variety of small and large parts submitted by 31 prime contractors for subcontracting at a permanent display, "Bits and Pieces," New York City Division of Contract Distribution, OPM. Parts are being changed as subcontracting requirements are met and new needs develop.

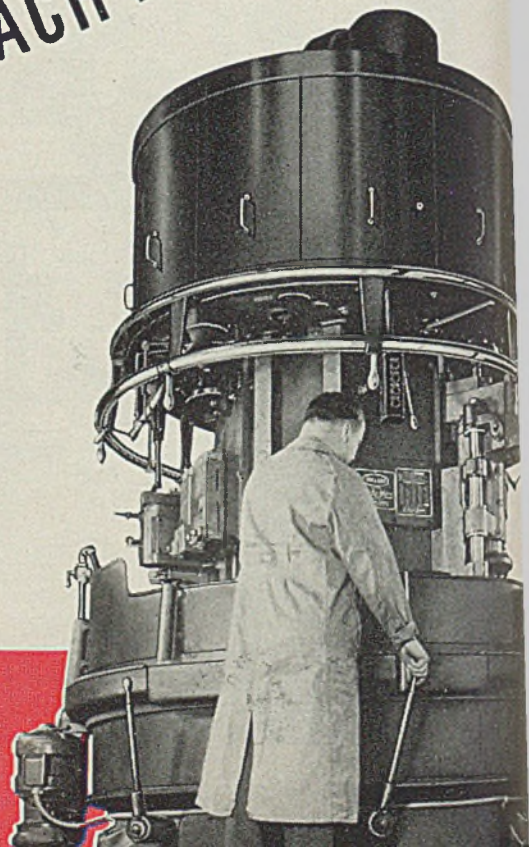
Included are bearings, cams, crankshafts, bushings, housing covers, nuts, screws, bolts, sockets, washers, rollers, trunnions, latch buttons, gear and scores of others. Photo shows D.C.D. engineers and Naval liason officers explaining items to interested manufacturers

# MULT-AU-MATICS MULTIPLY EACH MAN BY 8

EACH spindle on a Mult-Au-Matic will turn, face, neck, chamfer, bore, drill, ream, thread—in short, do about whatever you want. *And one man can run them all without moving from his tracks.*

A Mult-Au-Matic is 8 machines in one—8 spindles, each with independent speeds and feeds—all operating simultaneously.

There is no other machine tool like a Mult-Au-Matic—no other savings like Mult-Au-Matic savings. If you machine parts in quantities even as small as 200, you can use one profitably.



**THE BULLARD COMPANY**

**BRIDGEPORT, CONNECTICUT**

# Mirrors of MOTORDOM

***Automotive outlook is now "as clear as mud", but just try to buy a 1942 model passenger car or light truck! . . . Quota for January assembly first cut in half, then restored. Door left open to some measure of car output after this month . . . Labor still pushing its plan to assume share in direction of productive effort, while industry pleads for less interference and more work***

By A. H. ALLEN
Detroit Editor, STEEL

*DETROIT*

■ OUT of the confusion resulting from the freezing of new car sales, *probable* suspension of production after Jan. 31, prospects of rationing new cars, establishment of ceiling prices on used cars and related governmental steps, it is difficult to piece together any coherent analysis.

Taking events in their order, first was the ban on tire sales, then the freezing of new car sales, then the reduction of January production quotas to half the previous limit, then the restoration of production quotas to the original 208,000. In between these drastic regulations came a hundred and one supplementary orders and interpretive advices.

When dealers first found they could not sell new cars—defined as any 1942 models with less than 1000 miles—they concentrated on selling demonstrators which were snapped up like hot cakes at full list prices. Then a few cagey outlets decided to register new cars in the name of a private individual who could then sell them to the public. The OPM stopped this in a hurry and last Monday dealers received an interpretive wire stating that new cars were considered as any 1942 models, regardless of mileage. This virtually put a stop to any transaction involving a 1942 model, but banners in dealers' showrooms in Detroit last week advertised 1942 demonstrators for sale.

### Have Parts on Hand

The reason production quotas were restored to their original status was because of the large bank of parts which some companies now have in inventory. To "wash out the lines" effectively necessitates assembling more than the 104,000-car quota. General Motors, for example, is estimated to have $100,000,000 worth of fabricated parts on hand waiting assembly. The unfortunate truth of the matter, however, is that stocks of parts are badly out of balance and it may prove difficult even to assemble the restored quota for January. Principal shortage is in tires and Buick, for one, last week was combing its dealers for enough tires to run out its January quota.

What is to be done with the 200,000 cars to be produced this month, plus the 450,000 new cars now in the hands of dealers? The latter, now face to face with virtual extinction, would like to know pretty soon. There is widespread belief that this entire allotment of cars will be taken over by the government for military uses and dealers reimbursed full retail prices plus storage, except for the January production which would be handled through dealers but at wholesale prices. When asked what the government wants with 650,000 new cars, one dealer replied, "They will just run them under a spray gun and give them all a coat of olive drab before shipment to military posts."

This appears hardly likely. More generally expected is a plan for rationing of new cars to doctors, defense plant workmen and others who need the transportation to keep the war program moving. But, as one dealer put it, what does a workman in a war plant, now driving a 1935 Chevrolet, want with a 1942 Cadillac?

It is still possible, if not altogether probable, that some measure of passenger car production will be continued after the present hue-and-cry has died down. One plan is said to involve permission being granted to one of the "independent" companies —Nash, Hudson, Studebaker, Willys, Packard—to produce a single model in reasonably large quantities, this to be only passenger car made in the country. It should be noted the OPM left the door open for further production in its latest announcement which stated that passenger car output "probably" would be suspended after Jan. 31.

The confusion in retail circles was made all the worse by fictitious reports circulated widely here concerning plans to freeze immediately the sale of batteries, spark plugs and what not. Concerted rushes to buy these commodities were common last week, despite official denials of any curtailment. In the midst of below-zero weather, one decidedly uncomfortable announcement did come out of Washington, however; the order suspending sales of methyl alcohol for use in antifreeze compounds.

### Socialization of Civilian Consumption Brings Debate

There is much argument pro and con some of the steps being taken in the direction of virtual socialization of civilian consumption. It is argued that this was necessary, in fact demanded by the public, in England and so is essential here—a rather hollow argument to anyone familiar with the vast differences in civilian life in this country as against England. Further, the forced elimination of civilian products, it is said, will divert more money into war bonds and more into bank accounts for eventual payment of taxes; also will bring home forcibly to the public the emergency in which the country now stands.

On the other hand, it is impossible to convert an automobile plant into an arsenal by the simple expedient of stopping the sale and production of cars. It is true that consumption of some vital materials—brass and tin to mention two—is stopped, but in the meantime thousands are faced with jobless winter weeks pending distribution of orders, planning and installation of tooling and machinery for war production. The ideal

system would be to blend gradually into war production, so that a minimum dislocation of plant employment and retail distribution would be encountered. Apparently this could not be done, and the unemployed and uprooted workmen will have to make the best of the situation.

The figure of five billion dollars is mentioned as the added war equipment load which the automobile industry will be asked to assume; this is about the equivalent of the cumulative total of war business placed with the industry since September, 1939. The industry is perfectly willing and able to assume this load, in fact welcomes it. The crying need now, though, is for actual orders or letters of intent as to what specific types of armament are wanted and in what quantity.

To answer this need the ten-man "steering" committee, including five representatives from management and five from labor, was organized to consult with OPM leaders Knudsen and Hillman. Early deliberations last week struck a snag, reportedly over how much power the committee was to have. The labor representatives naturally saw in the committee the culmination of the CIO plan for industry committees manned by government, labor and management representatives, which would have full power to direct production.

Labor's insistence on this point led to a deadlock and dismissal of the committee. A new six-member group —three labor representatives and three management members—will be established, but will have authority only to make recommendations to OPM and no power to act by itself.

### Protests Labor's Efforts To Bore Into Management

In this connection, the industry made its attitude plain in a recent statement which read in part:

"The automotive industry didn't wait until Pearl Harbor to start doing its part. Since the beginning of the emergency, the industry has had the vision to see ahead and to realize what the country might require of it. . . .

"On hundreds of projects, 1941 marked the transition from the tooling-up stage to mass production. Billions of dollars of war work is now the job of this industry. Present capacities are being doubled, tripled and in some cases quadrupled. Guns, cannons, tanks, airplanes and airplane engines are being shipped at a rate double that considered possible a year ago.

"The industry's executives and engineers early realized this job could not be done by job shop methods—a cannon on the lathe this morning and a crankshaft on the same machine this afternoon. The volume and mechanical perfection of this war material demand accurate tooling and uninterrupted mass production.

"We stand, however, under an attack and a challenge. This attack impugns our integrity, our ability, our loyalty to our country.

"We can take it, and rest our case on the quality and the volume of war materials our plants are now turning out, and will turn out. But the attacks on this industry's war work constitute a gross attempt to deceive the American people — raising false hopes and expectations. Above all, they are designed to create division so that certain groups may obtain control of the productive machinery of the United States.

"Call them by any name you will, the plans of certain labor leaders constitute a design to transfer management of the automotive industry from the men who know how to make things, to those who have no training or qualifications for the responsibility.

"The men who led the original sitdown strikes, who tolerated and encouraged not scores but hundreds of sitdowns, slowdowns and other forms of production sabotage, now propose that they are the capable ones to guide the greatest single, behind-the-lines responsibility—production for war. . . .

"We do not believe that anyone should play politics with this job. Give us the blueprints, specifications and the orders, and we will deliver the goods. LET'S GET TO WORK!"

This message appeared in Detroit and Washington newspapers just before the first meeting of the advisory committee, and served to make the industry's position clear before it could be fogged up by highly colored reports of what supposedly took place at the meetings. It was also aimed to explode such ridiculous charges as that made by the CIO in advertisements in Washington newspapers, claiming that the reason there were insufficient airplanes at Wake island and Guam island was wrapped up with the automobile industry's refusal to convert its plants to war work in sufficient quantity. Such a charge represents the most vicious type of misrepresentation and propaganda. The simple reason why there were no more planes at island outposts is that military tacticians decided the 2500 planes being turned out in this country every month could be put to better use elsewhere.

## 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 | 545,355 |
| June | 324,253 | 362,566 | 546,278 |
| July | 218,600 | 246,171 | 468,895 |
| Aug. | 103,343 | 89,866 | 164,792 |
| Sept. | 192,679 | 284,583 | 248,751 |
| Oct. | 324,689 | 514,374 | 401,360 |
| Nov. | 368,541 | 510,973 | 373,892 |
| 11 mos. | 3,219,748 | 4,188,808 | 4,806,443 |
| Dec. | 469,118 | 506,931 | ..... |
| Year | 3,732,718 | 4,692,338 | ..... |

Estimated by Wards Reports

| Week ended: | 1941 | 1940† |
|---|---|---|
| Dec. 13 | 95,990 | 125,625 |
| Dec. 20 | 65,875 | 125,350 |
| Dec. 27 | 24,620 | 82,545 |
| Jan. 3 | 18,530 | 76,690 |
| Jan. 10 | 58,990 | 115,935 |

†Comparable week.

### Chrysler Will Make New Tactical Vehicle for Army

One of the first major war orders which will speed up conversion of auto plant facilities was that received by Chrysler on Dec. 31 which will provide employment for about 25,000 at the Dodge truck, Dodge main and Highland Park plants of the corporation, production to start early in April.

The order involves 12,000,000 hours of work, 10,000,000 of which will be for an entirely new Army tactical vehicle recently developed by Chrysler engineers. The remaining 2,000,000 hours will be devoted to a new order for Army trucks. The supply of parts and materials for the new orders will call for an additional 12,000,000 hours of work from suppliers and vendors. Better than $1,000,000 will be spent to prepare plants and to tool them for production. The tooling program has started and will be carried through on a 24-hour 7-day-a-week basis until completion. It is expected the orders will be completed by midsummer, with more orders expected at that time.

Number of vehicles included in the order is reported to exceed 80,000, with dollar value something under $100,000,000. Powered by a Dodge engine, the vehicle has been under test since last spring.

Study also is being made, according to information in industrial circles, of the possibility of adapting Plymouth engines for powering the army tank now being built in quantity by Chrysler. The arrangement is said to involve five engines placed side by side, with multiple driveshafts converging into a large transmission case of special design. The transmission case, incidentally, has been redesigned to use gray iron instead of aluminum.

# Extensive Expansion, Rehabilitation Program Undertaken by U.S. Steel

■ A BROAD program of plant expansion and improvement was undertaken by United States Steel Corp. in 1941, some important projects having been completed, with others under way at year-end.

In its "Yearbook of Industry" issue, Jan. 5, STEEL listed many of those which were announced dur the year. Further details now are available, the following being a complete list, including items financed by and to be operated for the government:

**Birmingham Area**

*COMPLETED:* Rehabilitation of an acquired blast furnace and enlargement of two others; construction of a battery of by-product coke ovens; installation of equipment for producing shell forgings; additional cold-reduced tin plate facilities installed.

*UNDER WAY:* Construction of an additional blast furnace with auxiliary equipment and power plant; installation of a new plate mill to roll wider plate; increasing sheet mill equipment; new facilities for producing electrolytically-coated tin plate; reopening and equipping ore mine; additional facilities at ore and coal mines.

**Chicago Area**

*COMPLETED:* Improving blast furnaces for increasing output; construction of new electric furnace plant; rebuilding two batteries of by-product coke ovens; rebuilding two open-hearth furnaces; additional equipment for producing cold-reduced tin plate.

*UNDER WAY:* Rebuilding a blast furnace; constructing an additional open-hearth furnace; rebuilding two batteries of by-product coke ovens; modernizing existing electric distribution system; construction of soaking pits and installation of cranes for economy of operation; installation of facilities for producing electrolytically-coated tin plate; and additional equipment for making screen cloth and hardware cloth; concentration and improvement of wire product manufacturing facilities, and construction of a commercial warehouse at St. Louis.

**Pittsburgh Area**

*COMPLETED:* Enlargement of a blast furnace, rebuilding and enlarging open-hearth furnaces and auxiliary equipment; installation of a cold-reduction mill for tin plate products; acquisition of a tin plate plant; installation of heat treating equipment and forge presses for armor plate; equipment for producing bombs, shells and shell forgings; installation of equipment for producing welded steel barges.

*UNDER WAY:* Rebuilding a blast furnace; enlarging and improving open-hearth furnaces; installation of additional auxiliary equipment at plate and structural mills; installation of facilities for producing electrolytically-coated tin plate; installation of facilities to increase the output of heavy armor and deck plate, including installation of necessary heat treating equipment; installation of additional facilities to increase the output of heavy and light armor plate including necessary heat treating equipment; also heat treating equipment for bombs, shells and shell forgings. Construction of two additional blast furnaces, an open-hearth steel plant and two bessemer converters, an electric furnace plant, a slabbing mill, a plate mill, a forge shop; rehabilitation and equipment of idle coal mines and beehive coke ovens in the Connellsville district; opening new mine and preparing idle coal mines for productoion in West Virginia coal fields.

**Other Areas**

*COMPLETED:* In the Cleveland area, rebuilding a blast furnace; installing additional facilities for annealing cold-rolled strip steel. In the Pacific Coast area, installation of an additional electric furnace and construction of a new commercial warehouse.

*UNDER WAY:* In the Cleveland area, rebuilding blast furnace to increase capacity; installation of a cold-rolling mill for producing stainless steel strip; additions to cold-rolled steel strip equipment and stainless steel round wire facilities; construction of five ore vessels for service on the Great Lakes. In the Pacific Coast area, construction of an additional open-hearth furnace; concentration and improvement of wire product manufacturing facilities. In the Worcester area, reconstruction and rearrangement of wire product manufacturing facilities. In the New Jersey-Pennsylvania area, additional facilities for construction of vessels for Navy and Maritime Commission at Kearny, N. J. (shipyard taken over by Navy Department on Aug. 24, 1941; returned Jan. 7, 1942); construction of new cement mill at Northampton, Pa.

## How Steel Employes May Purchase U.S. Bonds

■ United States Steel Corp. last week announced a plan for voluntary monthly purchases of defense bonds by employes. Effective Feb. 1 an employe may authorize deductions from earnings of any amount in multiples of $3.75. It is also provided that employes who desire to purchase one or more bonds each month may authorize monthly deductions of $18.75 or multiples of that amount.

As the purchase price of each bond is accumulated the Corporation or its subsidiaries will arrange for the purchase and delivery of the bond. The plan was adopted at the suggestion of the United States Treasury.

## Sloss-Sheffield Coal Mine To Be Reopened

■ Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., has started to rehabilitate its Bessie coal mine, which has been idle since 1930, at cost of $700,000. It is expected to produce 1500 to 2000 tons of coking coal per day and will employ 300 men. Production is to start in five months.

Kilby Steel Corp., Anniston, Ala., is building a 35-ton open hearth, to be ready April 1, adding 100 tons daily to its capacity.

## 133 Items Listed on St. Louis Tax Calendar

■ Complexity of the federal, state and local tax structure is emphasized by a 1942 tax calendar compiled by the St. Louis Chamber of Commerce to aid members to remember dates on which they must pay taxes, file reports or make claims.

Listed are 133 items.

The enumeration, according to the chamber, "is not a complete list, but includes only notices, returns and payments of general interest. Returns on fiscal year basis and those due monthly, except the federal manufacturers' and retailers' excise taxes, the state sales tax and the St. Louis milk inspection fees, are not included."

■ Domestic production and shipments of molybdenum were 3,758,200 and 4,458,600 pounds, respectively, in November, 1941 compared with 3,918,900 and 4,135,300 pounds in October, according to the Bureau of Mines. Average monthly production in 1940 was 2,859,400 pounds and shipments 2,110,800 pounds. Stocks of concentrates at the end of November totaled 17,902,000 pounds.

# 10 to 20 Per Cent Reduction in Manganese Consumption "Possible"

MANGANESE consumption by the steel industry can be reduced substantially without introducing critical changes in steelmaking practices, according to a survey by an American Iron and Steel Institute committee in co-operation with advisory committee on metals and minerals of the National Academy of Sciences.

The committee estimated an immediate saving of about 10 per cent from average amounts of manganese used can be made without undue hardship, but that not more than 20 per cent can be saved without serious effects on both production and use of steel products.

The committee included C. H. Herty Jr., Bethlehem Steel Co., chairman; R. S. Archer, Republic Steel Corp.; A. C. Badger, Youngstown Sheet & Tube Co.; Carl Henning, Jones & Laughlin Steel Corp.; J. K. Killmer, Bethlehem Steel Co.; and R. W. Simon, Carnegie-Illinois Steel Corp.

The group suggested a plan for evaluating conservation efforts and discussed individual products in accordance with that plan as follows: Class A products are those in which a definite conservation of manganese can be made with little or no effect on quality; class B products are those in which conservation can be made with a probable adverse effect on production and quality; and class C products are those in which conservation of manganese would have a definitely adverse effect on both production and quality.

The use of a given amount of manganese in the manufacture of any steel product is governed primarily by specifications set by steel producers which are designed to contribute to the physical properties of the finished steel or to enhance the surface quality obtained in rolling, forging or casting. Equally important are the standard specifications set by steel consumers in which the manganese ranges specified are designed to contribute to certain definite physical property requirements or to heat treatment processes.

### Two Specification Classes

In many cases specifications in the two classes duplicate one another, in other cases they are independent of one another. For example, the manganese ranges set forth in standard specifications for steel plates may be identical with what would be set up by steel producers were there no consumer specifications. On the other hand, consumer specifications for sheet steel and strip steel are rarely found and the manganese content of the product is determined almost entirely by the steelmaker, based on his experience as to rolling performance and desired physical properties.

The quantity of ferromanganese consumed in the manufacture of various products has been estimated from a study of each product based on 1940 production records. Table I gives the results of that study.

In order to clarify the problem further products were so grouped in respect to manganese content as to distinguish between specifications set by consumers and specifications set by producers; each according to the percentage of the total ferromanganese consumed. When a product fell into both classifications the percentage of ferromanganese consumed was arbitrarily divided into halves and one-half placed in each category. The results of that study are given in Table II.

On the basis of that table it is fair to conclude that the responsibility for manganese conservation is the mutual problem of steel producer and steel consumer. Among the problems to be solved by steel producers is the determination of the limits to which reduction of the manganese content of steel can be carried without impairing surface quality, production rates or both.

### Study Shell Requirements

On the part of consumers a similar effort should be made particularly among those which customarily purchase bars, semifinished products, wire rods, and wire to chemical specifications. Efforts already made by one steel producer indicate that most consumers are willing to consider a voluntary reduction in their specified manganese, purely from a patriotic point of view.

A discussion of the various products according to the committee's classification follows:

High manganese shell steel falls into class A. The committee has not as yet learned the present and future requirements for all types of shells as described by physical property requirements, heat-treatment procedure to be employed, and other such specification details. Therefore, no definite changes in specifications for shell steel will be proposed.

It is suggested, however, that careful consideration be given to the physical properties required, the manufacturing and heat-treatment procedures to be employed and the machining problems involved as related to each type and size of shell required in large tonnages with a view toward saving substantial amounts of manganese.

At present the steel compositions most commonly specified for American shells are WD X1335, WD X1340, and WD X1345 all of which

TABLE I

ESTIMATED CONSUMPTION OF FERROMANGANESE BY PRODUCTS

| Product | Approximate 1940 Ingot Equivalent Net Tons | Total Fe Mn Consumed, Pounds | Fe Mn per Ton of Ingots, Pounds | Fe Mn Consumed—per cent of Total |
|---|---|---|---|---|
| Bars | 10,800,000 | 288,700,000 | 26.6 | 29.3 |
| Sheets and Strip | 19,430,000 | 193,700,000 | 10.0 | 19.8 |
| Shapes and Piling | 6,550,000 | 107,000,000 | 16.3 | 11.0 |
| Semifinished Products | 5,650,000 | 81,200,000 | 14.4 | 8.3 |
| Plates | 5,950,000 | 74,400,000 | 12.5 | 7.6 |
| Rods and Wire | 5,990,000 | 62,100,000 | 10.4 | 6.3 |
| Tin Plate | 4,990,000 | 52,000,000 | 10.5 | 5.3 |
| Rails | 2,310,000 | 49,600,000 | 21.5 | 5.1 |
| Pipe | 3,730,000 | 43,050,000 | 11.5 | 4.4 |
| Wheels, Axles, Forgings | 1,530,000 | 28,700,000 | 18.8 | 2.9 |
| Total | 66,930,000 | 980,450,000 | | 100.0 |

Pounds of ferromanganese per ton of ingots—14.8

TABLE II

CONSUMPTION OF FERROMANGANESE
PER CENT OF TOTAL, CLASSIFIED BY CONSUMER OR PRODUCER SPECIFICATIONS

| Standard Specifications by Consumers | | Specifications by Steel Producers | |
|---|---|---|---|
| Bars | 29.3 | Sheets and Strip | 19.8 |
| Rails | 5.1 | Shapes and Piling | 11.0 |
| Semifinished Products | 4.1 | Rods and Wire | 6.3 |
| Plates | 3.8 | Tin Plate | 5.3 |
| Wheels, Axles, Forgings | 2.9 | Semifinished Products | 4.2 |
| Pipe | 2.2 | Plates | 3.8 |
| | | Pipe | 2.2 |
| Total | 47.4 | Total | 52.6 |

require a manganese content of 1.35 to 1.65 per cent.

The manganese content (1.50 per cent, average) of steel compositions WD X1335, WD X1340, and WD X1345 has two functions. The first is to convert most of the sulphur to manganese sulphide and thus improve the rolling and forging properties of the steel. For that purpose alone the specified manganese content of the steels under discussion is far too high. In this connection it is important to note that the tendency of high-sulphur steels to break in rolling or forging depends to a great extent upon the carbon content of the steel and that tendency is much more apparent in steels containing approximately 0.20 per cent carbon than in steels containing approximately 0.40 per cent carbon. Steels containing a carbon content of from 0.35 to 0.50 per cent and a sulphur content of from 0.075 to 0.15 per cent can be rolled or forged satisfactorily with a manganese content of 1.00 to 1.30 per cent, or even 0.80 to 1.10 per cent. As a matter of fact, large tonnages of such steel containing from 0.80 to 1.10 per cent have been rolled and forged with commercially satisfactory results.

The second function of manganese in the WD X1300 series of steels is that of a hardener. The hardness, yield point and tensile strength of such steels are increased in the air-cooled or oil-quenched conditions. Until recently the hardness requirements of high explosive shell forgings which had been cooled naturally, or with an air blast, were based on yield points of 55,000, 45,000, and 40,000 pounds per square inch. It is relatively simple to obtain a yield point of 45,000 pounds per square inch in a steel similar to WD X1340 but with a manganese content of 1.00 to 1.30 per cent, or perhaps even lower.

The yield point requirement for all types of shells made from the steels under discussion has recently been increased to 60,000 pounds per square inch.

It is the understanding of the committee that as soon as heat-treating facilities are available, high explosive shells will be specified to even higher physical properties which will be obtained by oil quenching and drawing. Such a revision in specifications will make possible the use of a normal manganese steel with either normal sulphur or sulphur slightly higher than normal. This procedure will eliminate shell steel as a manganese conservation problem.

The use of steels suitable for heat-treatment would, of course, save manganese, because by heat treatment, higher physical properties can be obtained with a given manganese content than can be obtained by air cooling.

Recently, actual heat tests have shown that in the case of WD X1335 composition, cold-drawn, the desired physical properties can be met with a manganese content of 1.00 to 1.30 per cent.

The high sulphur content of shell steels being currently manufactured requires some manganese to overcome hot-shortness. It may reasonably be assumed that the manganese which combines with sulphur to form manganese sulphide does not contribute to the hardness or yield point of the steel. Sulphur is added to steel to enhance its machinability but the need for such sulphur addition is worthy of close study.

### Lower Manganese Encouraged

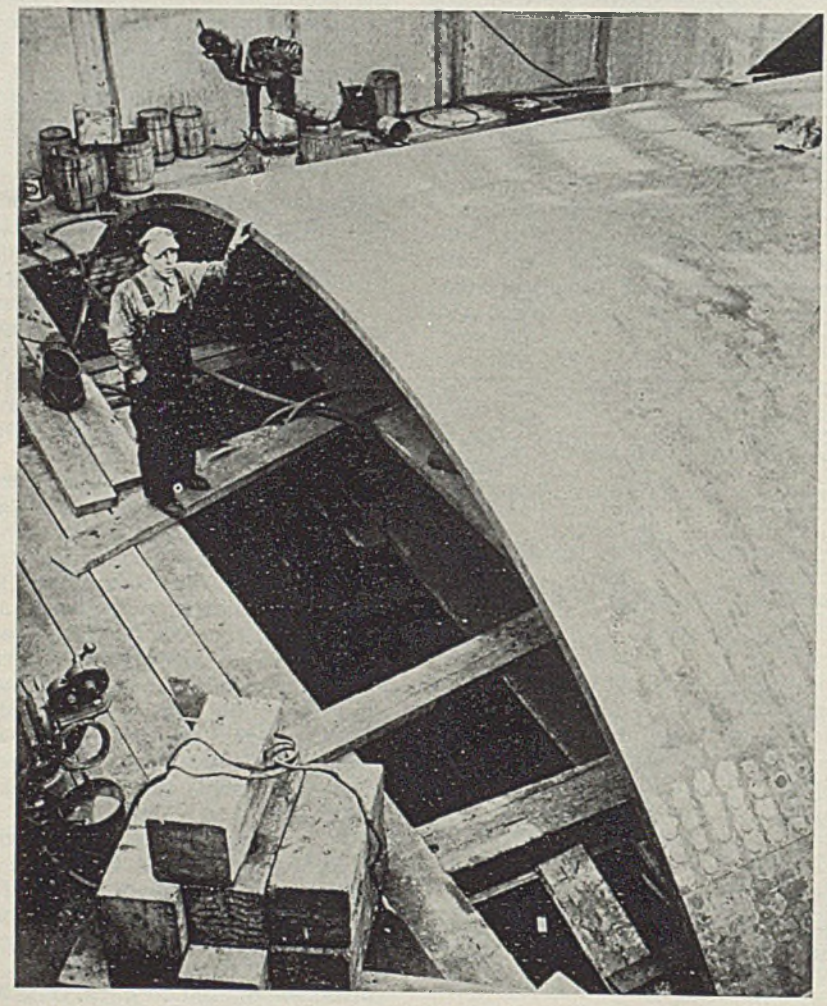
Many machine tools used in the manufacture of large - diameter shells will not run fast enough to take full advantage of the extra machinability of high sulphur steels.

Provided that the machine tool equipment is sufficiently rigid the surface speeds regularly used with cemented carbide tools on low sulphur steels are higher than surface speeds used with high speed steel tools on high sulphur steels.

Commercial high - manganese steels fall into Classes A and B. SAE grades T1330, T1335, T1340, T1345, and T1350 contain 1.60 to 1.90 per cent manganese and 0.05 per cent maximum sulphur. Similar AISI grades are A1330, A1335, and A1340 with 1.60 to 1.90 per cent manganese and 0.04 per cent maximum sulphur. It is the opinion of the committee that there are many applications where steels of lower manganese content would serve the purpose satisfactorily and that the use of such steels could be encouraged by adding suitable standard

(*Please turn to Page* 90)

## Driving New York's 3-Inch Steel Tunnel Shields



■ First photograph of one of two huge tunnel shields being used in digging the Brooklyn-New York vehicular tunnel. The shields constructed at the Dunkirk, N. Y., plant of the American Locomotive Co., are 31 feet 8 inches in diameter, 18 feet 8 inches long, weigh 242 tons, of steel 3 inches thick. Once placed in the ground, as shown, they are slowly pushed forward by twenty-six 250-ton jacks. The tunnel, which is scheduled to be completed by December, 1944, will be more than 11,000-feet long and will cost $57,000,000. NEA photo

# Closer Teamwork by Canada and U. S.

# Tariffs Down, Priority Ratings Up

*TORONTO, ONT.*

■ CANADIAN - AMERICAN War Production Committee has issued its report which has been accepted by Prime Minister Mackenzie King and President Roosevelt. The purpose of the committee was to remove legislative and administrative barriers standing in the way of the North American continent becoming one vast arsenal for democracy.

Under terms of an agreement it is expected Canada and United States within six weeks will take joint action to remove all tariffs on wartime supplies passing between the two countries. The removal of such tariffs would directly stimulate exports from the Dominion to the United States, and might result in greater production of zinc, lead, copper and nickel.

The Joint Materials Co-ordination Board, set up within the past few days by Canada, United States and Great Britain to purchase and allocate materials, is considered of vital interest to Canada and the most important step taken so far in relations between the two North American countries. It will assure Canadian industry of ample supplies of raw materials to maintain capacity production in all war plants. Canada will receive the same priority ratings for raw materials as those applied in the United States.

It is announced that the Dominion Steel & Coal Co., Sydney, N. S., already has been assured of a steady supply of high-grade iron ore from Brazil to mix with its low-grade ore from the Wabana, Newfoundland, mines.

It has been necessary for Canada to import about one-third of her required steel tonnage from the United States, and many times in the past Canadian production has been handicapped by temporary shortages caused by priority ratings in the United States. Under the new plan Canada's steel requirements will be placed on an equal priority basis with those of the United States Army and Navy, the top rating, and ahead of British requirements under the lease-lend program and all other demands. It is expected to result in an abundance of steel for Canada's shipbuilding and other industries.

New orders have been issued restricting production of automobiles, drastically, as in the United States.

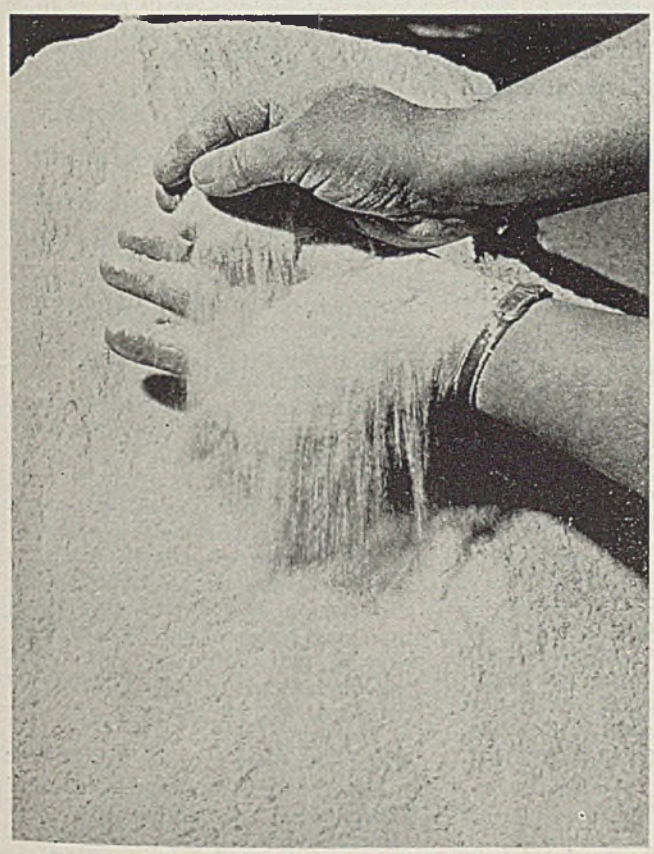
Department of Munitions and Supply, for the week ended Dec. 23, placed 36,204 contracts with total value of $11,621,565, including orders placed with United States companies valued at $4,970,593.

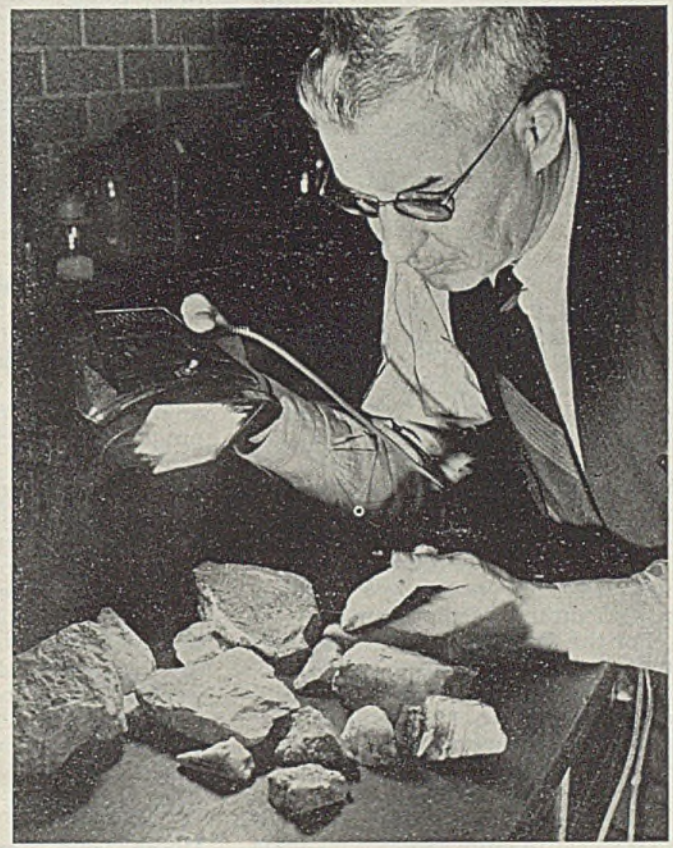
**Shipbuilding and Dockyard Supplies:** Canadian Dredge & Dock Co., Ltd., Toronto, $9450; Gutta Percha & Rubber Ltd., Halifax, N. S., $6427; Canadian National Railways, Montreal, $13,350; British Ropes Canadian Factory Ltd., Vancouver, B. C., $14,513.

**Land Transport:** Arlington Cycle &

(*Please turn to Page* 108)

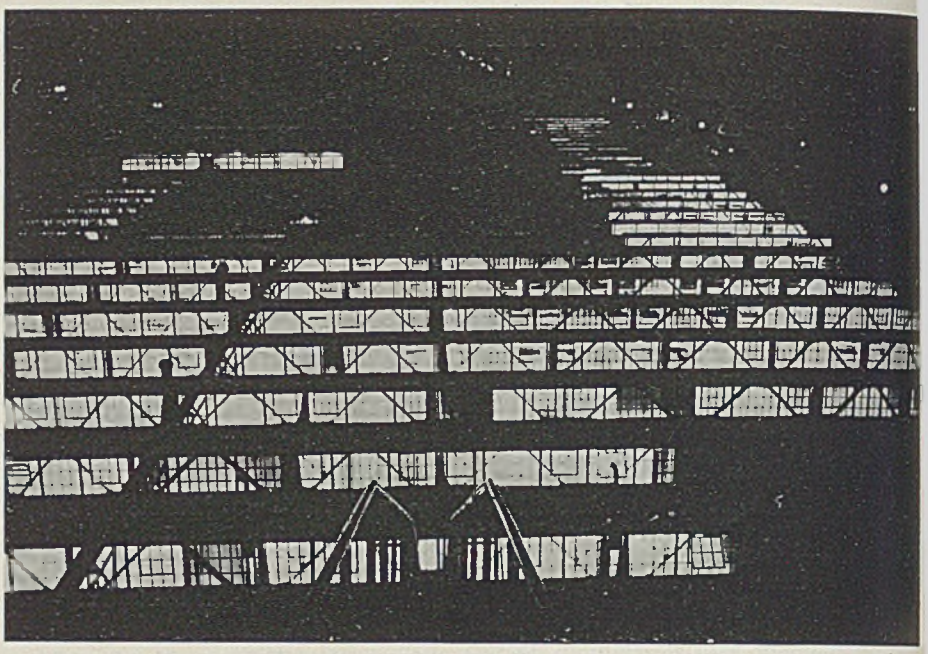
## Reclaim Tungsten from Gold Field Waste Piles





■ After the Japanese attack in the Pacific disrupted shipments of tungsten from the Far East the Canadian Bureau of Mines began to salvage scheelite, tungsten-bearing ore, from the waste piles of the Dominion's gold fields, where it had been tossed after being separated from gold-bearing ore. From the gold fields the scheelite is taken to Canada's tungsten refining plant at Ottawa. Already more than 30 tons of tungsten concentrates have been delivered to the Dominion's tool steel industries. Photo at right shows how a portable ultra violet ray is used at the mines to detect the metal which glows with a white light under the ray while the rest of the ore remains dark. At left is shown the tungsten concentrate as it comes from the mill and in the form in which it is added to the melting pots. Acme photos

# "Full Employment Of Normal Labor Force at Hand"



■ FULL employment of the normal labor force, if not already at hand, appears definitely in prospect, according to the National Industrial Conference Board. Percentage of the labor force unemployed has fallen to the lowest levels since 1930—even before the United States entered the war. Further intensification of the industrial effort probably will remove entirely the slack in the "normal" labor supply and cause a shortage in the labor market.

However, industrial production can be further expanded, it is pointed out, by:

1. Increasing the hours of work of those already employed.
2. Shifting workers to obtain maximum utilization of skills and abilities.
3. Recruiting the services of persons normally not in the labor force, principally retired workers, housewives and students of working age.

Most immediate return in increased production would result from raising the number of hours worked per week, although over-extension of working hours over a prolonged period would decrease efficiency.

Eventually any general labor shortage can be met by drawing upon the "secondary labor reserve". Size of this potential source is suggested by 1940 census figures. Only 12,800,000 of 50,400,000 women of working age were in the labor force. There was also 4,600,000 males of working age in school, and 2,300,000 others out of the labor force for various reasons.

Unemployment in September, according to Conference Board estimates, fell to 514 000, or less than 1 per cent of the total labor force. In October this figure had increased to 1,741,000 due mainly to a decrease in agricultural employment.

For the first ten months this year, unemployment averaged only 3,541,000, compared with 7,787,000 in 1940, and 11,860,000 in 1933, the depression high. Other comparisons:

(In Thousands)

| | | | |
|---|---|---|---|
| 1930..... | 2,928 | 1936..... | 7,474 |
| 1931..... | 7,067 | 1937..... | 6,472 |
| 1932..... | 11,403 | 1938..... | 9,862 |
| 1933..... | 11,860 | 1939..... | 8,916 |
| 1934..... | 9,788 | 1940..... | 7,787 |
| 1935..... | 8,992 | 1941 (10 mos. av.) | 3,541 |

Unemployment of 3,000,000 to 3,500,000 generally is considered close to the irreducible minimum, due to seasonal and other "frictional" reasons.

OPM's National Labor Supply Policy Board plans to have 23,500,000 persons working in war industries by 1944, compared with about 5,000,000 now so employed.

### Steel Industry Employment Slightly Lower in November

Steel industry employment underwent a slight decline in November, to 645,000 from 646,000 in October, according to the American Iron and Steel Institute. Employment in November, 1940, was 577,000.

November was the third successive month in which steel employment has declined from a record high of 654,000 in August. Decline reflects primarily the increasing proportion of "heavy" steel products for defense and war purposes, and a decreasing proportion of light products used chiefly for civilian goods.

Steel payrolls in November totaled $109,856,000, against $188,890,000 in October, a longer month, and $87,921,000 in November a year ago.

Wage earning employes earned an average of 99 cents an hour, against 98.3 cents in October, and 86.2 cents in November, 1940. Average workweek in November was 37.6 hours, compared with 40 hours in October, and 38.2 hours a week in November, 1940.

### "Differences Forgotten", Union Tells Management

American Federation of Labor union at the Archer avenue plant of Acme Steel Co., Chicago, has gone on record as whole-heartedly behind the war program.

Under the slogan "Remember Pearl Harbor, We Have a Job To Do", the union has adopted the following resolution:

"What differences there may have been between management and the employes are now a thing of the past. We have a job to do for Uncle Sam. The union further pledges itself not to cause any stoppages of production in this plant and the management can count on us to do our share and more in bringing this program to complete victory."

## Navy Returns Federal Shipbuilding to Owners

■ Federal Shipbuilding & Dry Dock Co. last week resumed operation of its shipyards at Kearny, N. J., after 134 days of Navy operation. The Navy seized the yards Aug. 24 under executive order by the President after a CIO strike for "maintenance of membership."

The maintenance of membership issue was not settled by the Navy, which during its operation of the yards recognized no union as such. In returning the facilities to the company, the Navy said: "Any unsettled issues between the company and the union should be settled by negotiation and agreement; if not, they can be resolved without interrupting production by recourse to the machinery established by the President."

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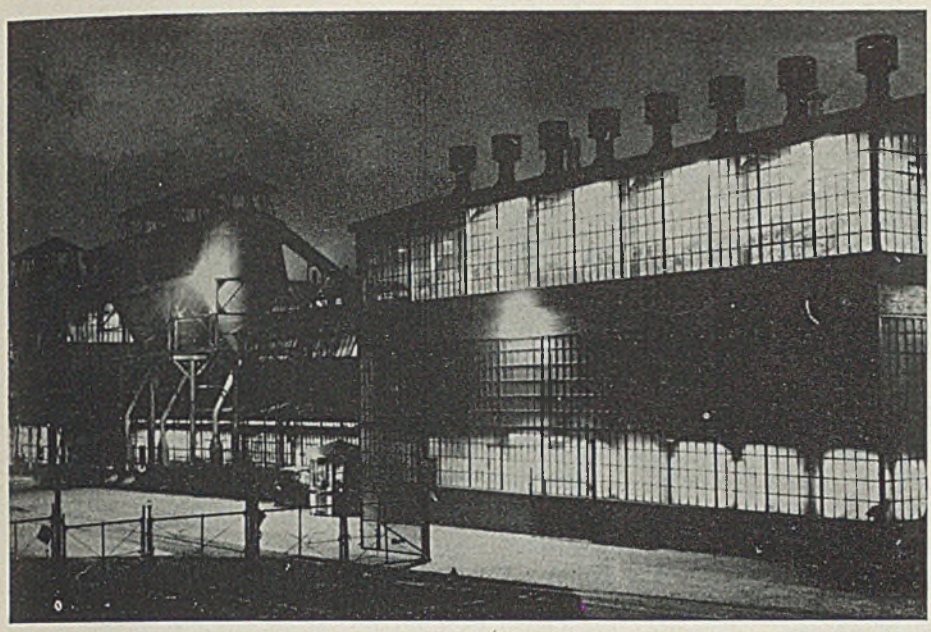
■ As an extension to the Electric Boat Co. plant, Groton, Conn., the World War I shipbuilding yards of Groton Iron Works will be placed in service. Ford, Bacon & Davis, engineers, New York, have been commissioned to design new buildings and facilities. There are six building ways and three craneways. Electric Boat now employs 7000 and has a large backlog of orders for submarines.



■ NIGHT WORK: The three-shift system now spreading throughout industries engaged in national mobilization appears largely responsible for the reduction in total unemployment. Far more workers are being absorbed in these industries than are being laid off in others.

Typical of the pressure for production are these night scenes. Left: General Motor's Chevrolet plant at Flint, Mich., producing army trucks. Below, General Electric's Schenectady, N. Y., works, where 30,000 men rotate on eight-hour shifts. Opposite page, Douglas Aircraft assembly plant in Santa Monica, Calif. NEA photos

# Local Antitrust Offices Empowered To Approve War Production Groups

*WASHINGTON*

■ AN arrangement with Thurman Arnold, Assistant Attorney General, Department of Justice, to expedite legal clearance of proposed war production associations has been announced by Floyd B. Odlum, Director of OPM's Division of Contract Distribution.

Organization plans of proposed associations must be passed upon by representatives of the Division of Contract Distribution and by the Department of Justice, to make sure they do not run counter to the antitrust laws. Until the new arrangement was worked out, all proposals to form such associations had to be cleared by the Department of Justice in Washington.

Now, as before, the first step for manufacturers to take toward forming a production association or pool is to get in touch with the nearest field office of the Division of Contract Distribution, outline their intentions and obtain detailed instructions. After this is done and a definite organization plan has been worked out, the plan should be submitted, as before, to the nearest Division of Contract Distribution field office.

Now, however, the Division of Contract Distribution does not have to take up all proposed associations with Washington officials of the Department of Justice. Under authority granted by Mr. Arnold, association plans originating in the areas from Chicago to the West Coast may be taken up and cleared directly by the Division of Contract Distribution field offices with the nearest of the following field offices of the antitrust division:

Chicago, Daniel Britt, Suite 820, 208 South LaSalle street.

St. Louis, Lyle Jones, 519 New Federal building.

Denver, James I. Henderson, 812 Equitable building.

Seattle, Charles S. Burdell, 814 United States Court House.

San Francisco, Wallace Howland, 422 Post Office building.

Los Angeles, Tom C. Clark, 254 United States Post Office and Court House.

War production associations are made up in many instances of small manufacturers who, individually, can do little for defense; but who, collectively, can handle substantial war contracts or subcontracts.

The new procedure for direct field clearance of associations in the area from Chicago to the West Coast applies only to local associations—those comprised of manufacturing units in a given locality.

As previously announced, associations employing "dubious promoters" are barred from clearance.

In the area east of Chicago, proposed associations will continue to be passed upon by the Department of Justice in Washington.

STEEL

# *Goal Is Set; Now To Achieve It . . .*

PRESIDENT ROOSEVELT'S message to Congress on the state of the union, in which he enumerated definite quotas for certain items of war equipment, commits the nation to a program of production which not only is breath-taking in its dimensions but also is challenging in its implications.

Having announced boldly to the world at large that in 1942 we will turn out 60,000 airplanes, 45,000 tanks, 20,000 anti-aircraft guns and 8,000,000 deadweight tons of merchant ships, the President set a goal which must be achieved. To fail to match words with deeds is to confess to a world of critical enemies and of hopeful allies that this democracy is impotent.

• • •

In the few days that have elapsed since the quotas were announced, men and women in all walks of life have had time to consider the implications of this unprecedented undertaking. They realize that it will tax the facilities and abilities of the nation. They know it will test the quality of the new unity of purpose which was welded by the shock of Pearl Harbor.

But with full appreciation of the scope of the job, no responsible voice anywhere has been raised to say that it is impossible. On the contrary, thousands of persons who weigh their words carefully have said that the planes, tanks, guns and ships can and will be produced—if we can muster the will to do it.

In short, almost every person who has commented on the problem has stressed the importance of national unity and morale. No one seems to question seriously the adequacy of physical resources. Admittedly the problems of materials, men and machines are great—in fact, almost overwhelming. Nevertheless, the general view is that these problems can be licked somehow, provided that the determination to win becomes strong enough.

The determination to win cannot be developed to worthwhile proportions if we persist in wasting time by quibbling over past mistakes. Those who are attempting at this critical moment to attach the blame for unpreparedness upon industry, labor, government or any other factor are indulging in a dangerous and futile bit of recrimination. Everybody made mistakes; they cannot be recalled.

The sensible thing to do is to wipe the slate clean as of 2:30 p. m., Sunday, Dec. 7, 1941. Count the first month of war as a period of disillusionment, of self-examination, and of reorientation for the American people. Fix Jan. 6, 1942—the day of the President's message—as the dawn of the real war period. Judge every man by his deeds from that day forward.

• • •

If this policy be adopted, we shall begin to make progress rapidly. If some man is showing exceptional capacity for getting things done, whether he be in Washington or in a plant, advance him. Do it on the basis of his record now—not on what he did a year ago or two years ago. If a man is falling down on a job replace him with the best man obtainable.

This operation could well start in the government's war industry set-up in Washington. It should be reorganized now. Clarify responsibilities. Co-ordinate functions. Set up one man as boss. Get the ablest men available.

These moves are absolutely essential to the success of the 1942 war program.

E. L. Shaner

EDITOR-IN-CHIEF

Jan. 12, 1942

# The BUSINESS TREND

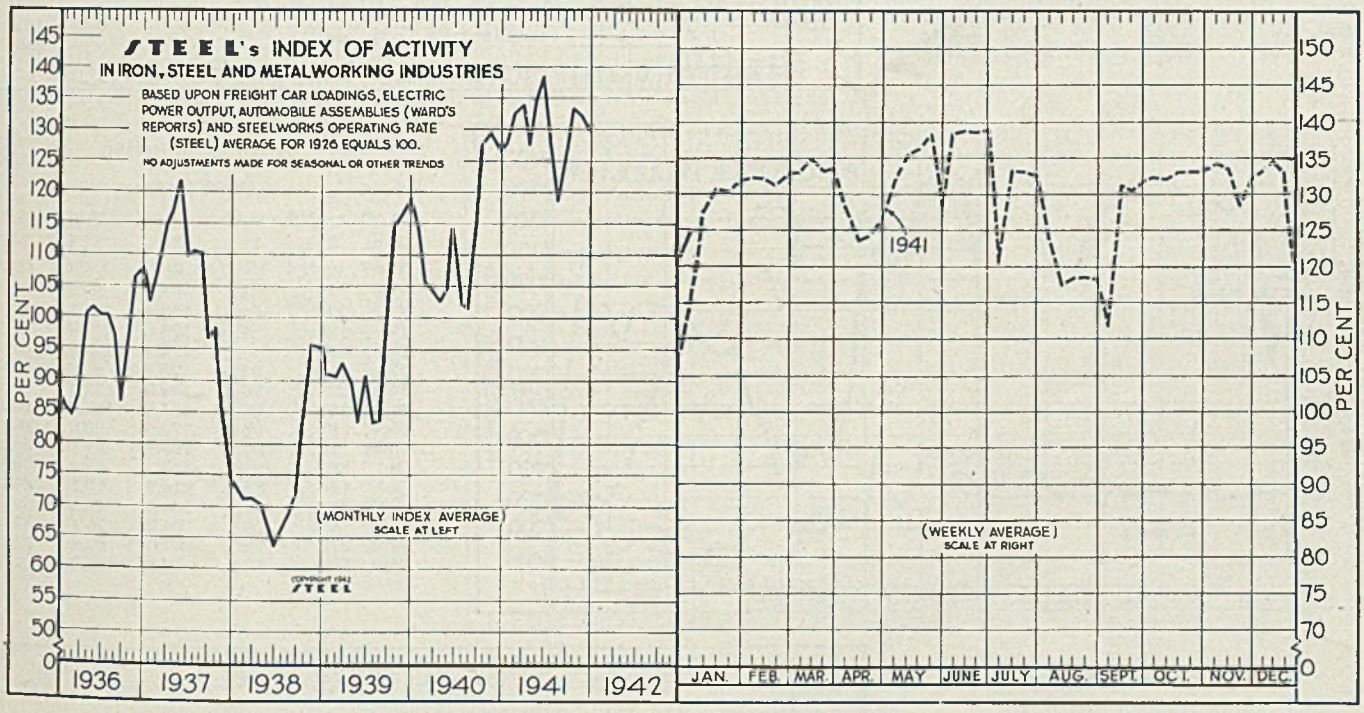
## Peak Output Sustained Through Year-End

■ INDUSTRIAL activity maintained its record pace through the year-end holidays. Plants producing military goods with but few exceptions operated New Year's Day while the usual closings for inventory taking were reduced to a minimum or completely done away with.

During the past year STEEL'S index of activity in the iron, steel and metalworking industries averaged 130.2, the highest on record. This compares with the previous yearly peak of 112.2 recorded during 1940. In 1929 the index averaged 109.5.

The index rose 4.2 points to 124.7 during the week ended Jan. 3. This remains substantially below the level recorded prior to the year-end holidays but compares favorably with the 114.5 level recorded at this time last year.

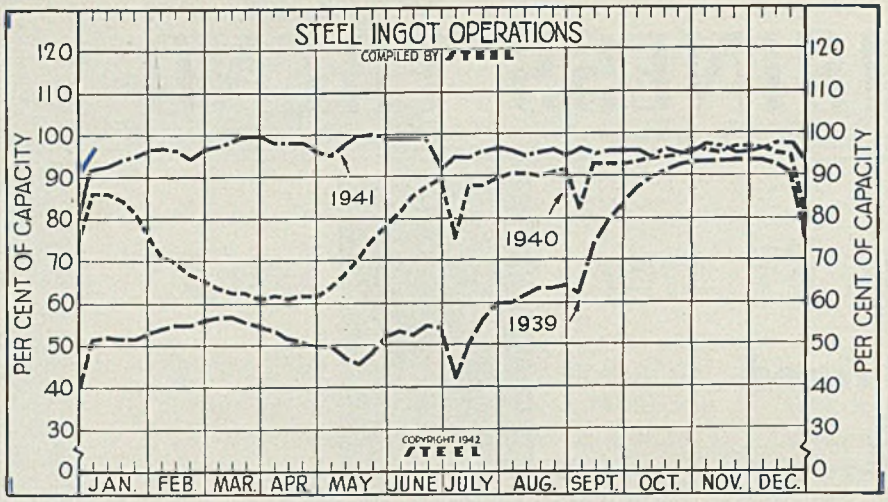
Steelmaking operations advanced four points during the week ended Jan. 3 to 97.5 per cent. Electric power consumption rose to 3,286,705,000 kilowatts during the latest period while freight carloadings advanced to 674,374 cars. New Year's Day holiday plus OPM curtailment orders reduced automobile assemblies during the week of Jan. 3 to 18,530 units, the lowest level for the new model year.




*STEEL'S index of activity advanced 4.2 points to 124.7 in the week ended Jan. 3:*

| Week Ended | 1941 | 1940 |
|---|---|---|
| Nov. 1 | 133.8 | 130.2 |
| Nov. 8 | 134.4 | 130.3 |
| Nov. 15 | 133.8 | 130.3 |
| Nov. 22 | 128.4 | 124.7 |
| Nov. 29 | 132.2 | 132.6 |
| Dec. 6 | 133.4 | 132.5 |
| Dec. 13 | 134.8 | 132.6 |
| Dec. 20 | 132.9 | 132.4 |
| Dec. 27 | 120.5 | 107.5 |
| **Week Ended** | **1942** | **1941** |
| Jan. 3 | 124.7 | 114.5 |

| 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 | 100.3 | 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 | 128.7 | 102.4 | 83.5 | 66.2 | 110.4 | 100.1 | 75.3 | 63.7 | 77.1 | 47.1 | 67.3 | 79.9 |
| Aug. | 118.1 | 101.1 | 83.9 | 68.7 | 110.0 | 97.1 | 76.7 | 63.0 | 74.1 | 45.0 | 67.4 | 85.4 |
| Sept. | 121.1 | 113.5 | 98.0 | 72.5 | 96.8 | 86.7 | 69.7 | 56.9 | 68.0 | 46.5 | 64.3 | 83.7 |
| Oct. | 129.9 | 127.8 | 114.9 | 83.6 | 98.1 | 94.8 | 77.0 | 56.4 | 63.1 | 48.4 | 59.2 | 78.8 |
| Nov. | 129.7 | 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

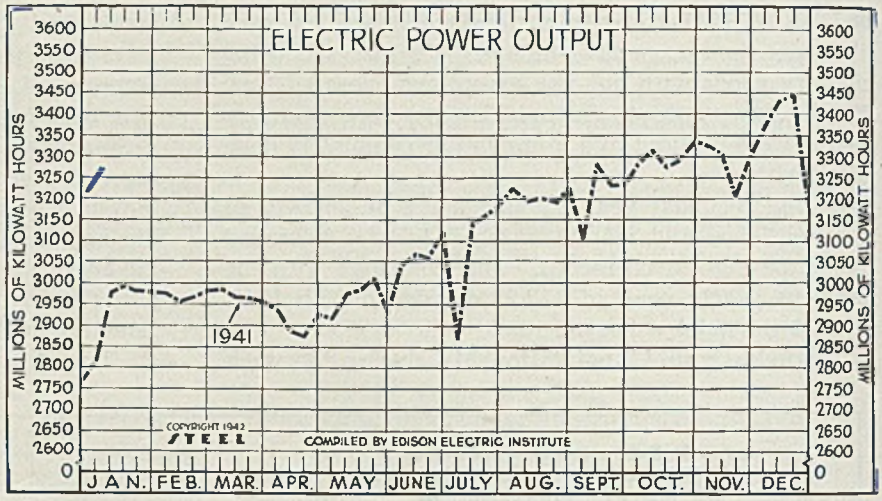
(Per Cent)

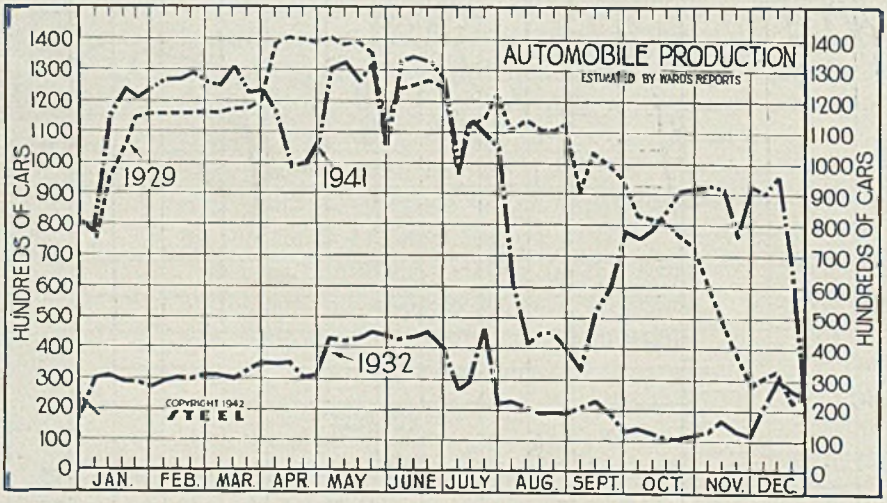
| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Jan. 3.... | 97.5 | 92.5 | 86.5 | 51.5 |
| **Week ended** | **1941** | **1940** | **1939** | **1938** |
| Dec. 27.... | 93.5 | 80.0 | 75.5 | 40.0 |
| Dec. 20.... | 97.5 | 95.0 | 90.5 | 52.0 |
| Dec . 13.... | 97.1 | 95.5 | 92.5 | 58.0 |
| Dec. 6.... | 96.5 | 96.5 | 94.0 | 61.0 |
| Nov. 29.... | 95.0 | 97.0 | 94.0 | 61.0 |
| Nov. 22.... | 95.5 | 97.0 | 93.5 | 62.0 |
| Nov. 15.... | 97.0 | 96.0 | 93.5 | 63.0 |
| Nov. 8.... | 97.5 | 96.5 | 93.0 | 61.5 |
| Nov. 1.... | 95.5 | 96.5 | 93.0 | 57.5 |
| Oct. 25.... | 95.5 | 95.5 | 92.0 | 54.5 |
| Oct. 18.... | 96.5 | 95.0 | 91.0 | 51.5 |
| Oct. 11.... | 94.5 | 94.5 | 89.5 | 51.5 |
| Oct. 4.... | 96.0 | 93.5 | 87.5 | 48.5 |
| Sept. 27.... | 96.0 | 93.0 | 84.0 | 47.0 |
| Sept. 20.... | 96.0 | 93.0 | 79.5 | 48.0 |

## Electric Power Output

(Million KWH)

| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Jan. 3..... | 3,287 | 2,831 | 2,558 | 2,239 |
| **Week ended** | **1941** | **1940** | **1939** | **1938** |
| Dec. 27 ..... | 3,234 | 2,757 | 2,465 | 2,175 |
| Dec. 20..... | 3,449 | 3,052 | 2,712 | 2,425 |
| Dec. 13..... | 3,431 | 3,004 | 2,674 | 2,390 |
| Dec. 6..... | 3,369 | 2,976 | 2,654 | 2,377 |
| Nov. 29..... | 3,295 | 2,932 | 2,605 | 2,335 |
| Nov. 22..... | 3,205 | 2,839 | 2,561 | 2,248 |
| Nov. 15..... | 3,304 | 2,890 | 2,587 | 2,325 |
| Nov. 8..... | 3,339 | 2,858 | 2,589 | 2,277 |
| Nov. 1..... | 3,339 | 2,882 | 2,609 | 2,271 |
| Oct. 25..... | 3,299 | 2,867 | 2,622 | 2,284 |
| Oct. 18..... | 3,273 | 2,838 | 2,576 | 2,281 |
| Oct. 11..... | 3,315 | 2,817 | 2,584 | 2,251 |
| Oct. 4..... | 3,290 | 2,792 | 2,554 | 2,229 |
| Sept. 27..... | 3,233 | 2,816 | 2,559 | 2,208 |
| Sept. 20..... | 3,232 | 2,769 | 2,538 | 2,211 |




## Auto Production

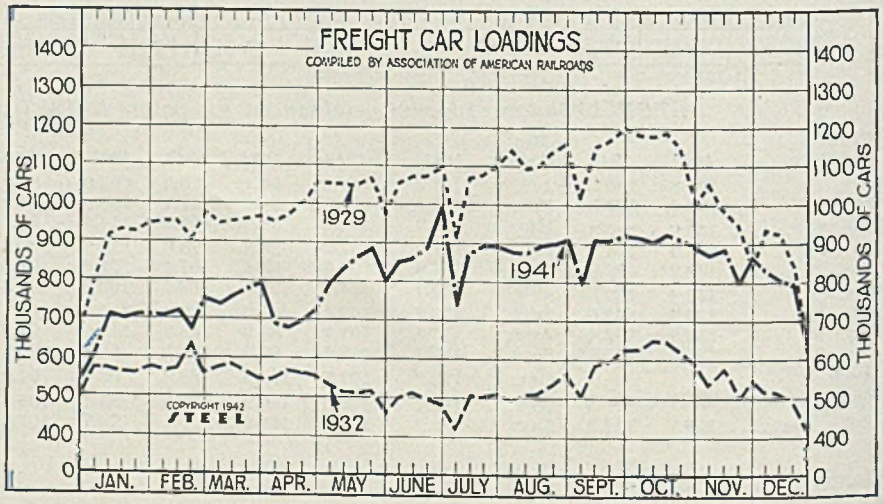
(1000 Units)

| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Jan. 3.... | 18.5 | 76.7 | 87.5 | 76.7 |
| **Week ended** | **1941** | **1940** | **1939** | **1938** |
| Dec. 27.... | 24.6 | 81.3 | 89.4 | 75.2 |
| Dec. 20.... | 65.9 | 125.4 | 117.7 | 92.9 |
| Dec. 13.... | 96.0 | 125.6 | 118.4 | 102.9 |
| Dec. 6.... | 90.2 | 124.8 | 115.5 | 100.7 |
| Nov. 29.... | 93.5 | 128.8 | 93.6 | 97.8 |
| Nov. 22.... | 76.8 | 102.3 | 72.5 | 84.9 |
| Nov. 15.... | 93.0 | 121.9 | 86.7 | 96.7 |
| Nov. 8.... | 93.6 | 120.9 | 86.2 | 86.3 |
| Nov. 1.... | 92.9 | 118.1 | 82.7 | 80.0 |
| Oct. 25.... | 91.9 | 117.1 | 78.2 | 73.3 |
| Oct. 18.... | 85.6 | 114.7 | 70.1 | 68.4 |
| Oct. 11.... | 79.1 | 108.0 | 75.9 | 50.5 |
| Oct. 4.... | 76.8 | 105.2 | 76.1 | 37.7 |
| Sept. 27.... | 78.5 | 96.0 | 62.8 | 25.4 |
| Sept. 20.... | 60.6 | 78.8 | 54.0 | 20.4 |

## Freight Car Loadings

(1000 Cars)

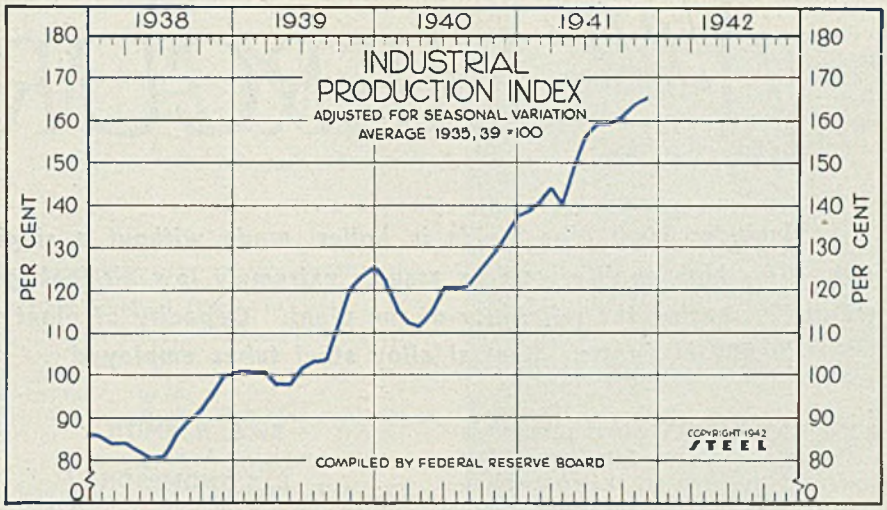
| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Jan. 3..... | 674 | 614 | 592 | 531 |
| **Week ended** | **1941** | **1940** | **1939** | **1938** |
| Dec. 27..... | 607 | 545 | 550 | 500 |
| Dec. 20..... | 799 | 700 | 655 | 574 |
| Dec. 13..... | 807 | 736 | 681 | 606 |
| Dec. 6..... | 833 | 738 | 687 | 619 |
| Nov. 29..... | 866 | 729 | 689 | 649 |
| Nov. 22..... | 799 | 733 | 677 | 562 |
| Nov. 15..... | 884 | 745 | 771 | 657 |
| Nov. 8..... | 874 | 778 | 786 | 637 |
| Nov. 1..... | 895 | 795 | 806 | 673 |
| Oct. 25..... | 914 | 838 | 834 | 709 |
| Oct. 18..... | 923 | 814 | 861 | 706 |
| Oct. 11..... | 904 | 812 | 845 | 727 |
| Oct. 4..... | 918 | 806 | 835 | 703 |

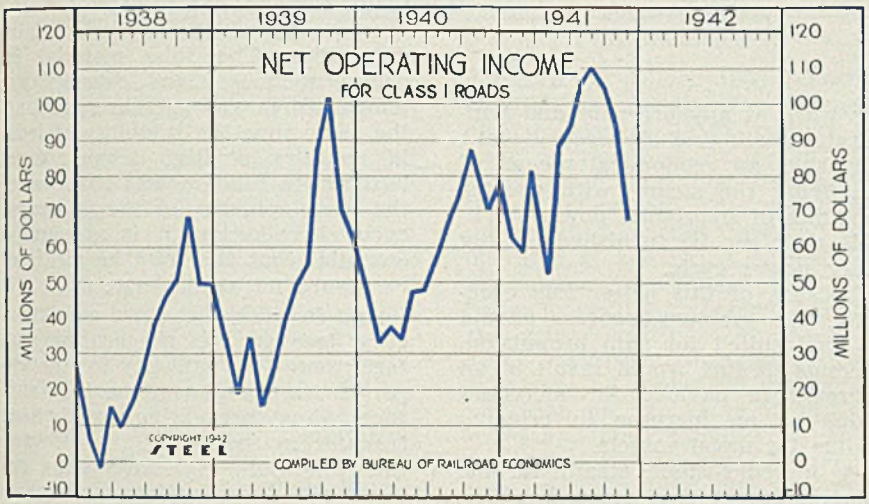


## Industrial Production
## Federal Reserve Board's Index

(1935-39 = 100)

| | 1941 | 1940 | 1939 | 1938 | 1937 |
|---|---|---|---|---|---|
| Jan. ..... | 139 | 122 | 102 | 86 | 116 |
| Feb. ..... | 141 | 116 | 101 | 84 | 117 |
| March ... | 143 | 112 | 101 | 84 | 120 |
| April .... | 140 | 111 | 97 | 82 | 120 |
| May ..... | 150 | 115 | 97 | 80 | 121 |
| June ..... | 157 | 121 | 102 | 81 | 119 |
| July ..... | 160 | 121 | 104 | 86 | 120 |
| Aug. ..... | 160 | 121 | 104 | 90 | 120 |
| Sept. ..... | 161 | 125 | 113 | 92 | 115 |
| Oct. ..... | 163 | 129 | 121 | 95 | 107 |
| Nov. ..... | 167 | 133 | 124 | 100 | 95 |
| Dec. ..... | ... | 138 | 126 | 101 | 87 |
| Year Ave. ... | | 122 | 108 | 88 | 113 |




## Class I Railroads
## Net Operating Income

(Unit: $1,000,000)

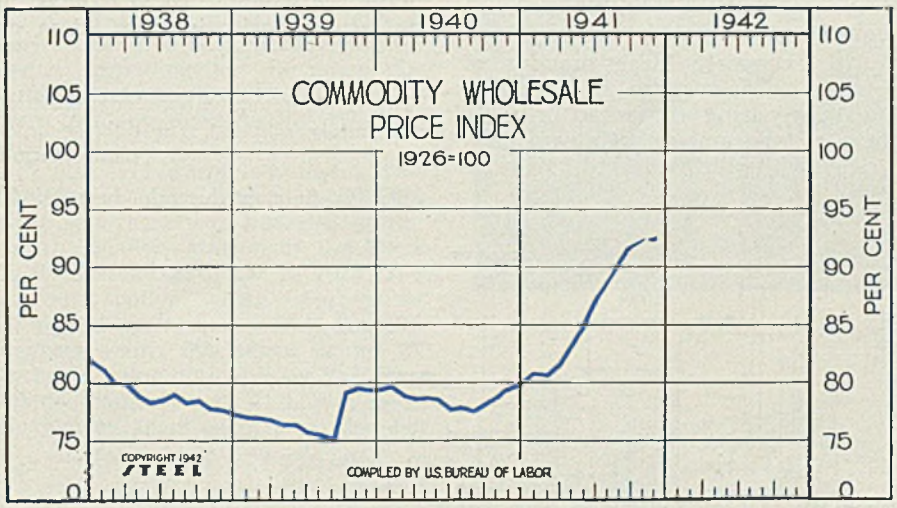
| | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|
| Jan. .... | $62.36 | $45.57 | $32.89 | $7.14 |
| Feb. ..... | 58.49 | 32.86 | 18.59 | 1.91* |
| Mar. .... | 80.63 | 36.73 | 34.32 | 14.73 |
| April .... | 52.57 | 33.82 | 15.32 | 9.40 |
| May ..... | 88.63 | 47.08 | 25.10 | 16.67 |
| June .... | 93.26 | 47.42 | 39.10 | 25.16 |
| July ..... | 106.31 | 57.08 | 49.01 | 38.43 |
| Aug. .... | 110.02 | 66.01 | 54.59 | 45.42 |
| Sept. .... | 104.07 | 74.19 | 86.43 | 50.36 |
| Oct. ..... | 93.66 | 86.99 | 101.62 | 68.57 |
| Nov. .... | 68.76 | 72.00 | 70.41 | 49.69 |
| Dec. ..... | ..... | 78.79 | 60.95 | 49.37 |
| Average . | ..... | $56.84 | $49.02 | $31.02 |

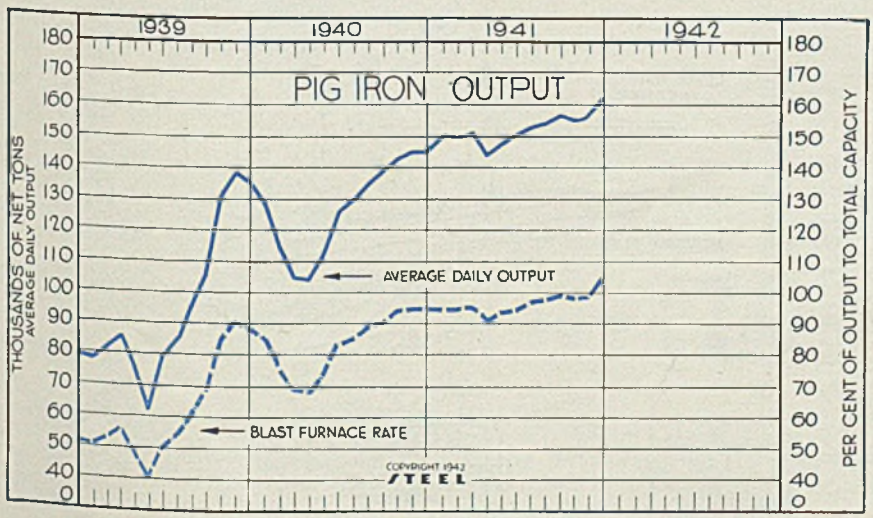
*Indicates deficit.

## All Commodity
## Wholesale Price Index
## U. S. Bureau of Labor

(1926 = 100)

| | 1941 | 1940 | 1939 | 1938 | 1937 |
|---|---|---|---|---|---|
| Jan. | 80.8 | 79.4 | 76.9 | 80.9 | 85.9 |
| Feb. | 80.6 | 78.7 | 76.9 | 79.8 | 86.3 |
| March | 81.5 | 78.4 | 76.7 | 79.7 | 87.8 |
| April | 83.2 | 78.6 | 76.2 | 78.7 | 88.0 |
| May | 84.9 | 78.4 | 76.2 | 78.1 | 87.4 |
| June | 87.1 | 77.5 | 75.6 | 78.3 | 87.2 |
| July | 88.8 | 77.7 | 75.4 | 78.8 | 87.9 |
| Aug. | 90.3 | 77.4 | 75.6 | 78.1 | 87.5 |
| Sept. | 91.8 | 78.0 | 79.1 | 78.3 | 87.4 |
| Oct. | 92.4 | 78.7 | 79.4 | 77.6 | 85.4 |
| Nov. | 92.5 | 79.6 | 79.2 | 77.5 | 83.3 |
| Dec. | .... | 80.0 | 79.2 | 77.0 | 81.7 |
| Ave. | .... | 78.5 | 77.1 | 78.6 | 86.3 |




## 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 | 95.7 | 83.6 | 51.4 |
| July | 153,749 | 130,984 | 85,121 | 97.0 | 86.1 | 55.0 |
| Aug. | 154,343 | 136,599 | 96,122 | 97.4 | 89.9 | 62.4 |
| Sept. | 157,378 | 139,085 | 107,298 | 99.3 | 91.5 | 69.7 |
| Oct. | 156,775 | 143,152 | 131,053 | 98.9 | 94.2 | 85.2 |
| Nov. | 156,906 | 146,589 | 138,883 | 99.0 | 96.4 | 90.3 |
| Dec. | 161,774 | 146,544 | 136,119 | 104.06 | 96.4 | 88.5 |
| Ave. | ..... | 128,128 | 86,375 | .... | 84.3 | 62.6 |

# New MERCURY-VAPOR

***. . . . includes 5000 pipe welds in boiler, made without a single leak. This high quality welding assures extremely low air leakage, greatly increasing the reliability of the plant. Capacity of plant is 50,000 kilowatts. Special alloy steel tubes employed***

By A. R. SMITH
And
E. S. THOMPSON
Turbine Engineering Department
General Electric Co.
Schenectady, N. Y.

THE MERCURY-vapor process is a binary system for producing power with greater thermal economy than is possible with the steam cycle alone. As shown in Fig. 1, the mercury first is vaporized in the boiler at comparatively low pressure and passes through a mercury turbine which drives an electric generator. The vapor from the turbine is exhausted to a condenser-boiler where its latent heat is transferred to water, forming steam which is superheated in coils located in the gas passages of the mercury boiler and then is used in steam turbines or for process work.

**Field of Application:** All the mercury equipments so far have been "topping" units. This is the field where the widest application of the process as any steam plant, no matter what its operating temperature and pressure, can be given a new lease on economic life if mercury equipment is added.

An extremely large amount of byproduct power can be produced by superposing the mercury cycle over a fixed amount of steam flow. Industry requiring steam for process work at any pressure and temperature will find a mercury plant furnishes an economical means of supplying the steam, with greater amounts of byproduct power available than can be furnished by any other power cycle.

Because of this better fuel economy, the mercury process should be well suited for ship propulsion. Savings in fuel would result in an increase in payload for merchant ships or an increase in cruising radius for naval vessels.

A mercury-vapor steam turbine electric locomotive could be built with the steam turbine exhausting at atmospheric pressure, thus decreasing the size of the air cooled condenser. Even with high exhaust pressure, considerable savings in fuel would be realized.

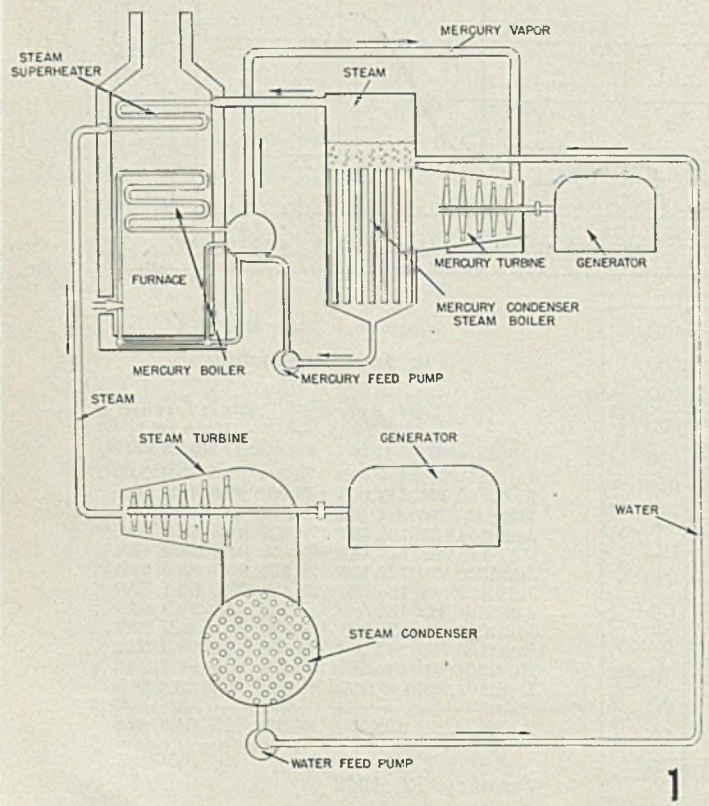
A binary system using mercury vapor and steam thus is unusually efficient and affords more power output for a given fuel input. An overall plant thermal efficiency of better than 37 per cent has been obtained with the new Kearny boiler plant. However, there are a few requirements which involve certain difficulties. The tube material is called upon to stand considerable temperatures and pressures, and at the same time the solubility of iron in mercury at high temperatures has been a fundamental obstacle in the development of the mercury cycle. In addition, it is absolutely essential that the joint be air-tight to assure no air leakage.

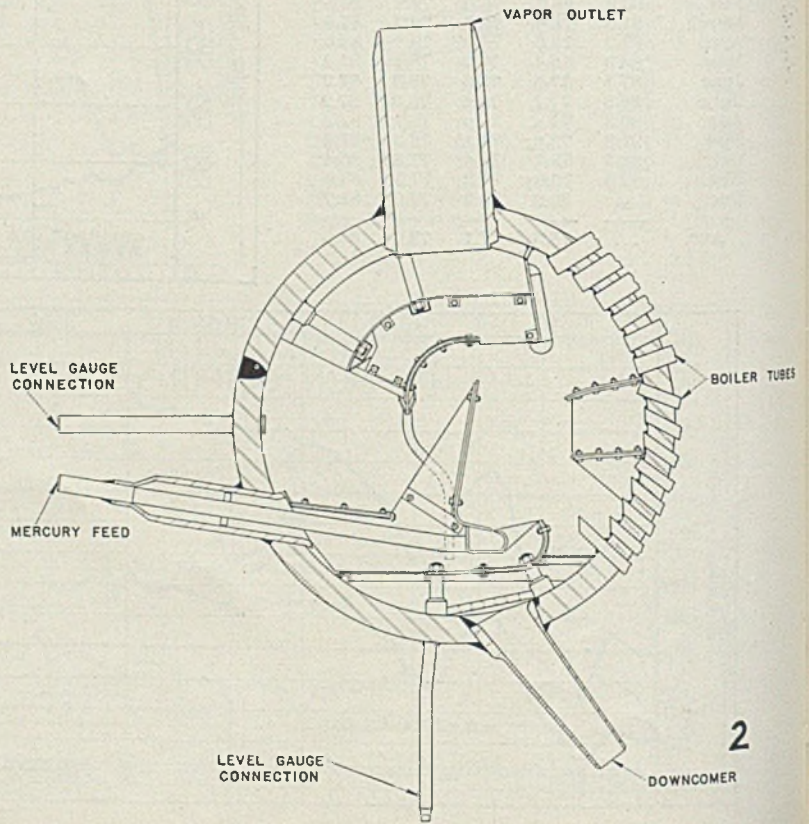
And furthermore, since pure mercury does not wet the heating surface, there is a tendency for the vapor to form a film at the tube surface, thus preventing good heat transfer to the liquid. To prevent this condition, high circulation ratios had to be maintained and many years passed before a way was found to make mercury wet the tube sur-

Fig. 1—Mercury vapor-steam-electric generating system. This binary system is unusually efficient, the Kearny boiler showing better than 37 per cent overall plant thermal efficiency on test

Fig. 2—Section through drum of 20,000-kilowatt mercury boiler





# POWER PLANT

**TABLE I—Chemical Analyses of Materials Involved (Per Cent)**

| | Carbon | Mang. | Chromium | Silicon | Moly. | Nickel | Tungsten |
|---|---|---|---|---|---|---|---|
| Croloy 5M-Si.... | .10-.13 | .50 max. | 4.00-6.00 | 1.40-1.55 | .45-.65 | ..... | ..... |
| Croloy 3M..... | .15 max. | .30-.60 | 2.75-3.25 | .50 max. | .80-1.00 | ..... | ..... |
| Croloy 2 ..... | .20 max. | .30-.60 | 1.75-2.25 | .50 max. | .40-.60 | ..... | ..... |
| Carbon-Moly. .. | .10-.20 | .30-.60 | ..... | .10-.50 | .45-.65 | ..... | ..... |
| Carbon-Steel ... | .08-.18 | .30-.60 | ..... | ..... | ..... | ..... | ..... |
| Carbon-Steel ... | .30 | .30-.60 | ..... | ..... | ..... | ..... | ..... |
| B & W 650..... | .16 max. | .75 max. | 22.0-25.0 | .75 max. | ..... | 10.0-13.0 | ..... |
| B & W 671..... | .40 max. | 1.50 max. | 24.0-27.0 | 1.00 max. | ..... | 14.0-16.0 | 1.75-2.25 |

face, thereby increasing the heat transfer rate with lower circulation ratios.

In spite of these difficulties and the comparatively little known about rupture strength of tube materials at high temperatures throughout extended periods, progress has been rapid.

In the first mercury-vapor boiler operated in 1912, the high temperatures made it impossible to maintain tight expanded joints in the tube sheet, so a boiler was built consisting of flattened tubes bent into an arc and welded to two headers which were connected by return pipe. Thus welding entered into the construction of even the very first mercury-vapor boiler. Several boilers of a similar type and of various capacities were tested in Schenectady, N. Y., and one unit successfully produced 1000 kilowatts from the mercury-turbine generator. Results were encouraging for the economy expected from the process was realized even in the very first unit, although many mechanical difficulties remained.

The results obtained at Schenectady through the 10-year period prior to 1922 convinced executives of the Hartford Electric Light Co., Hartford, Conn., that the binary cycle had sufficient promise to justify necessary expenditure for proving it on a commercial operating basis. The resulting first installation at the Dutch Point station was designed to deliver 1800 kilowatts from the mercury-turbine generator and to produce 40,000 pounds per hour of steam at 200 pounds per square inch gage and 100 degrees Fahr. superheat. The boiler employed the fire-tube principle and operated at a mercury pressure of 35 pounds per square inch. The boiler looked like a honeycomb with the center cell of each group of seven sealed over to make a return tube for the other six. Inadequate provision for expansion of adjacent tubes and inaccessibility for cleaning made it necessary to replace this boiler in 1925 with one made up of suspended "porcupine" tubes. Each of these tubes contained a core with a small opening in the center providing for the down circulation of the liquid. There were four headers, each having 160 porcupine tubes.

A still larger unit employing two condenser boilers and a 10,000 kilowatt generator was installed at the South Meadow station of the Hartford Electric Light Co. in 1928. The mercury boiler, which operates at 85 pounds per square inch and 908 degrees Fahr. has seven drums 37 inches outside diameter by 30 inches inside diameter and 21½ feet long. Suspended from each drum are 440

(*Please turn to Page* 84)

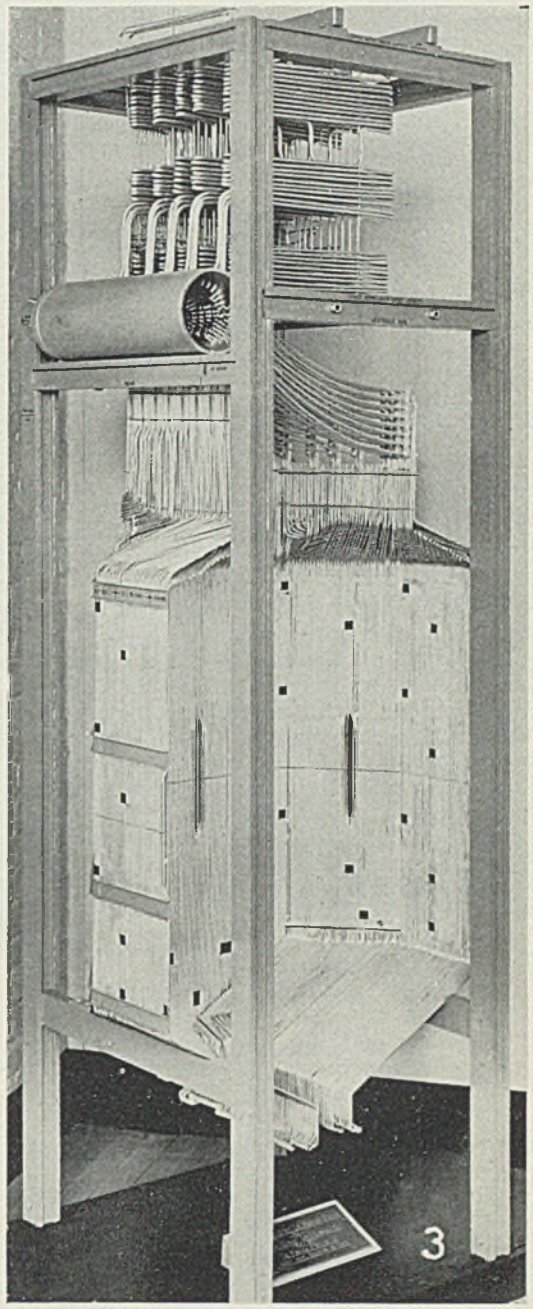



Fig. 3—Model of G-E mercury boiler built for the Kearny station



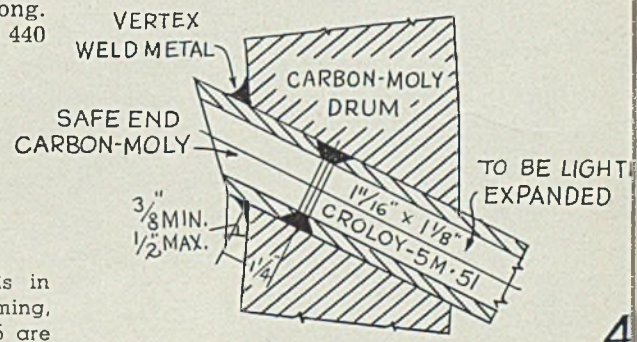
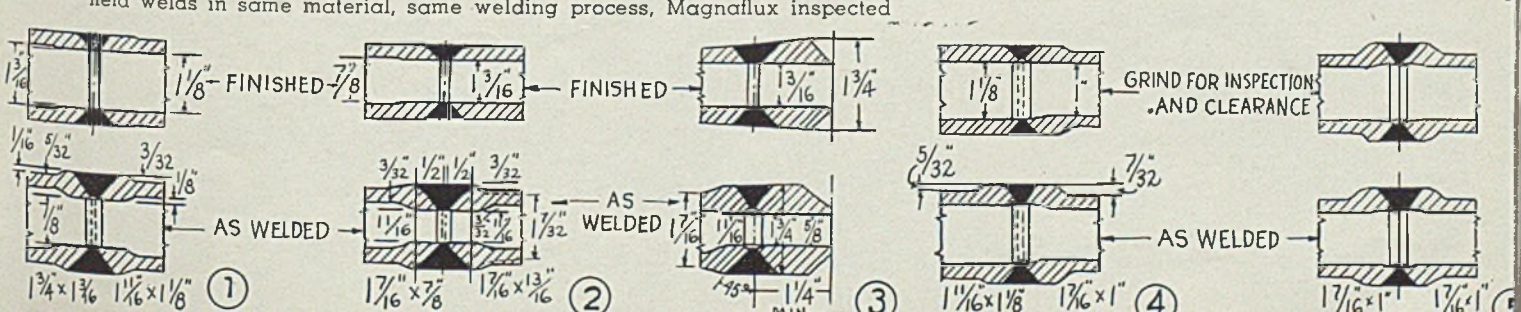



Fig. 4—Sections through representative welds. 1, 2 and 3 are shop welds in Croloy 5M-Si, atomic hydrogen process; finished inside by boring and reaming, outside by grinding and polishing. Magnaflux and X-ray inspected. 4 and 5 are field welds in same material, same welding process, Magnaflux inspected



# TOOLING . . . . Strip it

***We suddenly find ourselves involved in mechanized war with heavily armed opponents who are counting on America producing too little —too late. Yankee ingenuity meets this challenge with tooling expedients which go far toward "making up for lost time".***

■ SIMPLE, rugged tooling most emphatically is the order of the day on all war work. Extra minutes spent in the toolroom on anything which merely improves appearance of a tooling setup without adding to its utility now represent just so much aid and comfort to fast-working enemies whose only hopes for success lie in the possibility that America will produce too little—too late.

In normal times appearance of tooling ranks in importance with the appearance of machine tools as a factor in successful competitive selling. I am referring particularly to that variety of tooling installed on machines for the trade by machine tool builders themselves—including factory applied jigs, fixtures and attachments as well as actual cutting tools and their holders.

Most of the successful builders have used great care in recent years in blending and merging the design of these units into the basic design of the machines themselves. Under peacetime conditions this was a highly commendable effort —desirable for psychological as well as competitive reasons. As in the case of numerous other good but not indispensable activities, however, the time has come to say "Forget it—for the duration!"

The thing to do right now is to take a tip from the military side of the automotive industry, insofar as this matter of appearance is concerned. No one pretends that a military tank, a half-truck carrier, or a "jeep" is a handsome vehicle by peacetime standards. No one denies, however, that when it comes right down to suitability for rapid mass production, and maneuverability and stamina in action—these vehicles not only have what it takes but also look the part.

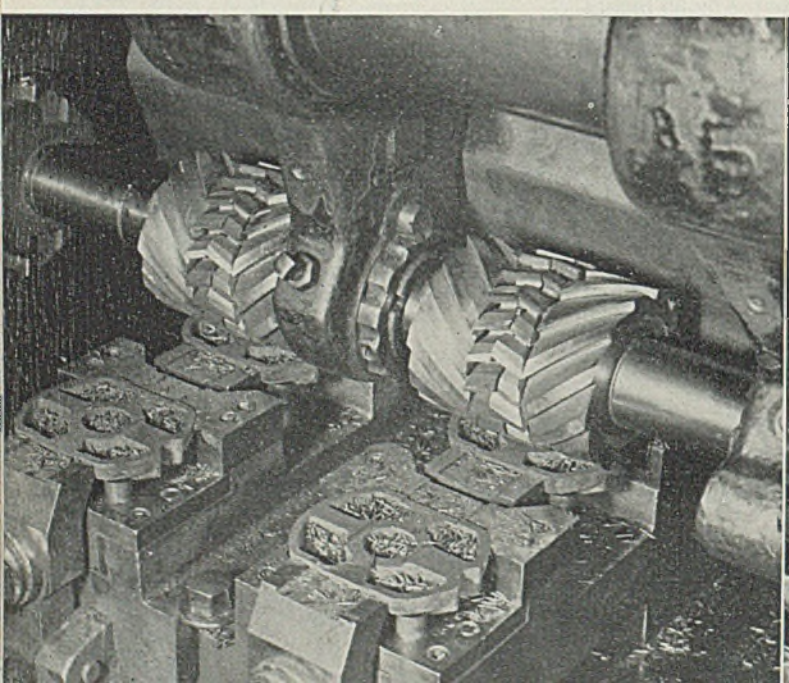
Tooling must came down to earth in the same way. After all, American machine shops are not exhibition halls these days. The gentry to whom the products of thousands of them are scheduled for unannounced delivery through bores of guns and by air, pin their hopes on the idea that America will fail to make delivery. One important step in avoidance of that possibility is to cut out all frills in tooling —bearing in mind that domestic competition is "out" until the naval, military and aerial competition which threatens America from overseas has been crushed and eliminated.

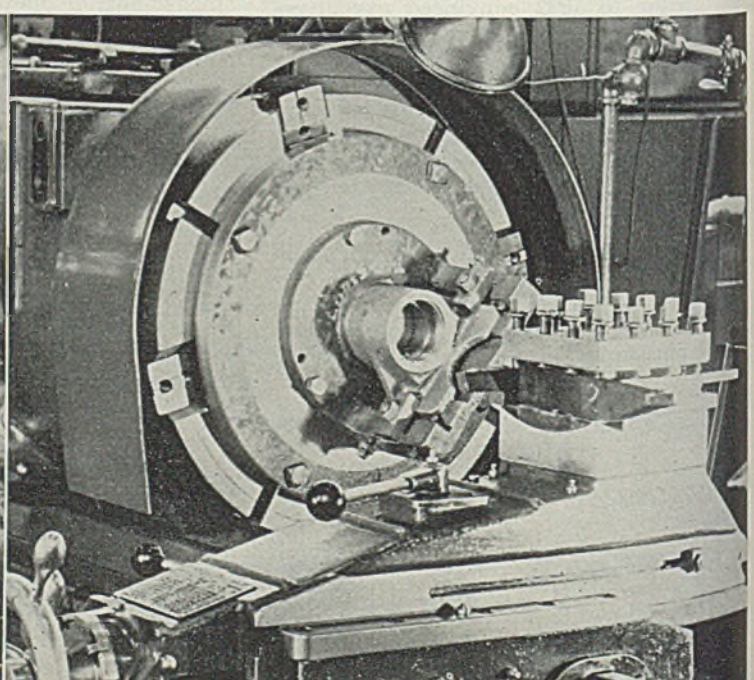
Two kinds of "hurry up tooling" now are in order. One variety is that designed to carry on as long as the rush war work continues. The other variety is that of temporary character, intended only to eliminate production delays which otherwise would occur while await-

Fig. 1. (Left)—Quick loading and rigidity are inherent in simple design of this indexing milling fixture developed by Maytag Corp. Minimum nonproductive machine time and maximum cutter life are two important ends attained by this tooling setup on Milwaukee manufacturing-type milling machine

Fig. 2. (Right)—Developed by Aetna Standard Engineering Co., Ellwood City, Pa., in connection with mass production of antiaircraft gun carriers, this shelf-type face plate fixture enables rapid, repetitive boring and facing of bracket bearings on Warner & Swasey turret lathe

Fig. 3. (Right opposite page)—C. A. Porter Machinery Co., Grand Rapids, Mich., created this special combination cutter, using standard Carboloy tools with shortened shanks as teeth of facing unit and brazing special Carboloy bits to edges of angular teeth





By GUY HUBBARD
Machine Tool Editor, STEEL

# for action!

ing delivery of more elaborate permanent tooling already under construction — oftentimes in outside tool shops. The latter includes gages as well as work holding devices and cutting tools—gage work being extremely exacting and therefore commonly farmed out to companies whose business is gage making.

Whether or not temporary tooling is justified depends largely on whether or not the parts for which it is intended are needed almost immediately to meet critical assembly schedules. If there is a possibility that lack of them will delay assembly while completion of the regular tooling is being awaited—then temporary expedients certainly are justified. Take care, however, that the making of this temporary tooling does not interfere with anything of equal or greater importance in the toolroom. All this is a matter of careful production planning weighed against careful allocation of toolroom capacity.

One way to get quick action—especially in the smaller shops—is for someone in authority to hand a part to an experienced toolmaker with instructions along the following lines: "Here is a rush job for which we must have temporary tooling (or a jig, fixture or gages, as the case may be) for use on such and such machine tool equipment. We haven't the time to make drawings. We are putting it up to you to build around this part the simplest possible tooling—just as quickly as possible."

There is nothing novel about this procedure. It merely is emergency reversion to the old idea that tools should be designed as well as built in the toolroom. This relic of the days before tool engineers won deserved recognition as a function separate from actual toolmaking and engineering of the manufactured product, should not be resorted to if tool engineering talent is available, nor will it work unless the toolmaker to whom the assignment is given is capable of extraordinarily good work with his head as well as with his hands.

Incidentally, he need not necessarily be one of the so-called old-timers—certainly he should not be one of the hidebound old-timers. Many young workmen have the ingenuity to think out a job like that along highly original lines. Furthermore, they have knowledge of modern expedients such as welding which will enable the tooling to be fabricated much more quickly, cheaply and effectively than in the old line ways. Nor will they overlook the time-saving possibilities of ready-made parts such as stock jig bushings and liners; thumb screws; star wheels; collar and shoulder screws; and jig feet.

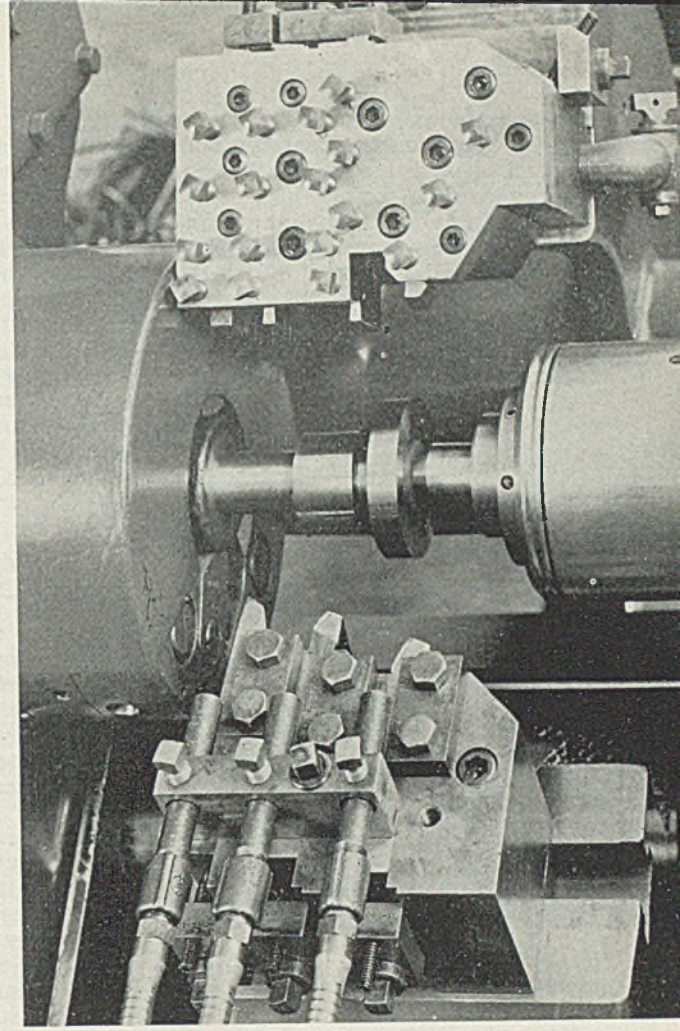
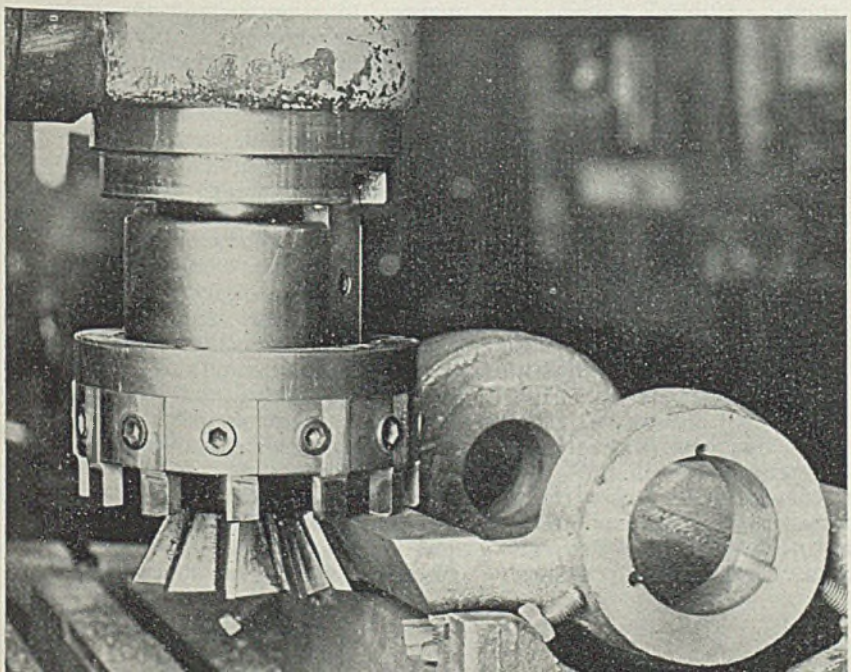


Fig. 4—Rigidity of tools through solid support close to all cutting edges is attained in this Fay automatic cluster gear setup, embodying profiled tool blocks devoid of all "fancy work"



Among the numerous expedients which can be made use of effectively on emergency tooling are: Cold drawn, cold rolled or commercially ground steel bar stock and shapes for building up tool holders, etc., with minimum machining; "expanding metal" for accurately locking bushings, guides, punches, etc., into rough holes; commercial ground stock for slides, guide rods and even for temporary gages; gas cut, contour sawed or nibbled shapes—including screw machine cams; standard ball bearing balls spot welded or brazed to handles for use as hole gages; and milling cut-

ters, boring tools and flycutters made up of standard tool bits or standard shank tools (including tungsten carbide tools).

The writer has seen many an ingenious setup—especially on turret lathes and automatics—which has been built up almost entirely of sections of cold-drawn, cold-rolled or ground bar stock and shapes, insofar as tool blocks and

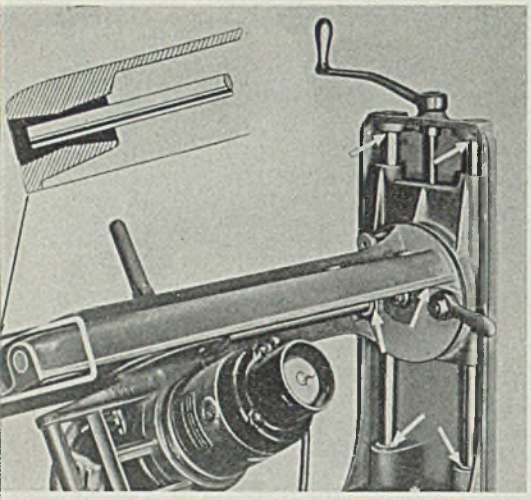


Fig. 5—Expanding metal is employed at points indicated by arrows, to anchor finished steel rod "ways" of this machine in cored holes, as shown by inset left, above. Photo courtesy Cerro de Pasco Copper Co.

tool holders are concerned. In planning setups of this nature, unnecessary use of other than round holes should be avoided and open slots which can be cut by planer, shaper or milling machine should be used wherever possible instead of closed mortices which require broaching or internal use of slotter or shaper tools. As a matter of fact this is sound advice on any tooling job these days.

One thing which must be watched when slotting cold finished steel parts parallel to their fiber structure, is their tendency to "open up." To illustrate, when the end of a cold-drawn rod is slotted deeply, the tines of the fork thus formed sometimes will bow outward noticeably. This trouble can be overcome by straightening under a press, or by normalizing before machining.

Whether or not these parts should be case hardened depends upon the amount of punishment to which they will be subjected and whether they are stop-gap units or those intended for long-continued use. Don't do any unnecessary heat treating on tool work these days. Remember, heat treating departments are overloaded just as much if not more than other shop departments, and additional equipment for them is fully as scarce as machine tools.

And speaking of machine tools, I would like to call attention to the possibilities of heavy duty surface grinders as effective machines for dressing down the surfaces of tool blocks and other tooling details to exact size. Oftentimes it may be desirable to send this work out of the tool room into the shop to have it done on the large horizontal or vertical spindle grinders which have come into such general and highly successful use on production.

### Don't Overlook the Shop

As a matter of fact there are many jobs which well can be taken out of the tool room and done out in the shop. These include jobs which should be "roughed out" before finishing in the tool room, also those which run into sufficient quantities to warrant running them off on turret lathes, cylindrical or centerless grinders, or even on automatics.

Unless every machine in the shop is operating constantly right around the clock seven days a week, ways can be found to sandwich this tool work between production setups without disrupting regular production schedules. It should be mentioned in passing that production machine tools of recent vintage are as accurate or even more accurate than were the tool room machines of a few years ago. Many a fine tool room today largely is equipped with standard machine tools and they are able to hold their own on at least 90 per cent of the jobs.

The extent to which standard machine tools can be used advantageously on jobs which ordinarily call for now relatively scarce highly specialized tool room machines, including jig borers and precision horizontal boring mills is exemplified by the setup shown in Fig. 2. This shows a Warner & Swasey turret lathe in the Ellwood City, Pa., plant of Aetna Standard Engineering Co., boring and facing bracket bearings used in mobile mounts for antiaircraft guns. To handle these parts, a shelf-type face plate fixture was made. This embodies accurate locating and quick locking features which eliminate most of the time and trouble which would be involved chucking this part in the conventional way, to the necessary degree of accuracy. This whole setup quickly can be set aside at any time to allow the turret lathe to be utilized on more conventional work.

Use of "expanding metal" in hurry-up tool work deserves a complete article in itself. Expanding metal is tin-lead-bismuth alloy of comparatively low melting point; this alloy—like type metal—having the peculiarity of expanding slightly when solidifying. Thus it will grip and lock firmly in place, even in unfinished cored holes, parts such as punch and die sections, ground steel bars used as guides or slides (see Fig. 5), finished bushings and various other tool and machinery elements.

These elements—which preferably should be knurled or otherwise prepared to insure secure anchorage, must be located exactly and held firmly before the expanding metal is poured. Also, adequate provisions must be made for pouring in and retaining the molten metal around the parts. Pouring spouts and ducts often are cored into castings used in connection with this method, and clay collars are molded around the ends of horizontal rods and bushings to retain the metal until it solidifies. Expanding metal is used extensively in building the emergency shell lathes sponsored by the National Machine Tool Builders' Association, also in the ingenious shell lathes designed by Lucien I. Yeomans, who introduced this system with conspicuous success on similar machines during the first World war. Unquestionably it has wide possibilities in this emergency.

### Many Ways To Speed Shaping

Gas cutting, bandsaw "contouring," and "nibbling" all lend themselves to speeding up the shaping of parts to be fabricated by welding into jigs, fixtures and tool holding devices. In many cases the surfaces can be left just as they are, except that all burrs and sharp edges and corners should be removed for the sake of safety. In other cases—such as templets and disk cams, the necessary finish can be obtained quickly by chain filing or contour grinding.

The narrow blade band sawing method can be employed to good purpose in "contouring" the ends of tool blocks to multidiameter work, thus getting maximum support under the tools which turn the various diameters. This "close-holding" of tools is particularly important when cemented carbides are used. This can go even so far as to have a shelf or step extending beyond the body of the block beneath the tools thereby providing rigid support directly below the cutting edges—thus eliminating the possibility of deflection and chatter. Incidentally, anything done to eliminate deflection and chatter is highly desirable, regardless of the kind of cutting material employed. Even carbon steel tools will do better work and have longer life when mounted in a substantial and rigid tool block.

Typical of good common sense—

minus frills—in tool block design is that depicted by Fig. 4. This shows a setup for rough turning and facing cluster gears in a 16-inch Fay automatic, the work being held between centers and driven by quick-acting pawl-type dogs which can be seen at the hooded headstock end. The simplicity of this dual setup of multiple tools, of which those at the back operate upside down, is testified to by the fact that the whole thing looks almost exactly like the basic tooling layout which is submitted to a prospect when quoting on a job such as this.

All fancy work has been avoided and straight line machining on the contoured tool blocks has been held down to essentials for housing and gripping the tools and maintaining clearances. Note that standard screws and standard pipe fittings have been employed to the utmost in building up this tooling and that standard plate and shapes have been utilized freely.

Selected ball bearing balls as hole gages should not be considered as substitutes for high grade plug gages on fine work—if the latter can be obtained. However, they will serve very well on many jobs which are not quite exacting enough to deserve tying up scarce plug gages when the latter are needed on other jobs on which only plug gages will serve. A ball gage does not give any indication of the straightness of a hole, but on modern machine tools straightness is well assured by the machine itself. After spot welding a ball to a knurled steel handle, it will be well to check it to make sure that breaking of its surface tension by the weld has not changed its diameter appreciably.

### Tool Situation Still Critical

While there has been widespread publicity for several years past emphasizing the serious scarcity of new machine tools, not so much has been said about impending shortages of finished cutting tools—milling cutters for instance. While this speaks well for the vigor with which the tool industry has met defense needs and now is meeting war needs, it cannot be too strongly emphasized that the tool situation is critical. Therefore, any practical measure which will help to meet this situation is important at this time. Such expedients include: Conservation of existing tools; salvage of worn or broken tools; and expedients which will make common tools and "home-made" tools do work for which difficult-to-get and highly specialized tools ordinarily would be deemed necessary.

In the latter category is the setup shown by Fig. 3, photographed at C. A. Porter Machinery Co., Grand Rapids, Mich. Here a machinery part is being machined with a "home-made" combination face and angle milling cutter embodying ideas which can be followed out in many different ways. The face milling part of this cutter is made up of standard ½-inch square Carboloy-tipped tools, the shanks of which have been shortened to allow rigid mounting in a slotted body of reasonable thickness—into which they are locked by standard socket screws. The angular part of this cutter also has carbide cutting edges—special carbide tips being brazed onto its teeth.

### "Kills Two Birds—"

This combination does the work much faster than it could be accomplished by single cutters, and the cutter itself was made up much more quickly than a conventional combination of special design could have been obtained from a cutter manufacturer. Therefore, the company not only was able to get out its own work on time but also relieved some hard pressed cutter manufacturer of added burden at a time when war work already was imposing a crushing load upon the American tool industry.

Sound common sense which always has characterized American interchangeable manufacturing will be a major factor in bringing us through to victory in the present highly mechanized war. The same fundamentals now underlie success in production of material for war as always have been at the root of successful production of competitive peacetime goods in the United States. This point is well exemplified by the typically American fixture and tooling setup shown by Fig. 1.

This happens to show the face milling of a cast iron wringer housing as accomplished by the Maytag Corp., Newton, Iowa, but it might well be a housing used in a tank, a marine diesel engine or in many another piece of military or naval equipment. In fact the thinking behind this tooling is exactly the same as that now being practiced successfully by Maytag tool engineers and production men on large and important war contracts.

Here are some of those fundamentals: (1) Rugged support for the work; (2) exact location of each piece; (3) quick loading and unloading, and positive locking; (4) simultaneous handling of as many parts as capacity of machine tool table and spindle will allow; (5) provisions for unloading finished parts and loading rough castings while machining is under way, thus reducing idle man, machine and cutter time; (6) insurance of good finish on the work, and conservation of overall cutter life and life between grinds, by driving and supporting means which eliminate destructive chatter.

Only No. 5 of the foregoing characteristics is not more or less self-evident in the illustration. Unloading and reloading while machining continues is possible because the fixture—used on this Milwaukee manufacturing milling machine—is double and of indexing type. While four pieces are being milled in one section, the operator removes four and loads four castings into that section which has just "been through the mill." The only time the machine is not cutting is during the few seconds required to index the fixture.

Each set of cutters consists of two Barber-Colman interlocking mills held between a pair of 6-inch spiral surface mills. Area of each machined surface is approximately 3⅛ by 3⅞ inches and about 3/32-inch is left on the castings for machining. Running at 104 surface feet per minute with feed of 12 inches per minute, each set of cutters handles 2000 pieces between grinds.

Examples dealt with in this article have been selected more or less at random from among several hundred equally commendable ones. These I have observed during visits to dozens of shops both large and small all the way from "downeast" Maine to western Missouri, since the United States became recognized as the Arsenal of Democracy. They typify Yankee ingenuity, "stripped for action" to achieve immediate, record-breaking production of war *materiel*. Only through expedients such as these can we hope to make the most of every available machine tool, every man-hour, and every pound of our priceless assets in metal cutting tools.

## Develops Quick-Drying Black-Out Paint

■ A black-out paint for darkening windows and skylights of industrial and commercial properties where it is impractical to extinguish lights is announced by American-Marietta Co., 43 East Ohio street, Chicago. Marketed in paste form, it can be sprayed or brushed on windows when cut with 50 per cent water. One gallon of the paint is estimated to cover 800 square feet of surface. It is said to dry within 40 minutes, providing a surface that will not flash back or glare when hit by artificial light used within the room.

In interior applications, a single coat may be covered with a white paint where large glass surfaces make the higher reflection properties of a white surface necessary.

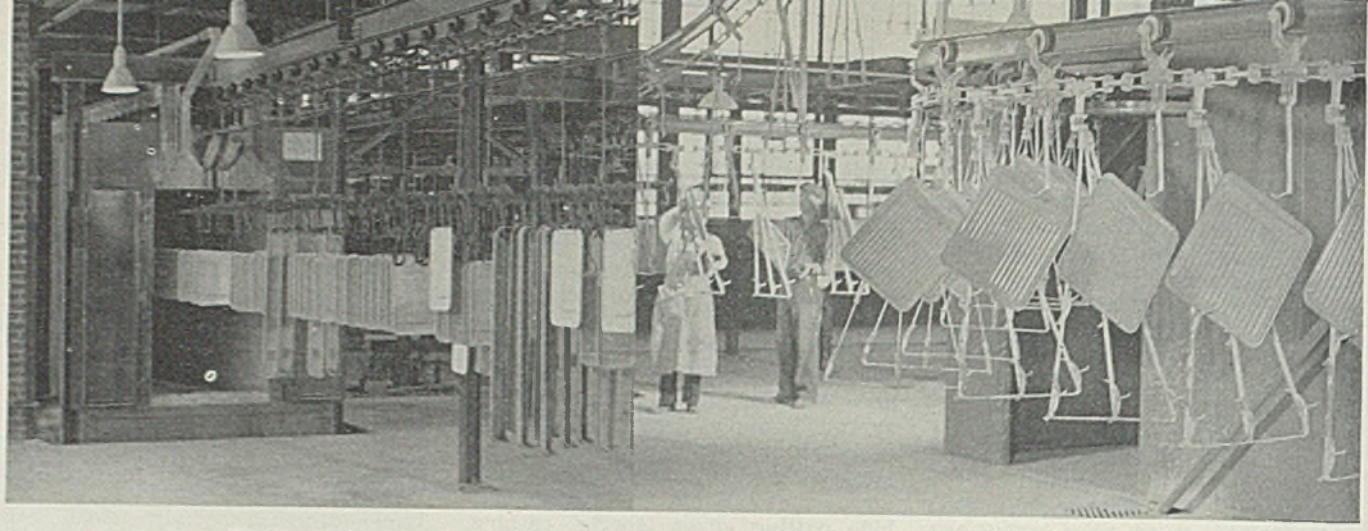


Fig. 1. (Left above)—Entrance end of muffle-type single-flow continuous enameling furnace. Note twin ducts carrying air to "curtain" at entrance and slot in roof for conveyor hooks

Fig. 2. (Right above)—Closeup of conveyor and special pallet-type carrier which holds work at right angles to direction of conveyor travel

# MECHANICAL HANDLING

## Aids Plant Expansion

By H. H. SLAWSON

■ PRODUCTION of ranges at the Florence Stove Co., Kankakee, Ill., has almost been tripled, the former output of 700 now being increased to nearly 1800 stoves a day. Before the plant modernization, much finishing work was done outside the plant. Today all of the finishing is done in the plant itself, even at the increased output mentioned.

The new finishing system for painted and porcelain enameled ware is of unusual proportion and design, being one of the largest finishing systems in use by a stove manufacturer. It embodies numerous features specially devised for this job to speed production, improve quality and reduce costs. Plant's products include kitchen ranges, stoves, space heaters, poultry brooders and camp stoves. Ranges receive two coats of porcelain enamel, applied and fired separately.

In the modernization program, old equipment for the japan and enamel spray was completely junked and new apparatus installed throughout. The new porcelain enameling system will be described here. Increased output was achieved by adding equipment of latest design to existing facilities. The original porclain enameling equipment included a drying oven for handling the dipped base coats, two continuous white spray lines—one with a manually operated spray booth, the other with an automatic spray system—and a furnace to bake the white cover coat. New equipment includes an automatic pickling machine, a base-coat drying oven, four

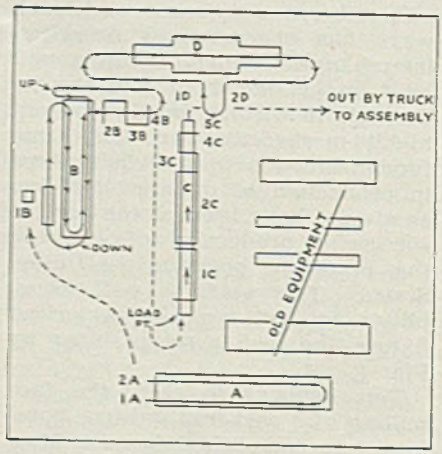



Fig. 3—Rough layout showing flow of material. Ware is trucked to loading point of automatic pickling line 1A. Unloaded at 1B, ware is trucked to base coat dip tank 1B, loaded on base coat dryer B conveyor, through dryer and touch-up booths B, 2B and 3B. Trucked from 4B to 1C, work is loaded on conveyor of white coat line, subsequently unloaded and loaded on enameling furnace conveyor at 1D

Hydro-filter spray booths and a new furnace for the vitrification process. New equipment is housed in a 58,000-square foot addition.

Parts given a porcelain enamel finish include some 22 items of various sizes and shapes. After fabrication has been completed, the parts are trucked to storage space near the pickling line. Cleaning and pickling of the steel parts are handled in a new automatic pickling machine 112 feet long and 18 feet wide, shown in Fig. 5. After work is hung on the conveyor, it passes through the alkali cleaner, rinse, sulphuric acid tank, nickel dip, neutralizer and drier. Handling is entirely mechanical after the items have once been loaded on the conveyor. This unit processes approximately 6700 pounds of stove tops and other pieces per hour, nearly doubling the production of 35,000 to 40,000 square feet per day formerly obtained in pickling.

As can be seen in Fig. 5, the conveyor chain passes down one row of tanks and back up an adjacent row. The conveyor chain moves cast aluminum arms which project in pairs at 5-foot intervals. These arms have a lift of 58 inches, which accommodates the largest stove top assembly. Transfer of ware from tank to tank is accomplished by stationary hump-type cams rigidly attached to the conveyor rack. The carrier arms are supported by ball bearing rollers of hardened steel. As these roll up the hump, across its flat section and down again, they lift and lower the load from tank to tank.

Transfer takes 30 seconds. Rest period in the tanks is 22 seconds, this timing being controlled through an electric time relay. During the 22-second rest period, operators have time to load and unload the carrier arms at the end of the line. Each of the tanks in this double line has its own exhaust hood, fan, pump and baffle plate. The entire layout

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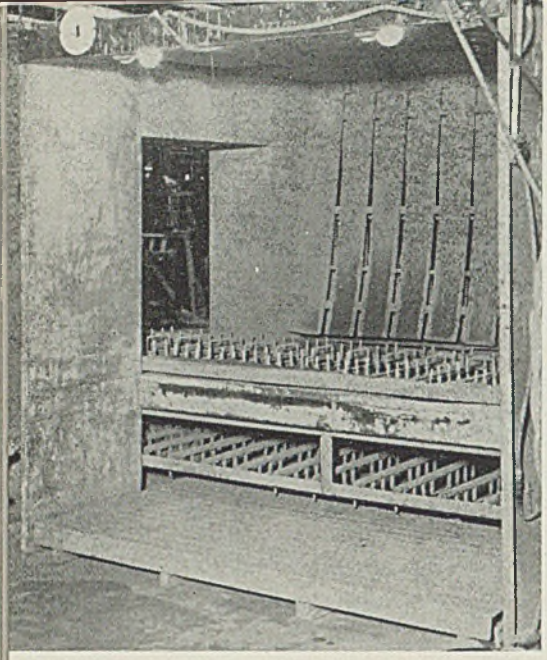

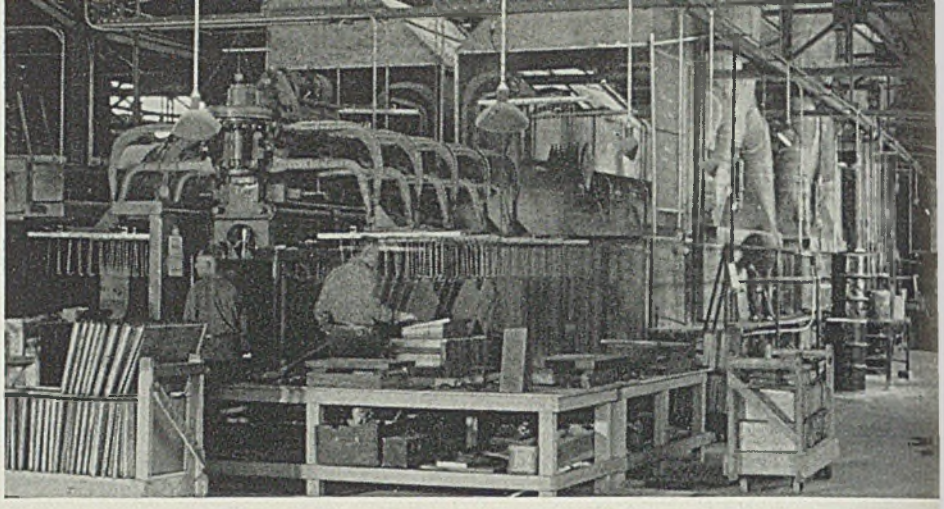

Fig. 4. (View at left)—Mahon Hydro-filter spray booth showing baffle plates to catch overspray and pin-point conveyor for flat ware

Fig. 5. (Directly above)—View of loading and unloading station at end of automatic pickling line

is built in 10-foot units which allows extension of the machine if this becomes necessary.

The 4000-gallon nickel dip tank has a pump and filter for cleaning and recirculating the solution. The liquid is pumped from the tank through a series of filter plates and a diatomaceous silica filter powder at a rate of 2000 gallons per hour, renewing the tank's liquid contents completely every two hours. This is expected to allow use of the original nickel solution indefinitely. Recharging of filter requires only an hour's work once a week.

The full automatic equipment provides precise control of the treatment. Since the conveyor and carrier arms carry each piece individually, all areas of the ware are reached. In the former hand method of stacking the ware in bulky baskets, complete exposure of all areas of the ware was not always obtainable. The automatic handling equipment also eliminates the possibility of marring or scratching the steel, thereby assuring improved quality of ware.

Obviously handling costs are tremendously reduced and the product improved by this mechanized movement through the cleaning and pickling cycle. Also, it eliminates the occupational hazard. Operators no longer need wear rubber boots, aprons, etc., since they need only load and unload the machine at one end of the line where adequate ventilation carries off fumes and vapors.

As shown in the floor plan Fig. 3, work is trucked to the ground-coat dipping position. Ground coat dip tank B1 is located alongside the base-coat drying oven B. After being dipped, work is loaded on a conventional overhead monorail chain conveyor 470 feet long. Trolleys spaced on 24-inch centers ride on a 4-inch I-beam and are pulled by a No. 458 drop-forged rivetless chain. Conveyor has a variable-speed corner-sprocket drive unit arranged to propel the work at rates from 12 to 36 feet per minute.

Flat ware is placed on a triangular-shaped removable pallet-type carrier rack which provides extreme flexibility. Pallets are suspended from the chain to hold the work at approximately a right angle to the conveyor's direction of travel, thus permitting a somewhat closer spacing and increasing the conveyor's capacity. Between the pallet attachments are hooks for carrying bulky pieces such as stove housings.

Fig. 2 shows a view of this pallet-type carrier rack for holding the work at approximately right angle to the direction of travel. This is a portion of the conveyor used with the base-coat drying oven B shown in Fig. 1 at top of page 58.

Ground-coat drying tunnel, B, Fig. 3, is 88 feet long, 10 feet wide and 8 feet high, is heated by gas burners. Work is in the furnace for periods of from five to fourteen minutes. Work coming from this drying tunnel makes a right-angle turn and passes through two Hydro-filter spray booths, each 10 feet long and placed in a staggered position as shown in the layout diagram, Fig. 3, at B2 and B3. The staggered positions permit the operator in one booth to build up a coating on two edges of a stove part while the other operator reinforces the opposite two edges. This method of handling the work materially increases production, a result possible only because of the right-angle position of the specially designed pallet rack on the conveyor. Heat remaining in the parts as they come from the drying tunnel is sufficient to dry the coating added at this point.

Ground-coat conveyor carries work to unloading point at 4B, Fig. 3. Defective work is allowed to remain on the conveyor, which returns over the drying tunnel passing through a water spray booth which automatically rinses off the pieces prior to their return to the dip tank. Rinsing at this point also removes the ground-coat material from pallet racks, hooks and conveyor chain, thus preventing any build up of residue.

To provide the increased supplies required for the expanded porcelain enameling department, two additional 6 x 8-foot pebble mills, each with a capacity of 5000 pounds per charge, were installed with a single 25-horsepower motor driving both mills through a right-angle speed reducer. Usual requirement of mills of this size is a 25-horsepower motor for each mill. Engineers have long known that about twice as much power is required to start

(*Please turn to Page* 69)

## New Handbooks Available

Copies of "Modern Shell Production," revised, containing additional information on heating and heat treatment of ordnance, shell and bomb fuses, small arms ammunition and cartridge cases, are now available.

"Modern Shell Production" contains 160 pages and is fully illustrated. It is priced at $1.50 per copy.

Also available are copies of "Modern Gun Production." This handbook includes articles on principles of gun construction, gun carriages, recoil mechanisms, instruments for fire-control and rangefinders. It is priced at $1 per copy.

Orders should be addressed to Readers Service department, STEEL, Penton building, Cleveland.

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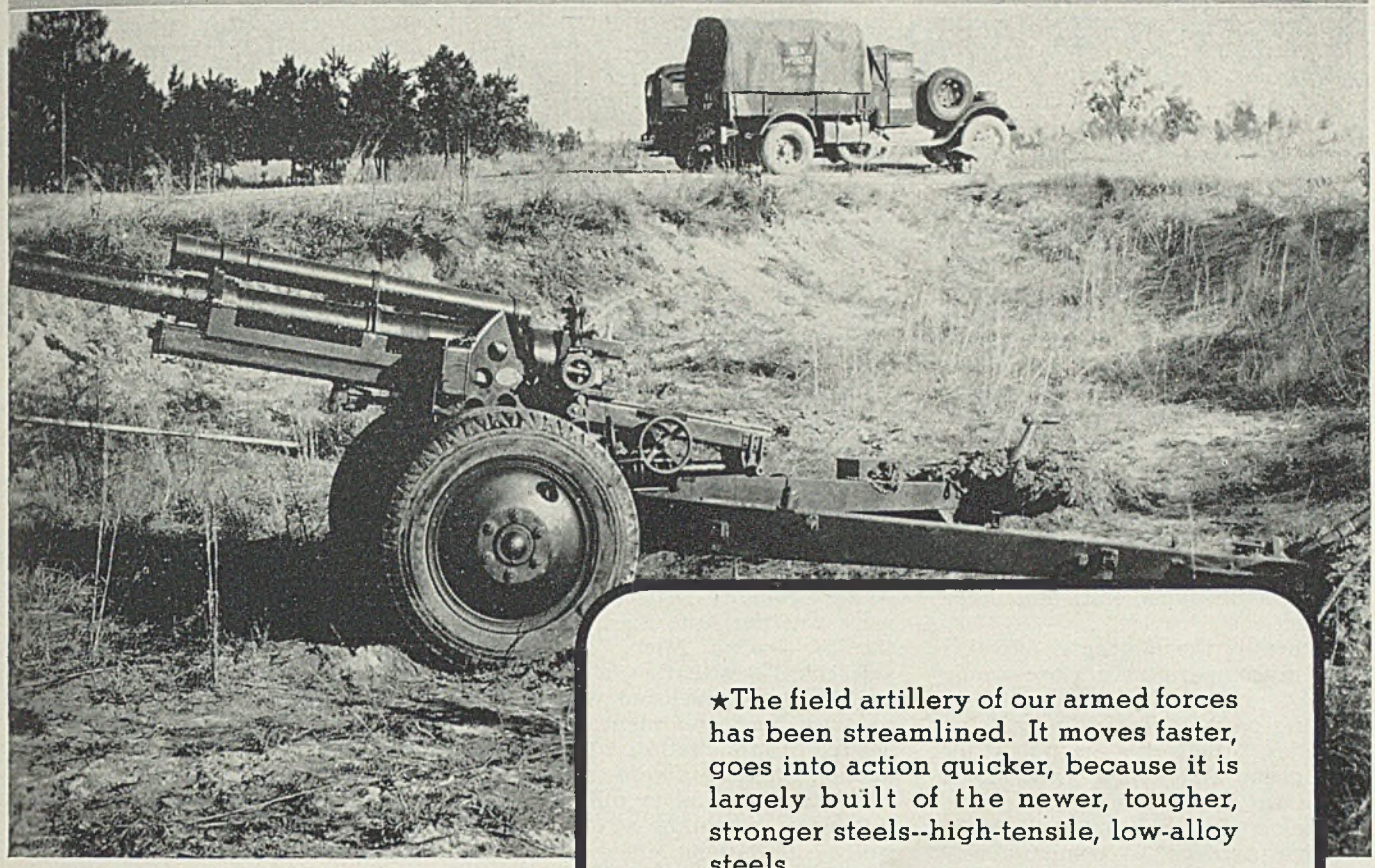

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# CAST STEEL MORTAR SHELL

By EDWIN BREMER
Associate Editor
The FOUNDRY

■ IN MODERN warfare, the mortar satisfies an important requirement that cannot be met easily by other more powerful pieces of ordnance. Its comparatively short range and low muzzle velocity make the mortar seem almost puny beside a cannon of equal caliber. But its high angle of fire, from 40 to 60 degrees, far outweighs those disadvantages, for this feature permits the mortar shell after firing to drop almost straight down, a feat impossible for more powerful weapons with longer and flatter trajectories. Thus it is a valuable weapon for lobbing shell over walls, fortifications, hills and other obstructions.

Naturally, the mortar is effective only in comparatively close range combat, and serves efficiently in cleaning out the enemy in opposing trenches, shell craters, machine gun nests and other excavations where the combatants' bodies hidden below the general terrain level, are not exposed to comparatively straight, direct fire. The mortar, with its almost vertical fire, can drop its death dealing shell in the midst of such excavations, and for that reason is regarded highly by military men.

**Shell Fragmentation Is Important:** A prime requisite of a mor tar shell is that it break into small pieces on explosion after it reaches its objective. That ability to break or fragment as it is termed in military circles, must be such that it will create the greatest possible damage to those within its range. Hence, the pieces or fragments caused by bursting of the shell must not be too large on one hand, or too small on the other, since a large quantity of small missiles, say ⅛-inch in diameter, is much more effective than by a few large ones of 2-inch diameter.

Accuracy in fragmentation, in wall thickness, weight, etc., necessitate careful control in production. To meet the great demand of our war effort and to use all production facilities available, attention logically was directed to the steel foundry as a possible source for mortar shell. One of the first steel foundries to co-operate with the Army Ordnance Department in this work was the Auto Specialties Mfg. Co., St. Joseph, Mich. After considerable investigation, a steel composition was developed which with a short heat treatment, gave the desired fragmentation. Rapid production methods were set up to fulfill demands as to uniform wall thickness, smoothness of surface, weight limitations, etc.

**Makes Shell in Two Sizes:** At the present time the firm not only produces 60-millimeter mortar shell for the Army, but also 3-inch mortar shell for Great Britain. The 60-millimeter shell is made of low-carbon cast steel which receives a 15-hour heat treatment while the British shell is made from a medium carbon steel which receives a 9-hour heat treatment. Since production of both types differs only in slight detail, their manufacture will be described, as a single phase, mentioning the variances as they occur.

Steel for the shell is melted in four electric furnaces. Auto Specialties Mfg. Co. is one of the two steel foundries using a continuous melting process. Raw material is comprised of 30 to 40 per cent return sprue and gates, and 60 to 70 per cent low-carbon plate scrap with small amount of ore. The heats melt down with 0.16 to 0.18 per cent carbon and extremely low silicon.

Carbon usually is picked up from ferromanganese or by additions of pig iron. One furnace has a capacity of 40 tons of hot metal, another 9 tons, and the remaining two 8 tons.

The steel is melted and poured continuously during the two-shift or 16-hour day. All four furnaces are charged with cold metal early in the morning at the end of the second shift. Melting and charging schedule is arranged so the different furnace heats are staggered aout 1 hour apart. Melting begins about 3:30 a.m. and pouring at 7:30 a.m. from the first of the small furnaces.

Approximately 40 to 60 minutes are required to take off the steel from one of the small furnaces, using 350-pound ladles poured directly into the moving molds on a conveyor close to the furnaces. When one of the small furnaces is emptied, steel is taken from the large 40-ton furnace in a ladle and transferred to the small furnace. After the metal is brought up to temperature and composition ad-

Left, pouring a test piece for the laboratory. Right, the larger shell is the 3-inch British unit, weighing approximately 7 pounds. The smaller unit is the 60-millimeter American mortar shell, weighing about 2 pounds

justed, the small heat is poured into the waiting molds.

Before pouring is begun from the small furnaces, nearly all slag covering the bath is removed, leaving a nearly bare metal surface. Approximately half through the heat, the slag again is skimmed off. An optical pyrometer is used to check tapping temperatures—about 3000 degrees Fahr.—and also pouring temperatures—2850 to 2900 degrees Fahr.

As each small furnace is emptied, it is charged with hot metal from the 40-ton furnace, so at about 10:30 a.m. some 25 tons of metal have been removed from the latter. Then about 10 tons of cold material is added to provide enough metal for filling the three small furnaces again, and the power is turned on to insure completion of melting at 2 p.m., when the small units will be ready for hot metal charges.

Around 3 p.m. the 40-ton furnace has delivered practically all its metal to the small furnaces, and then it is charged completely with cold metal. Full power is turned on so that the molten steel will be available at 9 or 10 p.m. At the end of the second shift, all furnaces are empty and are charged with cold metal in preparation for the first operations the following day.

Quality of the steel is carefully controlled. From one to three preliminary carbons are run on the heats. At least one of these determinations is made by the laboratory, the others with a Carbanalyzer. Following the preliminary determinations, the carbon content is adjusted if necessary; ferromanganese and ferrosilicon added. Laboratory test samples are taken after pouring is begun on the second ladle, the fifteenth, the thirtieth, and the last ladle for determination of carbon, silicon and manganese. Results are reported back to the furnace melters by telephone. Once each day on each furnace, determinations are made of sulphur, phosphorus and chromium.

On heats for Army Ordnance shell, two keel blocks are poured from the fifteenth and thirtieth ladles, and a mold from those same ladles is tagged for identification. Shell from those molds are selected for fragmentation tests at Picatinny arsenal. Selection usually is based on high and low chemical analysis, generally on the carbon content. One keel block is used for determination of physical properties, which is witnessed by the government inspector. The other is held until an official okay is received from the War Department. Drillings on each heat also are forwarded to that department.

Shell molds are made on a battery of 10 molding machines arranged in a line along an overhead conveyor which contains 182 stations. Rate of speed of the conveyor is such that approximately one hour intervenes from the time the mold is placed on the carrier until it is shaken out. Sand system contains about 100 tons of molding sand of which 30 tons is in the molds on the conveyor and 70 tons in two storage bins of 35 tons capacity each.

In the sand handling system, excess sand at the molding stations and at the shakeout drops through floor gratings onto pusher-type conveyors where some tempering water is added to decrease dusting. From the pusher conveyors, the sand is belt-fed to an elevator. Then it passes over a magnetic separator and through a rotary screen located over the storage bins. Cores and other extraneous material are by-passed to a chute. An exhaust fan removes the dust.

From the storage bins, the sand drops into two sand mullers of 1500-pound capacity each. Sufficient bentonite clay and moisture are added to bring the moisture within the desired range of 2 to 3 per cent and the bond up to 3½ per cent. Permeability of the heap or green sand ranges from 212 to 226, and sand determinations are made frequently to maintain the proper control. Sand is mixed in the mullers from 2 to 4 minutes and then is discharged onto a belt conveyor. From there it goes to an elevator where it falls onto a belt conveyor which feeds a pusher-type conveyor located over the molding station sand bins.

Drag molds for the shell which are molded and cast in the vertical position are made on five jolt, roll-over, pattern draw-molding machines. Cope molds are produced on five jolt, squeeze-molding machines. Cast steel flasks are used. The American 60-millimeter mortar shell are mounted in two rows of 6 or 12 on a plate. Pouring sprue is located in the center with a

This is the actual operation of filling the shell molds with hot metal. A continuous melting and pouring schedule is maintained

main runner extending between the two rows of shell patterns. Branch gates at right angles to the main runner extend into casting cavities. Since the British mortar shell is somewhat larger (3-inch) only 8 are mounted on a plate in two groups of four each. As in the case of American shell, the pouring sprue is in the center with a main runner extending to the X-form gates which feed into each group of four cavities.

**Use Mold Facing:** Approximately half the shell casting is located in the drag and half in the cope. To insure a high-quality surface on the exterior, molds are faced with specially prepared sands available in boxes at each molding station. Facing for British shell is comprised of all new silica sand with an A. F. A. grain fineness of 48 to 52 to which 70 pounds of bentonite is added per 3000 pounds of sand.

Facing sand for American shell is composed of half heap molding sand and half new silica sand. Since the mixture already contains some bond, only 20 pounds of bentonite is added to a 3000-pound batch. Moisture content of the facings ranges from 1.8 to 2.0 per cent; green compression is about 5 pounds per square inch, and permeability ranges from 212 to 226. Each batch of sand is tested to insure that it is in proper condition.

**Production:** Two men operate each drag machine and two operate the cope machines. In addition to those, one man sets the cores in position while two men gage the cores with a jig or templet which locates them in the mold for concentricity and height. The core gage, constructed of aluminum, fits down on the flask pins and contains recesses into which the projecting ends of the cores slide as the gage is forced down into position. Approximately 45,000 to 50,000 American shell are produced on two shifts. The larger and heavier British shell are produced at a rate of 22,000 to 25,000 for the same period of time.

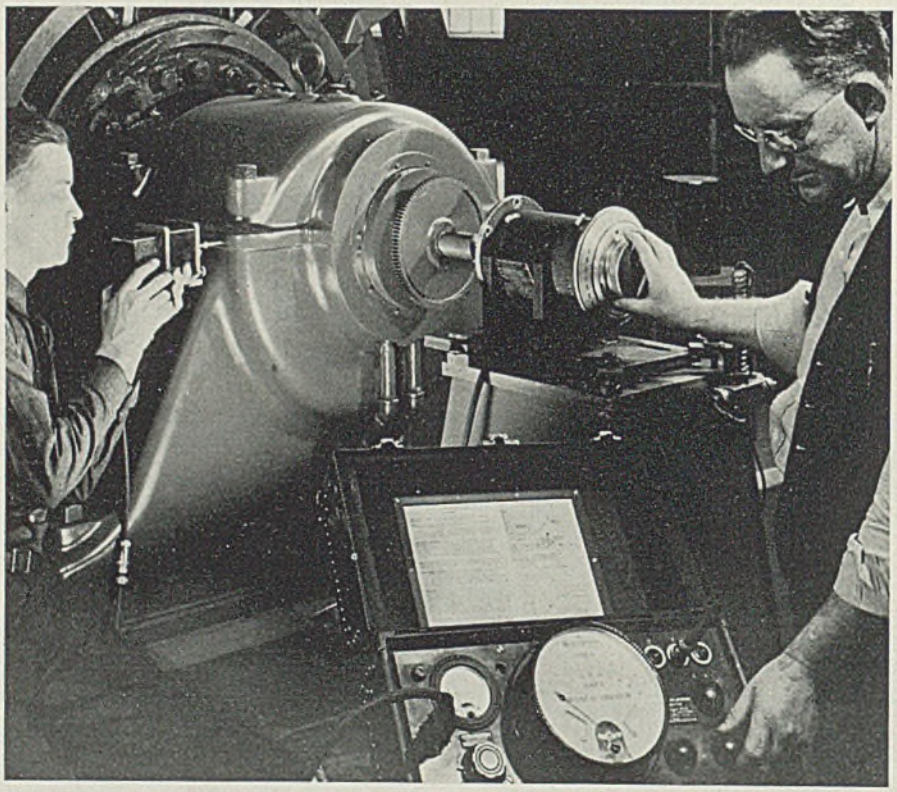
Molds on the conveyors are poured from 350-pound ladles as they move slowly along. After a cooking period, molds reach the shakeout where they are dumped on a vibrating screen which effectively separates the castings from molding sand and cores. Castings then are dumped on the floor where they are knocked off the gates and runners with a sledge hammer. The heads or risers on the castings are clipped off on a shear. Next the castings are cleaned by tumbling in barrels. The gate fin or projection is ground off, the lot numbers stamped on each shell, and the shell castings annealed or heat treated.

**Heat Treating** is accomplished in two continuous-type electrically heated ovens equipped with controlled atmospheres. Capacities of furnaces depends on the heat-treating cycle. With the 9-hour cycle used for British shell, output is about 35 tons per day. With the 15-hour cycle used for American shell, the output is 28 tons per day.

After heat treatment the shell are cleaned inside and out by abrasive blasting, using steel grit. Then the ends of the shell are clipped square. American shell now go to a coil press where the end is press-coined for further machining operations. British shell are straightened in a press. After final inspection, shell are sent to the machine shop for further finishing operations.

Cores for British shell are blown on two core-blowing machines and placed in a horizontal position on the core dryers. Those for American shell are made by hand and turned out on end on core plates for drying. A battery of eight ovens side by side, equipped with recirculating heating systems, is used for drying. After drying, cores are coated by hand with a silica wash, except for the ends. Then they are placed in a vertical position on a conveyor which carries them to a spraying stand where a further coating of silica wash is applied.

## Analyzing Machine Vibrations



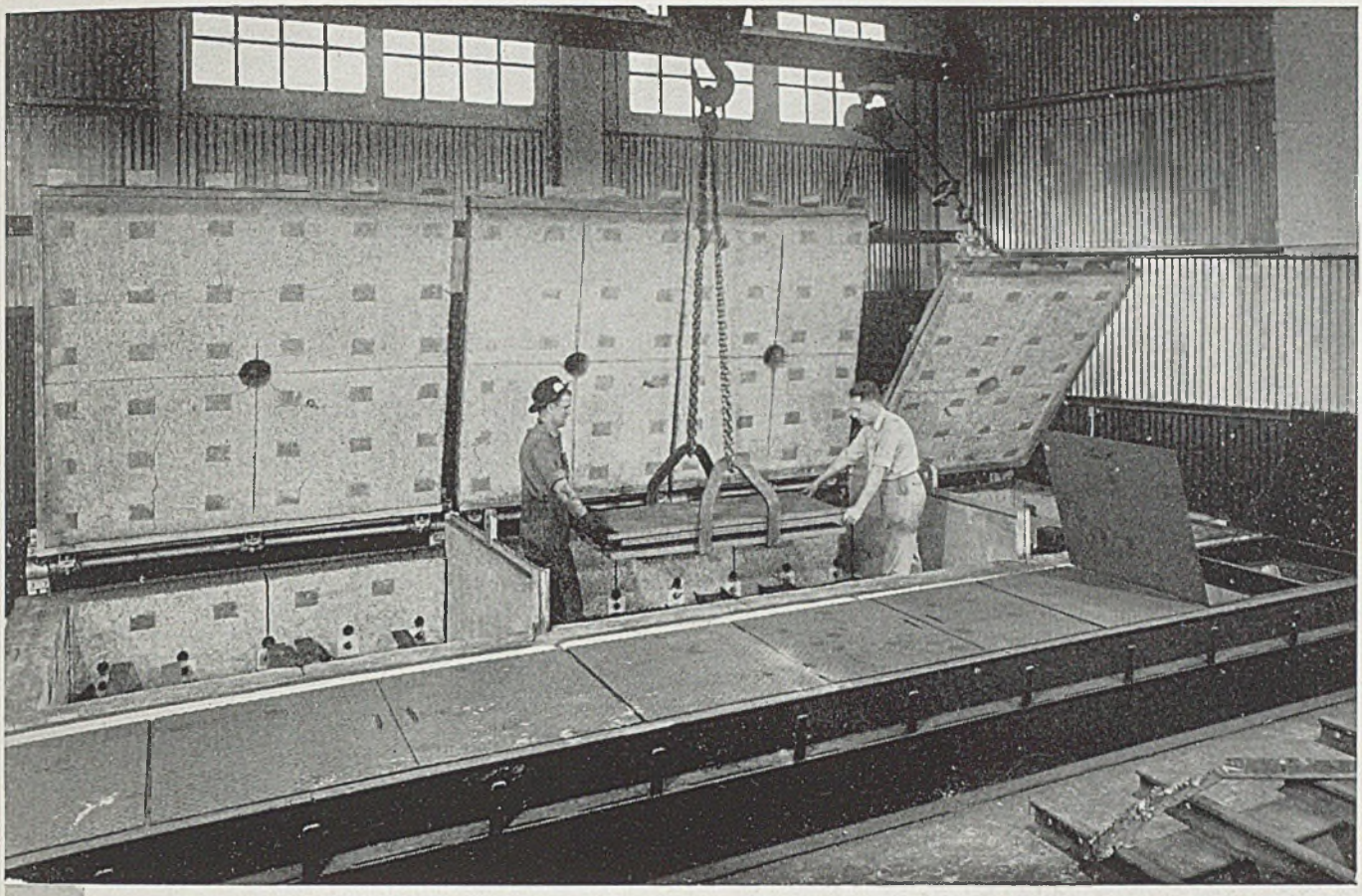
■ Latest version of the portable dynetric balancer is one making use of a new sensitive metering element that eliminates the amplifier formerly needed. This not only simplifies the apparatus but reduces its weight by more than half.

View shows one of the improved balancers at Westinghouse's East Pittsburgh Works, where it is used in analyzing vibrations of motors, generators and other machines running at speeds between 100 and 7500 revolutions per minute.

Operating on the wattmeter principle, the analyzer matches and compares the voltage outputs of the sine-wave generator, on the right, which is driven by the machine being tested, with the vibration-induced voltage generated in the improved magnetic pick-up, held by the man at the left. Amount and location of unbalance in machine is obtained from indications of vibration meter and generator protector.

## Offers New Black-Out Paint for War Plants

■ A dead flat black paint that totally blocks the passage of light through war plant windows is reported by Thompson & Co., P.O. Box 6757, Pittsburgh. Delivered ready to use, it is said to have good weather-resisting qualities. The paint, called SP 3000 Eclipse blackout paint, is applied quickly and easily by either brush or spray, and dries over night.



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A normalizing furnace for flame cut steel shapes is illustrated above. The shapes are cut from steel plates up to 16" thick by oxyacetylene torch to 1/8" tolerances. The flame-hardened edges are normalized by heat treatment in this gas-fired furnace. The furnace is so designed that it may be operated as one unit, 6' x 22' long; or, by the use of the dividers, it may be operated as three individual furnaces, 5', 12', and 7' long, or in combination of those lengths.

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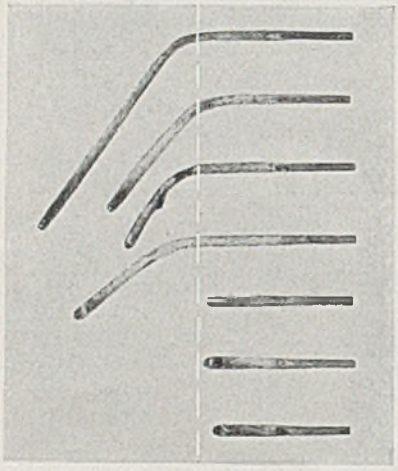
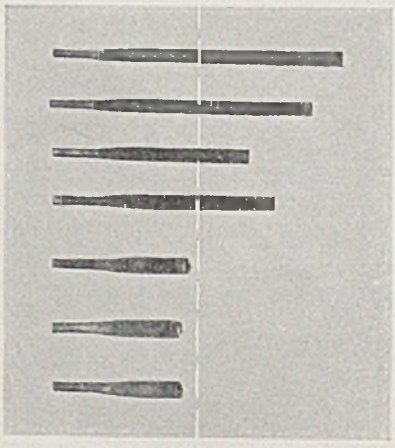


*(Fig. 1) **Three** electrodes used straight can do as much as **four** which are bent before being used.*



*(Fig. 2.) **Three** electrodes burned down to the holder can give as much production as **four** when "long" stub-ends are left.*

MANY welding shops have been, unknowingly, wasting as much as 25 per cent of their electrodes. To conserve this raw material and get high-speed production, many operators today are improving their technique.

For example, the habit of bending electrodes wastes about ¼ of their useful length. (Fig. 1) Or, the habit of just throwing away "long" stub-ends likewise results in a waste of approximately ¼ of the electrode. (Fig. 2) To avoid this needless waste of 25 per cent of the electrode, smart welding operators are making it a practice to use electrodes *straight,* without bending, except where bending is actually necessary to get at a joint. They are also burning each electrode *clear down to the holder* before discarding the stub-end.

To better accomplish this saving and increase efficiency, operators must have electrodes with which the arc can be struck and restruck easily and which burn all the way down, without over-heating. *They find that G-E rods meet all their requirements. General Electric, Schenectady, N. Y.*

## Production-proved and certified correct!

To help you schedule your production requirements more accurately, to help you avoid shortages and overages, and to help you make more accurate estimates than ever before—G-E electrode cartons are now *production-labeled.* Every 50-lb carton of G-E rods in the popular types and sizes bears a label stating estimated weld footage obtainable on typical joints, as well as the estimated weight of deposited metal obtainable.

They're using G-E rods for profit and production in every industry that uses welding, *because G-E rods are shop-tested and certified correct.*


*The G-E WELDERULE, a pocket-size estimator, helps production too! This handy aid is a ready reference for users of G-E production-labeled electrodes. Contains all the pounds and footage data on 11 different commonly used sizes and types of joints as well as 22 sizes and types of popular G-E electrodes in both the 14- and 18-in lengths. Ask for your copy.*

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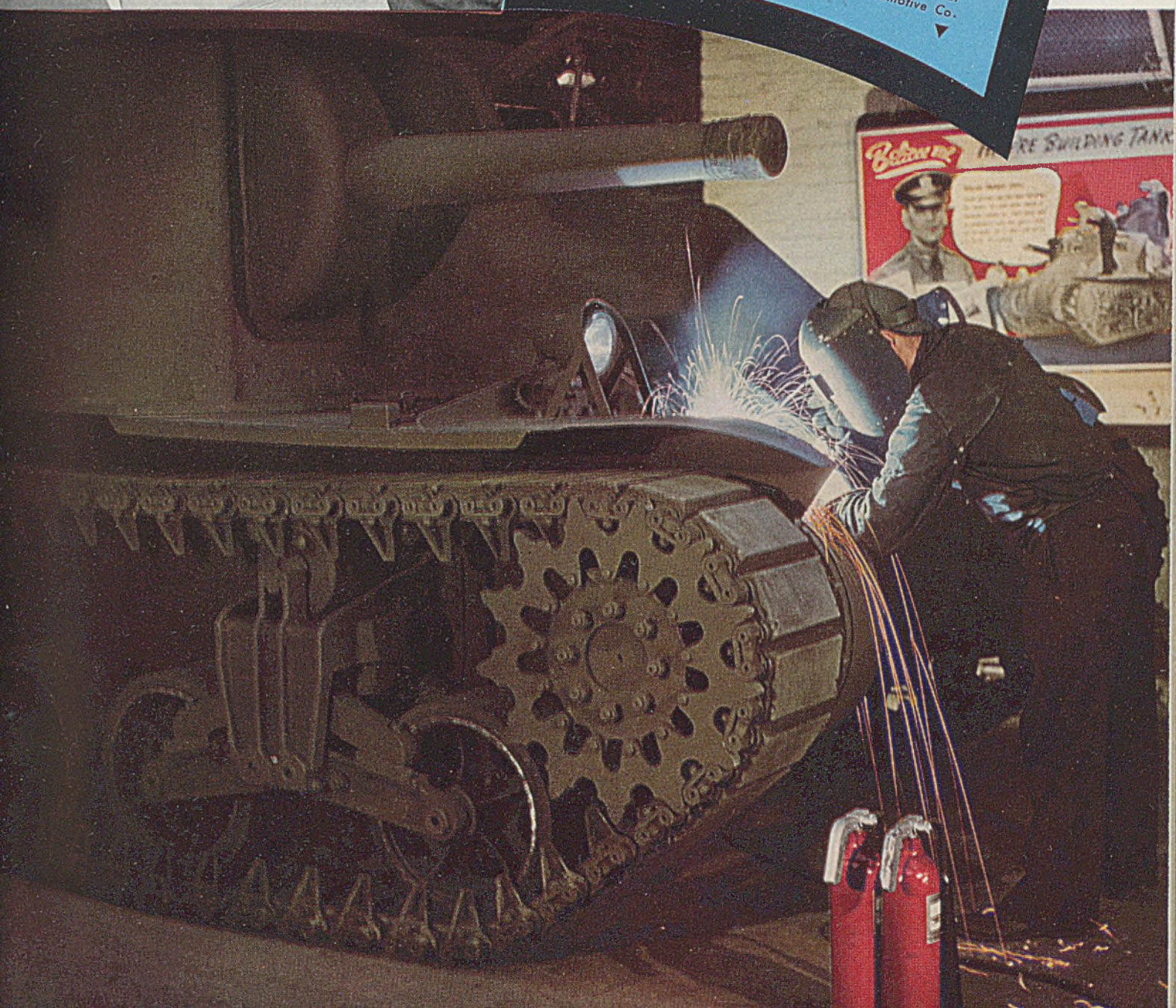
General Electric a-c welders, together with G-E electrodes, speed production on 28-ton combat tanks in the shops of the American Locomotive Co.



# . . . So we took the "Slide" out of Slide-Wire Contacts!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So Foxboro engineers based the design of Foxboro Non-Recording Potentiometer Controllers on this extra-precision principle. Excepting when the dial is turned to establish the control temperature, the contact never moves. Only when a *fixed setting* of the measuring circuit is used will the galvanometer deflection have a directional relation to the control temperature setting. The result is positive, knife-edge detection with extreme control sensitivity.

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*Creative Instrumentation*

RECORDING · CONTROLLING · INDICATING

## Mechanical Handling

(*Concluded from Page* 60)

a pebble mill as is necessary to operate it. Thus after the mill has turned over a few revolutions, power requirements are reduced almost one-half. This is particularly true where roller bearings are used.

With this in mind, the dual unit was designed by the Stevenson Co., Wellsville, O. Its operation begins with starting the motor and transmission. After running a few seconds, the first clutch is engaged and the unit then draws about 11.27 horsepower after a few revolutions. Then the second clutch is engaged. Although the horsepower momentarily jumps to around 40, it drops back immediately to a total of 17 to 19 horsepower for the two mills.

Use of a single motor and reducer instead of two is expected to reduce the power bill for these two pebble mills by about $1000 annually. Porcelain grinding balls instead of flint pebbles also are employed because the result is thought to be a more thorough and uniform pulverizing of the frits. Grinding continues until not less than 92 per cent of a 100-gram test lot will wash through a 200-mesh screen.

From 4B, Fig. 3, at the end of the base-coat drying oven conveyor line, the work is trucked to the load point at the extreme end of the white-coat conveyor line just ahead of 1C. Here the work is loaded on the conveyor and passes immediately into the large Hydro-filter spray booth. This 14-foot booth is similar to that shown in Fig. 4 and is equipped with baffles at the back of the booth, over which a water curtain flows. About 90 per cent of the overspray is carried into the pan beneath the conveyor, and the balance is almost completely intercepted by the baffles before it can wash off into the water chamber. Under other arrangements a frit loss of at least 10 per cent was considered normal. But with this arrangement, practically all of the overspray is salvaged. Subsequently it is reconditioned for use by drying, running through a magnetic separator and regrinding.

A notable feature of this white-coat production line C, Fig. 3, is the pin-point table conveyor for handling flat ware through the spray booth and drying tunnel. This conveyor is 97 feet long and consists of a double-strand of roller chain carrying cross bars each 3½ feet long and spaced on 8-inch centers. Each of these cross bars has a series of upright pins spaced on 4-inch centers to provide a delicate yet firm support to the flat stove parts while the conveyor carries them through the spray booth and drier.

Tips of the pins are 36 inches from the floor, the most convenient height for the operators. A portion of the pin-point conveyor can be seen in Fig. 4 which shows one of the smaller booths at the far end of the white cover-coat line. Here at 3C and 4C, Fig. 3, are two 7-foot long booths for spraying reinforcing on the edges of the work. These also employ the Hydro-filter arrangement for recovering overspray.

Pieces requiring reinforcement on their edges are supported on a row of pins 10 inches high located along the outer rim of the conveyor. These pins tilt the work at an angle which makes it readily accessible when it reaches the touch-up booths after passing through the drier. Heat for the drying oven is supplied through 20 gas burners located beneath the conveyor.

### Sharp Edges Knocked Off

Emerging from the white-coat spray line, the work is passed to girls who brush the edges, thus bringing out the black base coat that serves as a trim for certain pieces as well as eliminating future danger of sharp edges that may result after the vitrifying process. Nearby is the loading point for the conveyor of the continuous enameling furnace 1D, Fig. 3. After being hung on this conveyor, the work enters the continuous enameling furnace, a muffle-type single-flow unit designed and installed by Albert G. Boland Co., St. Louis. Of the total length of 92 feet, the first 30 feet comprises the preheating chamber, the next 37 feet the principal hot zone, and the remaining 25 feet is a cooling chamber. Tunnel is 36 inches wide. Height from hearth floor to underside of the roof tile is 60 inches. An air seal is provided at each open end to reduce heat loss. The natural gas fuel supply is supplemented with propane, which is used as a reserve.

Equipment includes two gas premixers and seven burners. Three burners on one premixer consume up to 2000 cubic feet of gas per hour to heat the preheat chamber, while four burners on the second premixer use up to 1000 cubic feet per hour in the main working chamber. Each burner is separately controlled by a single two-point recording controller. Waste gases of combustion are utilized in the preheating chamber. A 2-horsepower motor drives a blower which supplies the air for the burners. Two other blowers create air pressure for the "curtain" which seals the furnace openings. In case of electric failure, an automatic shutoff valve cuts off the gas supply before the blower ceases to operate.

Temperature in preheating zone is around 600 degrees Fahr., about 1580 degrees in the hot zone and about 600 again in the cooling chamber. For the second white coat, hot zone temperature is lowered to about 1480 degrees. Speed of conveyor is such that work remains in the hot zone about 3¾ minutes.

Enameling furnace has a flat arch roof with a slot to allow passage of the long hooks suspended from the overhead conveyor to hold the work. Castings forming the face of this slot are protected from direct heat by refractory material in such a way that no roof insulation can fall through the slot into the furnace. Fig. 1, p. 58, shows a view of the entry end of this enameling furnace.

Castings forming the base of this slot also support the slot sealing device which slides over them as the conveyor chain progresses through the furnace. In this manner, no metal in the roof or its support is exposed to direct heat from the furnace. This eliminates the possibility of scale or dirt dropping on the ware while it is being burned and thus eliminates this hazard to quality. It also reduces loss of heat through the furnace roof.

Furnace delivers up to 7000 square feet of single-coat steel work per hour. As work comes from the furnace, it is removed from the conveyor at 2D and is carried out from the enameling department by truck to the assembly department.

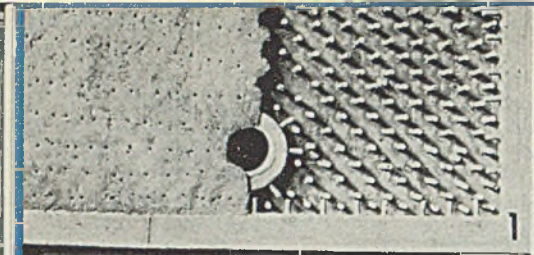
## Chicago To Be Scene of Oil Heater Conference

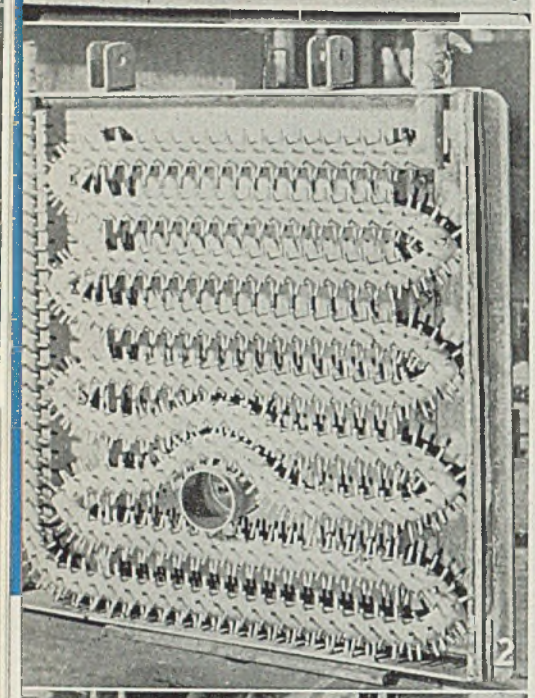
■ The Palmer House at Chicago will be the scene of a general conference, Jan. 15, on oil-burning space heaters according to an announcement issued by the National Bureau of Standards, United States Department of Commerce, Washington. This action was taken following a request from manufacturers of these units for co-operation of the bureau in the establishment of a commercial standard.

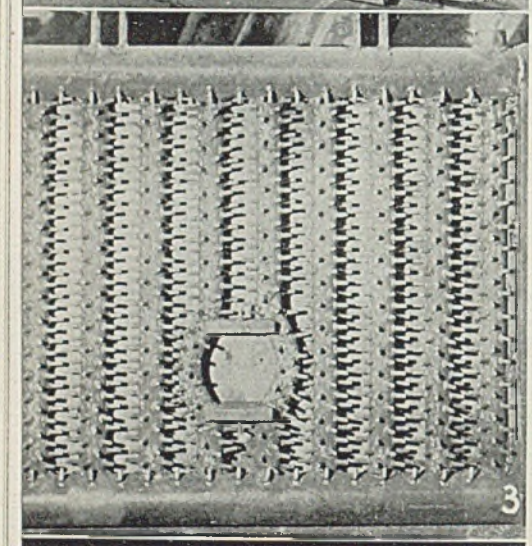
The meeting at Chicago was scheduled to enable all those interested to take part in the adjustment of the proposed standard. Manufacturers are asked to notify I. J. Fairchild, chief, division of trade standards, National Bureau of Standards, of individuals who will be present at the conference in order that facilities may be provided.

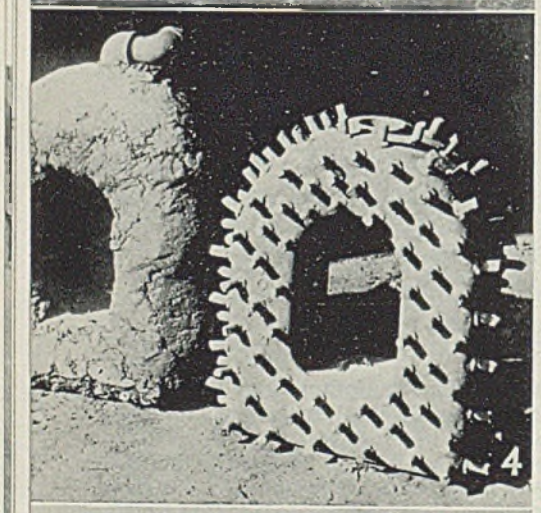
## Shell Holding Units

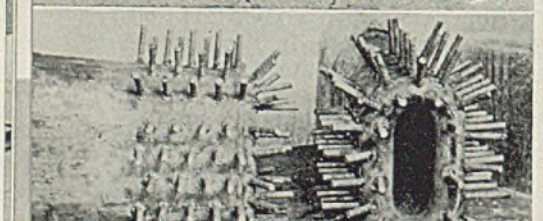
■ Equipment for holding shell from 20 up to 155 millimeters including arbors with and without adjustable stop, collets for trench mortar shell, etc., is announced by Airgrip Chuck Division, Anker-Holth Mfg. Co., Port Huron, Mich. Units in the line are being offered to manufacturers working on government orders.











# Protecting

# WATER-COOLED EQUIPMENT

# On

# OPEN-HEARTH FURNACES

By J. B. LUCKIE
Assistant Sales Manager
E. J. Lavino & Co.
Pittsburgh

***Insulation of cooling media, such as charging doors, bridgewalls, ports, door frames and bulkheads is proving economical at open-hearth shops. Refractory of basic quality is held in place by studs welded to the metal. Insulated doors show life of 150 to 250 heats.***

WATER COOLING seems to be a necessary evil in certain parts of the open-hearth furnace. The cooling units should be insulated to get a minimum heat loss, and covered to protect the metal surfaces from oxidation which may cause leaks, and the eventual replacement of the cooling media.

Exposed parts of open-hearth doors, which occupy such a large area of the frontwall, always have been covered with a low-price clay brick or brick bats. Because the doors could be replaced easily, not much thought was given to their life or to cost of refractories. Approximately two years ago the idea was advanced that since basic brick were proving economical in frontwall piers, basic material might also prove economical in door linings, and so plastic chrome ore began to be used to cover various water-cooled media in the open hearth.

Fig. 1 shows a standard, solid water-cooled door, half with studs exposed and the other half with the plastic chrome ore rammed into place. During the course of developing new uses for plastic chrome ore, in places other than the open hearth, it was found necessary when applying it to a vertical metal surface, to employ studs welded to the metal. These studs remain rigid because one end is cooled. By this arrangement the refractory not only is held in place but it is chilled so that there is not excessive erosion from temperature and dust in the gases. The importance of the weld in order to secure maximum cooling effect is apparent. The weld should be solid, and not merely of such a character as to hold the stud in place. It has been found that as the stud oxidizes and wears back, the plastic chrome ore wears back at about the same rate. The ore should be rammed solidly with hard blows to eliminate all voids, and dried out. The door then is ready for service.

Details of the door and stud application are shown in Fig. 8. The ¾-inch studs are staggered on 3-inch centers, and are 4½ inches long, which is the thickness of the plastic chrome ore, and the original thickness of the clay brick. This diameter and spacing of the studs and the thickness of the refractory are not necessarily the last word. Originally, ½-inch studs were tried but there was not enough cooling effect at the hot end and they seemed to wear back rather rapidly, allowing the chrome ore to do the same. The ¾-inch studs seem to be more satisfactory. Tests now are being made with 1-inch studs placed on 4-inch centers in order to determine if

From a paper presented before the Ohio Section, Open-Hearth Committee, American Institute of Mining and Metallurgical Engineers, Columbus, O., Oct. 17-18.

Fig. 1—Water-cooled open-hearth charging door showing welded studs at right and plastic chrome ore rammed in place at left

Fig. 2—Open-hearth charging door equipped with studded horizontal pipe

Fig. 3—Open-hearth charging door built with studded vertical pipe

Fig. 4—Open-hearth port burner cooler for use with liquid fuel with and without refractory

Fig. 5—Port burner cooler showing welded stud design. Studs are heavier than those shown in Fig. 4

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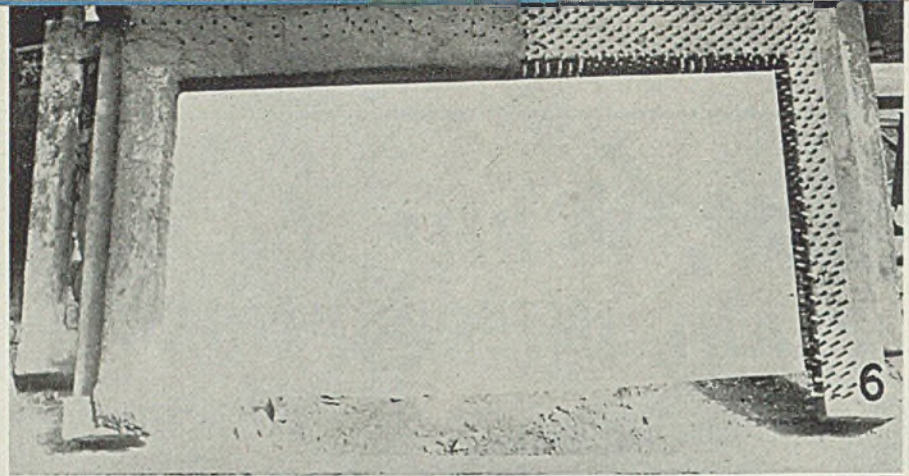

Fig. 6—Water-cooled door frame of the archless type with and without refractory coating

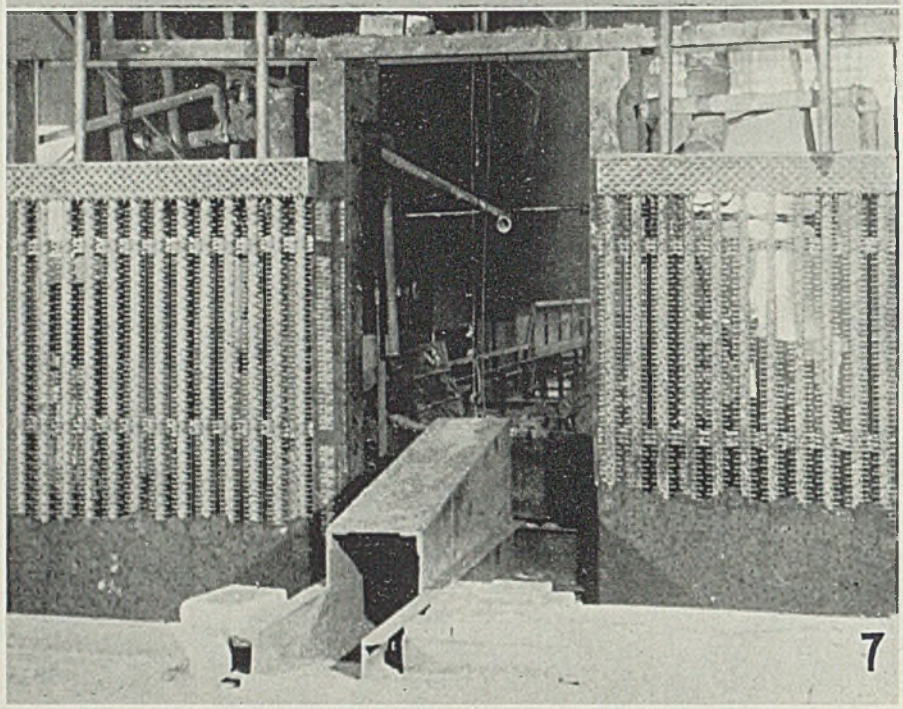

Fig. 7—Two bulkheads built with 2-inch studded pipe which have withstood in excess of 391 heats

Comparative costs and life of clay brick and plastic chrome ore vary considerably, but in most doors clay brick will last 10 to 30 heats and a door lining will cost $5 to $10, depending upon the size of the door, and material used. A plastic chrome ore lining, including studding, will cost $40 to $70 per door, but its life will be 150 to 250 heats, or a ratio of about 1 to 10. In a few plants, considering only refractory costs, the chrome ore about pays for itself, but there are certain important intangibles, which must be taken into consideration, such as the availability of cranes and millwrights which are needed for door changes.

A door with the studs welded to the horizontal pipe is shown in Fig. 2. The door is 4 feet 5 inches square. The studs are ⅜-inch thick and 1¼ inches long. The pipe has a diameter of 2½ inches. Several of these doors have been tried and some exceptionally long service obtained. The first cost, however, is high.

Another door with the pipe running vertically and headers on each end is shown in Fig. 3. This door is 4 feet 5 inches wide and 3 feet 6½ inches high. The studs are ⅜-

(*Please turn to Page* 89)

more cooling effect prolongs the life of the refractory. However, studs too large and too close together will defeat the purpose of the insulation. Some doors have been originally designed for thicker clay brick, and in this case the studs are longer, the plastic chrome ore thicker, and life of the refractory correspondingly longer.

Recently a few plants have been trying the bolt and nut idea in place of studs, welding the nut to the plate and screwing bolt or threaded rod into place with some added graphite paste. When the lining needs replacing, the bolt is unscrewed and replaced with a new one. It seems to be working out satisfactorily, provided the bolts are not eroded too short. This arrangement saves much welding.

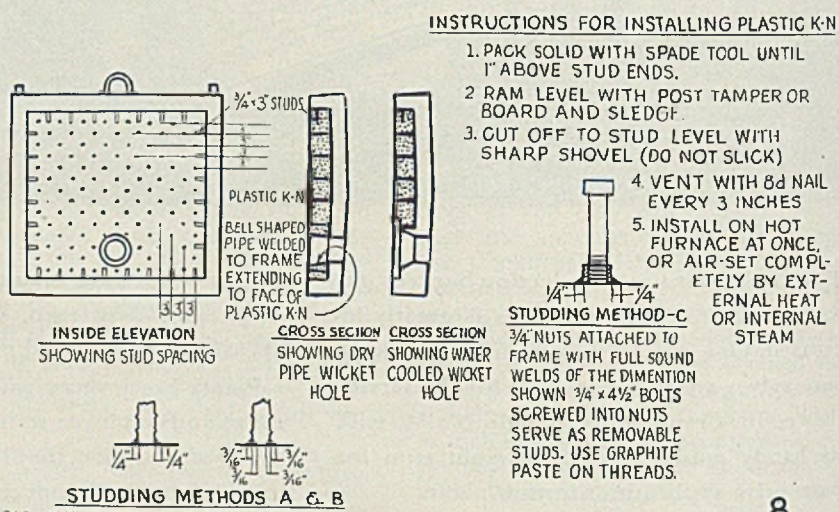


Fig. 8—Details of studded water-cooled open-hearth charging door

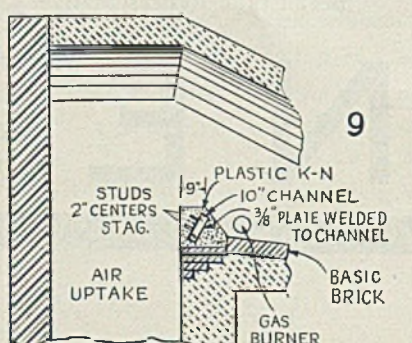


Fig. 9—Bridgewall equipped with studded cooler for natural gas fired open-hearth furnace

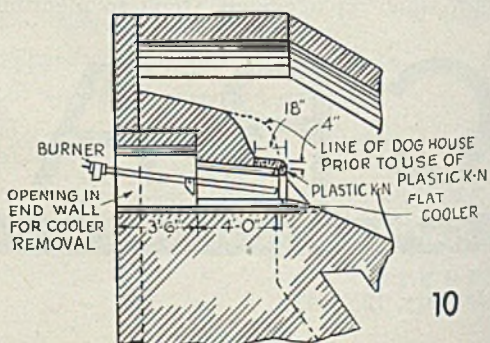


Fig. 10—Details of open-hearth port assembly showing studded cooler in place

# *Announcing . . .*

## *Further Reductions in the Price of*

# CARBOLOY STANDARD TOOLS AND BLANKS

*Effective January 1, 1942*

With completion of its second plant expansion in 6 months, Carboloy Company announces its second price reduction affecting standard tools and tips since these were developed and put into mass production just slightly over a year ago.

The latest and most important expansion of the Carboloy plant has been designed to provide greater production capacity for carbide metals and tool tips. Since plant operations have been on a 24-hour, 3-shift basis for some time already, Carboloy—to take full advantage of the increased metal capacity in terms of actual tool production—is striving to convert an even greater percentage of its cutting tool and tip business from "specials" to standard tools and tips. These reductions, therefore, anticipate an expected increase in total Carboloy tool output.

The reductions affect standard tools above 3/8 inch and standard tips over 3 grams. Price reductions on blanks also affect special tools on which such blanks are used, of course. Reductions in minimum prices of typical standard tools, based on a style 1 turning tool follows:

| TOOL SIZE | PREVIOUS MINIMUM | NEW MINIMUM* |
|---|---|---|
| 1/2 sq. | $1.60 | $1.50 |
| 3/4 sq. | 4.20 | 3.50 |
| 1-1/4 sq. | 9.60 | 7.90 |

**Minimum price now reached at only 5 tools on all standard tools.*

Reductions in minimum prices of typical standard blanks are as follows:

| TIP SIZE | PREVIOUS MINIMUM | NEW MINIMUM* |
|---|---|---|
| 3/32x3/8x9/16 | $0.48 | $0.43 |
| 3/16x1/2x3/4 | 1.70 | 1.31 |
| 3/8 x5/8x1 | 5.80 | 3.89 |

**Minimum price now reached at only 10 blanks on all standard blanks.*

Although Carboloy Company, fortunately, has been able to maintain deliveries on a most favorable basis, compared to the average for the cutting tool industry, it is hoped that the freeing of further "special" tool manufacturing facilities for the production of higher-output-rate "standards", will enable it to increase output to a point where 100% of standard tool shipments can be made from stock.

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■ WITH increased emphasis on production for war, turning from many accepted materials to alternates becomes a "must". Particularly is this true of metals. And of all the metals, zinc is one of the most useful and therefore necessary in the war effort for no metal is more widely employed as a protective coating for steel exposed to the weather.

Filling civilian needs by the substitution of paint for galvanizing therefore is a direct contribution toward making more zinc available for ordnance work. The selection of a proper alternative is discussed here by E. F. Hickson, chemist, National Bureau of Standards, in material prepared especially at the request of the Protective and Technical Coatings Section of OPM.

The Editors

# PAINT COATINGS Substituted for METALLIC ZINC COATINGS

**. . . . . to conserve zinc for urgent war requirements**

By E. F. HICKSON
Chemist
National Bureau of Standards
Washington

■ THE FACT that zinc is vital to the success of the nation's war effort focuses increasing attention on suitable substitutes for the zinc coating formerly employed to protect various iron and steel surfaces. This article will be confined to the use of organic protective coatings as possible substitutes for metallic zinc coatings.

As is the case with many other critical materials, no paint has all the desirable properties of the ordinary hot-dip galvanized or zinc-coated surfaces on steel, including their high resistance to abrasion, corrosion, weathering; relative freedom from cracking, chipping, peeling and scaling of the types encountered with paint coatings, etc. On the other hand, in a highly polluted industrial atmosphere, certain acid-resisting and water-resisting paints are advantageous. Since the environment and other external factors thus have such a pronounced effect on the durability of both paint and metallic zinc coatings, only general statements can be made here. Frequently painting systems have to be devised to cover each individual case. Consider, therefore, that it is hard for any general recommendation to cover every specific situation.

*Factory-Primed Exterior Sheet Steel Formerly Zinc-Coated (Roofing, Flashings, Etc.)* Since much of this work is done at the shop where the metal is rolled and fabricated, the priming paints should be industrial finishes purchased by the steel manufacturer directly from the industrial finish manufacturer. Special industrial primers for preventing corrosion of black iron readily available generally consist of rust-inhibitive pigments such as red lead, white lead, blue lead, metallic lead, zinc oxide, with or without various percentages of chromate pigments, often combined with iron oxide pigments. They are usually ground in quick-drying varnish liquids. The articles are either sprayed or dipped with these primers.

While they may air-dry rapidly, they are usually baked in suitable ovens. Baking for a relatively short period produces a hard, dry surface which may be handled, thus expediting production. On the other hand, where the objects are to be coated in the field by the user, the slower-drying types of primers, such as red lead in oil and similar rust-inhibitive primers, may be used.

The industrial finish manufacturer has also worked out special priming liquids and finishes for the interiors and exteriors of drums which are to hold certain industrial liquids such as oils, etc. These primers are usually baked on by the drum manufacturer, thus making them much more resistant to various liquids. For those having problems of this character, it is suggested that they immediately get in touch with a reliable manufacturer of industrial finishes.

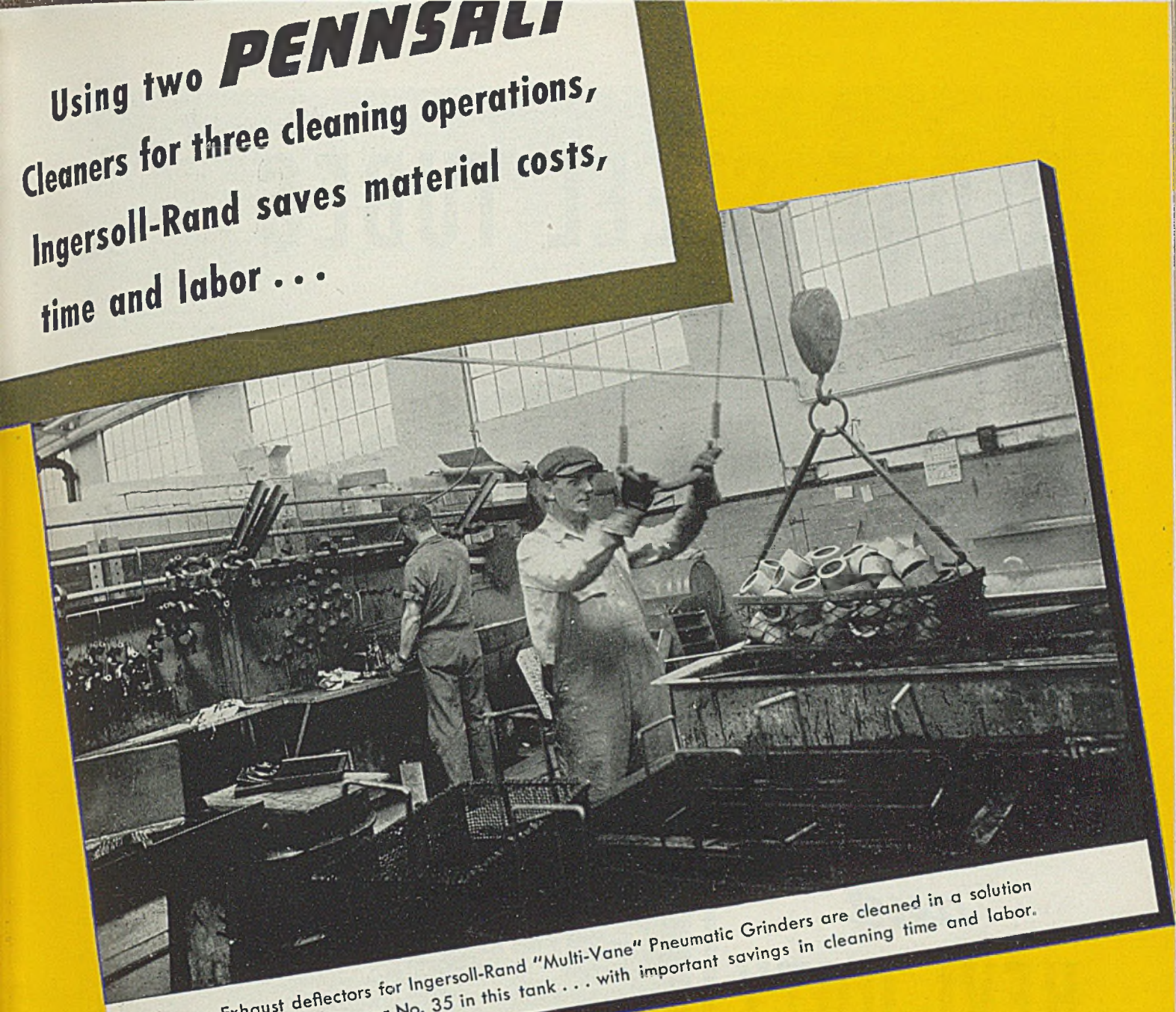
If the sheet steel is painted at the factory, it may be given a chemical treatment followed by a baked-on high-grade priming paint. Sheet steel coated with vitreous enamel or glass coating is also available. In connection with the chemical surface treatment, reference should be made to BMS Report 44, *Surface Treatment of Steel Prior to Painting,* of the National Bureau of Standards, obtainable from the superintendent of documents, Government Printing Office, Washington, for 10 cents.

Among surface treatments for plain steel subjected to accelerated weathering, salt spray and condensation corrosion tests, hot-dip phosphate treatments have shown outstanding merit in improving the protective value of paints. Particularly effective protection is obtained when such treatments are used under severely corrosive conditions in combination with a primer of the inhibitive type. Two phosphate-

**TABLE I—Complete Titles of Federal Specifications Referred to in Body of the Article**

| Fed. Spec. No. | Complete Title |
|---|---|
| TT-P-20 | Paint, Blue-Lead-Base; Basic Sulphate, Linseed Oil, Ready-Mixed |
| TT-P-31a | Paints; Iron Hydroxide and Iron Oxide, Ready-Mixed and Semipaste |
| TT-P-36a | Paints, Lead-Zinc Base, Ready-Mixed and Semipaste, White and Tinted |
| TT-P-51a | Paints; Oil, Interior, Eggshell-Flat Finish, Ready-Mixed and Semipaste, Light Tints and White |
| TT-P-56 | Paint (For) Priming Plaster Surfaces (Plaster Primer and Sealer) |
| TT-P-61 | Paint; Ready-Mixed, and Semipaste, Black |
| TT-P-86 | Paint, Red Lead Base; Linseed-Oil, Ready-Mixed |
| TT-P-101a | Paint; Titanium-Zinc and Titanium-Zinc Lead, Outside, Ready-Mixed, White |
| TT-P-156 | Paint, White Lead Base, Basic Carbonate, Ready-Mixed, Light Tints and White |
| TT-E-506a | Enamel; Interior, Gloss, Light Tints and White |
| TT-V-51 | Varnish; Asphalt |
| SS-A-666 | Asphalt; (For) Built-Up Roofing, Waterproofing and Dampproofing |
| SS-A-701 | Asphalt Primer (For) Roofing and Waterproofing |
| SS-R-451 | Roof Coating; Asphalt, Brushing Consistency |
| R-P-381 | Pitch; Coal-Tar (For) Mineral-Surfaced Built-Up Roofing, Waterproofing and Dampproofing |

# Using two PENNSALT Cleaners for three cleaning operations, Ingersoll-Rand saves material costs, time and labor . . .



Exhaust deflectors for Ingersoll-Rand "Multi-Vane" Pneumatic Grinders are cleaned in a solution of Pennsalt Cleaner No. 35 in this tank . . . with important savings in cleaning time and labor.

Ingersoll-Rand Company, famous manufacturer of pneumatic tools, compressors and other equipment, has achieved important savings in three cleaning operations by using two Pennsalt Cleaners.

**1.** For still tank cleaning of many metal parts prior to Parkerizing, Ingersoll-Rand uses Pennsalt Cleaner No. 35, saving time and labor.

**2.** Similar savings have resulted from Ingersoll-Rand's use of Pennsalt Cleaner No. 35 for still tank cleaning of metal parts after hardening.

**3.** In spray washers which clean iron and steel castings, forgings and bars, bronze, brass, zinc and aluminum parts . . . about 10,000 different metal parts . . . Ingersoll-Rand uses Pennsalt Cleaner No. 32 with great success. This cleaner efficiently removes machine oil and polishing compounds from the metal parts, and also provides rust protection between processing steps. By changing to Pennsalt Cleaner No. 32, Ingersoll-Rand saves an estimated 37% in the cost of cleaning materials . . . *and* gets better results!

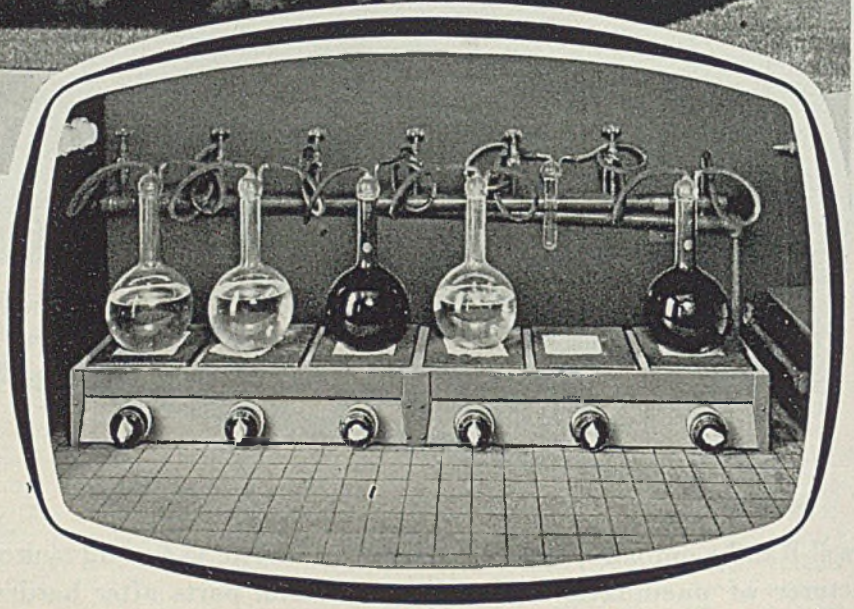
If you have a metal cleaning problem, there is a Pennsalt Cleaner which will meet your specific needs . . . and probably save *you* valuable time, labor and cost. Write today to our Pennsalt Cleaner Division for information.

**PENNSYLVANIA SALT**
MANUFACTURING COMPANY
*Chemicals*
1000 WIDENER BUILDING, PHILADELPHIA

# GLOBE STEEL TUBES


*and*

# HEVI DUTY HOT PLATES



In their new laboratories the Globe Steel Tubes Co. have installed a Hevi Duty Six Station Electric Hot Plate for chemical analysis . . . These compact multiple stations allow for saving of space and convenience of operation.

***Send for Bulletin HD-835***

**HEVI DUTY ELECTRIC COMPANY**

LABORATORY FURNACES — TRADE MARK MULTIPLE UNIT REG. U. S. PAT. OFF. — ELECTRIC EXCLUSIVELY

**MILWAUKEE, WISCONSIN**

chromate cold-wash treatments for plain steel also appear to improve paint protection.

It is essential that the primer be baked on at proper temperatures and under proper operating conditions. It is also essential that the primer be of high-grade quality and that it be not thinned excessively on the job. As mentioned, the primer should contain rust-inhibitive pigments, and the vehicle should be of a suitable baking type.

Finish coat paints of the desired color may be applied on the job. For example, finish coats of white or light tint paints may be obtained under Federal Specification TT-P-36a, TT-P-156 and TT-P-101a; red and brown iron oxide paints under Federal Specifications TT-P-31a, black paint under Federal Specification TT-P-61; and green paint under Federal Specification TT-P-71a. Table I gives the complete designation of the federal specifications referred to here.

*Painting Exterior Sheet Metal on the Job Formerly Zinc-Coated (Roofing, Flashings, Window and Louver Heads, Etc.)* The problem here is to have a sheet that must stand exposure to ordinary storage, handling and fabrication, and then be able to be welded or soldered and subsequently painted. One government agency specifies that for exterior sheet metal work for roof flashings and flashing at door, window and louver heads, the materials shall be either phosphate-treated steel or terne plate. It also specifies that the surfaces that are to be painted shall be thoroughly cleaned and all traces of flux removed. The steel shall be 26-gage phosphate-treated, and given immediately a dip-coat of mineral oxide paint baked on at a temperature of 250 to 300 degrees Fahr. Both sides of phosphate-treated steel and all exposed surfaces of other sheet metal work, flashings, etc., (except copper) are to be painted with one coat of red lead and oil paint before placing. The red lead paint shall comply with Federal Specification TT-P-86.

*Painting Interior Sheet Steel Formerly Zinc-Coated (Air Ducts, Etc.)* The same recommendations of pretreating the steel prior to applying a baked-on high-grade rust-inhibitive primer may be followed. However, for certain places where the surface is not to be exposed to the weather, the application of a bituminous base coating (Fed. Spec. SS-R-451) may serve the purpose. However, it should be required that this coating dry hard and free of tackiness. In the case of air ducts that become hot, it is suggested that instead of the above-described bituminous base coating, the ducts be dipped in asphalt varnish (Fed. Spec. TT-V-51). This will produce a coating that will bake on the surface at a temperature of 300 to 400 degrees Fahr. Special heat-resisting enamels in black and gray colors that will withstand temperatures considerably above 400 degrees Fahr. are also available.

*Painting Exterior Structural Steel (Girders, Towers, Etc.), Formerly Zinc-Coated.* After priming the clean surface with rust-resisting primer such as red lead paint (Fed. Spec. TT-P-86), basic lead chromate paint (Fed. Spec. TT-P-59), blue lead paint (Fed-Spec. TT-P-20), etc., use a finish coat of gray paint or any other tint conforming to Federal Specification TT-P-36a or TT-P-156. If chalk-resistant titanium oxide is specified, Federal Specification TT-P-101a, or War Department cantonment paint, Standard Specification 8000 E, page 88, June 30, 1941, may also be used, tinted gray or any other desired color. If color is of no moment, dark-colored paints such as iron oxide (Fed. Spec. TT-P-31) or black (Fed. Spec. TT-P-61) will be more durable than white or light tint paints. Additional information on painting structural steel may be found in the National Bureau of Standards Letter Circular 422, *The Painting of Structural Metal.*

*Painting Interior Structural Steel Formerly Zinc-Coated.* In industrial plants where good light reflection from the structural steel is desired, the following procedure may be used: Apply a priming coat of quick-drying red lead paint (Procurement Division Specification No. 358), or a similar rust-inhibitive primer, followed by either two coats of eggshell flat white paint (Fed. Spec. TT-P-51a) or gloss white enamel, sometimes called "gloss mill white", (Fed. Spec. TT-E-506a). The enamel will be more water-resistant and more durable. For special conditions where fumes are encountered, such as in chemical laboratories, bakeries, tobacco factories, cafeterias, etc., a special enamel known as fume-and-heat-resisting enamel (National Bureau of Standards Letter Circular 489) may be used.

*Painting Steel Surfaces Formerly Zinc-Coated for Sub-Soil or Under-Water Exposure.* Bituminous base coatings are suggested for this purpose. The following paragraphs give some of the properties of these coatings:

A—Cold or Brush Application Type.

1—*Solutions of either asphalt or coal tar in a volatile distillate.* These coatings are of brushing consistency and are primarily intended for use as primers on surfaces which are subsequently to be coated with a hot application of asphalt. (See Fed. Spec. SS-A-701). This type of material is also commonly used on surfaces where a black coating is desired, which will not be subjected to the action of heat or sunlight. These materials are known commercially as black or liquid asphaltum, bituminous paint, primers, etc.

2—*Asphalt varnish or enamels.* These are composed of a high-grade asphalt fluxed and blended with properly treated drying oils and thinned to a brushing consistency with a volatile solvent. (See Fed. Spec. TT-V-51.) Special types of this material will withstand dry temperatures up to 600 degrees Fahr. (see U. S. Navy Specification 52-E-2a, Enamel, Black, Heat-Resisting).

These coatings in general are more durable than those listed in paragraph 1. They are primarily intended for use indoors as coatings for surfaces where a hard, black glossy surface is desired. They will, for a limited time, give adequate protection against moisture and corrosive vapors. They should not be used where they are alternately exposed to sunlight and moisture. These materials are known commercially as asphalt varnish, asphalt enamel, and heat-and-acid-resisting enamel

3—*Cold mastic type.* These consist of asphaltic materials (with or without fatty oils) and mineral filler, thinned to a heavy brushing consistency with a volatile solvent. (See Fed. Spec. SS-R-451.) This material is intended for use in the repair and coating of asphalt and metal roofing and for application to concrete, masonry and steel structures as a dampproofing and protective coating

B—Hot Application Type.

1—Asphalt, Fed. Spec. SS-A-666.
2—Coal tar, Fed. Spec. R-P-381.
3—Bituminous enamels.

A description of the characteristics and methods of application of these materials can be found beginning on page 3 of the National Bureau of Standards Letter Circular 42, *Acid-proof Coatings for Concrete Surfaces.* Reference should also be made to National Bureau of Standards Research Paper 1058, issued December 1937, *Soil-Corrosion Studies,* 1934, *Bituminous Coatings for Underground Service,* obtainable from superintendent of documents, Government Printing Office, Washington, for 10 cents.

*Painted Wire Formerly Zinc Coated.* The problem here is to suggest a paint that will be an acceptable substitute for galvanized wire screen (1-inch mesh) used in reinforcing stucco in home construction. Probably the best method would be to have the work done at the finishing plant, where the black iron screen could be passed through a tank of black, flexible enamel or japan, and then baked in suitable drying ovens prior to shipping the screen in rolls. This coating would be tough and flexible and would not chip off. The necessity of having some kind of a

coating on the black iron is to prevent rust stains from "bleeding" through the stucco and paint after the building is erected. A cheaper but not as durable a method is to dip the roll of black iron screen being used on the job in a tank of a bituminous solution as described on page 4. This material would dry quickly, and since the amount of bituminous coating on any one wire would be relatively small, it is doubtful whether there would be any trouble from the bitumen "bleeding" through the stucco. Another possibility is to dip the roll in a quick-drying, thin spar varnish.

**General Considerations:** As can be seen from the above, it is possible to use federal specification materials or their equivalents as substitutes for zinc-coated surfaces under a variety of conditions. Recommending the use of synthetic resin paints and enamels has been avoided because of the shortage of certain ingredients used in these paints. The same holds true for aluminum paint. Similarly, certain highly durable cellulosic finishes could be employed, but an acute shortage of the plasticizers and solvents for these is also developing.

Of course the conditions to which the surface is exposed has a direct influence on the durability of the paint coating. Thus a coating that may show excellent resistance under water (for example a bituminous coating) may fail rather quickly when exposed to the weather.

In using paint to replace galvanized or zinc coatings, it should be kept in mind that the condition of the surface is of utmost importance. It should be clean, dry and free of all rust and scale prior to painting. Within practical limits, the protective value of a paint film is roughly proportional to its thickness. Thus for exterior exposure the safest procedure is to apply three coats of good paint, each coat being spread at a practical spreading rate (500 to 700 square feet per gallon). Where exposure conditions are particularly severe (for example an outside roof), it is suggested that two coats of primer and two coats of the finish paint be applied.

Equally important as the character of the surface and the thickness of the paint film on the ultimate durability is the method of application. There is no substitute for skill in application. This is at least as important as the quality of the paint. It is for these reasons that the only proper method of evaluating a paint job is on the basis of cost of paint per square foot area applied per year of service.

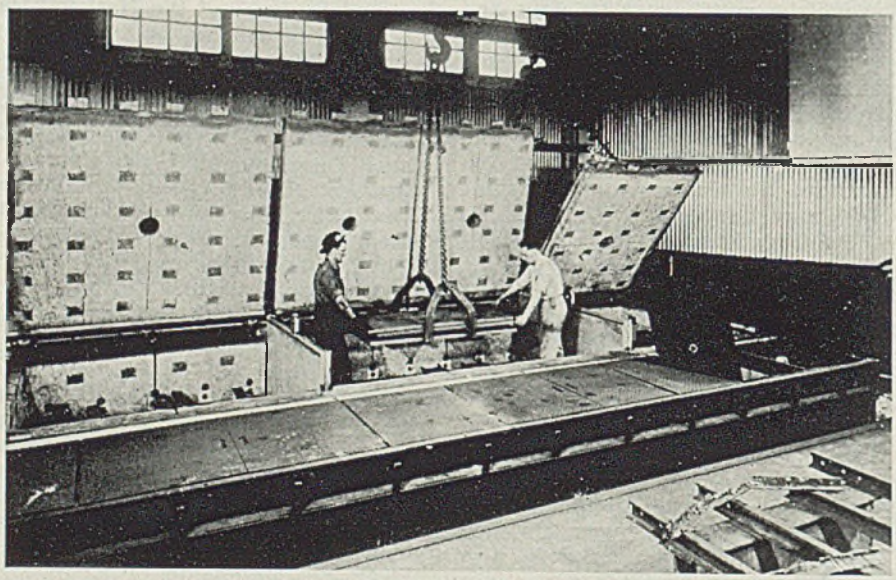
Wherever federal specifications are referred to here, they cover products which will be satisfactory for the use referred to, but for the general buying public similar products may be obtained under trade brands at any paint store throughout the country.

## Device Cleans Air Cleaner in 30 Minutes

■ A new semiautomatic device or cleaner, developed by Westinghouse at East Pittsburgh, Pa., now enables electrostatic precipitators used with continuously running machines, to be cleaned with only a brief interruption.

For example, a hundred-cell array of Precipitrons is divided into five 20-cell sections. The section to be cleaned is placed in front of one of these sections which is disconnected from the ventilation system and from the power supply. The motor-driven carriage of the cleaner sweeps slowly up and down in front of the dirty precipitator plates. It has three horizontal rows of nozzles from which water, air, and oil are sprayed in turn over the plates. The operation then stops, having lasted but 30 minutes. Cleaning a 100-cell precipitator bank formerly was a job for three men working for eight hours.

## Three-in-One Annealing Furnace



■ Lowering plates into new 3-section annealing furnace: View above shows the 24-foot unit recently installed by Joseph T. Ryerson & Sons Inc., Chicago, for annealing steel after being flame cut. Each section of the furnace may be used as a separate unit. Crane service and finger-tip control synchronize movements for utmost efficiency

## Volume Gives Help in Collective Bargaining

■ *Collective Bargaining Contracts;* fabrikoid, 734 pages, 6 x 9 inches: published by Bureau of National Affairs, 2301 M street, N. W., Washington, for $7.50.

Since collective bargaining has become a part of the fabric of American economic life the need has arisen for a handbook affording negotiators those shortcuts to successful practice which may be found in experience of others and knowledge of current procedure.

The present volume presents in Part I techniques in collective bargaining, which give instruction in the difficult art of conducting relations between employers and employe organizations, both at the conference table and after agreements have been reached. Bargaining methods are explained point by point and problems of living under a collective bargaining contract are worked out step by step from both the employer and union side.

In Part II, which is a contract clause finder, negotiators are provided a large selection of provisions of collective bargaining contracts in current use which are designed to accomplish practically all the purposes which negotiators wish to achieve, on either side of the table. In addition to being models they provide the negotiator with practical alternatives, tested compromises and an impressive range of talking points based on what others have done.

Part III presents texts of representative collective bargaining contracts which afford working models of complete agreements which many will wish to study from the standpoint of form. They constitute an exhibit exemplifying the collective contracts under which a large proportion of participants in American industry work.


# Let's talk things over and together face this emergency

**DAYS LIKE THESE ARE TOUGH ON EVERYBODY**--We are all faced with new manufacturing problems and stepped-up production for Government orders which won't allow time for experimentation, yet all completed products must be right, finished according to specifications.

**NEW PRODUCTS FROM NEW METALS NEED NEW PROCESSES**--In most cases your old formula won't work on today's strange metals. However, a MacDermid metal finishing specialist, when consulted, can demonstrate a proven formula, perfected for that particular metal and together you can determine the best way to adapt it to your use—producing a chemically and metallurgically cleaned product, freed from all inorganic surface dirts, readied for inspection.

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## ★ Special Processes and COMPOUNDS for CLEANING Basis Metals

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# Industrial

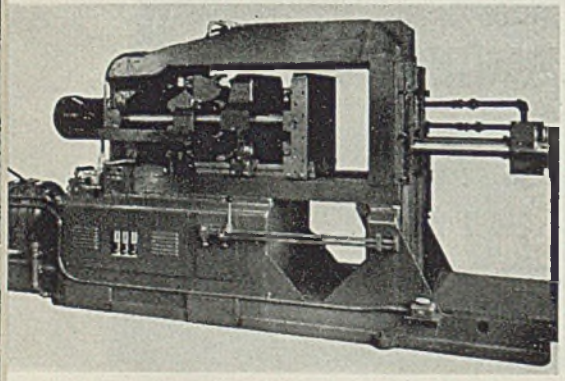
## Diesel Locomotive

■ Whitcomb Locomotive Co., Rochelle, Ill., announces a new 80-ton diesel electric locomotive for heavy duty work. It embodies two Buda supercharged diesel engines, each developing 325 horsepower which provides ample power to insure snappy performance in switching and spotting cars, as well as road work at speeds up to 40 miles per hour. Its weight in working order is 160,000 pounds and its normal tractive effort is 40,000 pounds at 25 per cent adhesion. It is capable of exerting 53,330 pounds tractive force with the use of sand. Each engine-generator unit including ra-

diator, air compressor, and blower is mounted on a common sub-base mounted on the locomotive frame. Instead of the usual arrangement with the radiator at the front end, the assembly has been turned around placing the radiator at the rear near the cab. Adjustable shutters on each side of the hood provide air to the radiators. The trucks of the locomotive are of the built-up type securely welded together. Traction motors are mounted on each of the four axles and power is transmitted by means of single reduction gearing. The cab is well insulated and equipped with safety glass windows rubber mounted in steel sash.

## Die Casting Machine

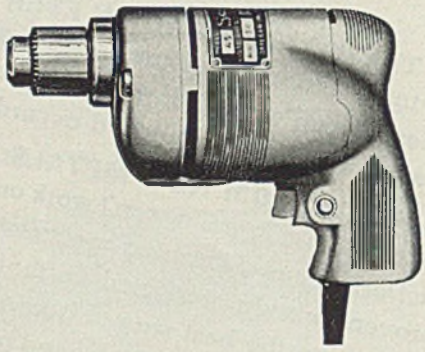
■ Phoenix Machine Co., 2701 Church avenue, Cleveland, announces a new Lester-Phoenix die casting machine for use in the production of aluminum, brass and magnesium castings for aircraft where each casting is to be subjected to X-ray inspection. The machine is so efficient that rejections on thousands of castings is said to have been less than one per cent.



Density is achieved by high injection pressure sustained throughout the injection stroke. Pressure, created by a self-contained hydraulic system, is confined within the die by a die "squeeze" of 400 tons. This is accomplished by hydraulically actuated double-toggle linkage and cam locks, within a rigid nonelastic frame of cast steel beams. As a rigid, nonadjustable frame requires an internal adjustment for die thickness, a large central screw actuated by a worm and worm wheel through a single hand crank is employed. Electric timers provide exact repetition of any selected casting cycle.

## Drill for Metal

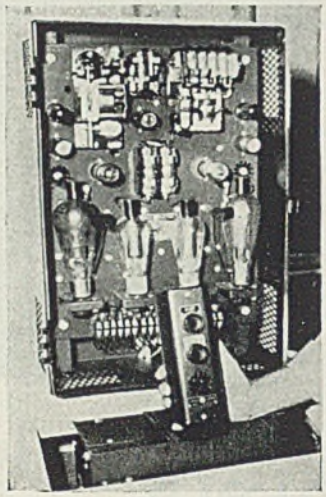
■ Skilsaw Inc., 5033 Elston avenue, Chicago, has introduced a new ¼-inch drill for fast production drilling. Known as the Skildrill, it



weighs only 2¾ pounds, and is only 6⅝ inches long. It features a die-cast body, complete antifriction ball and needle roller bearings and helical-cut gearing throughout. It has a no-load speed of 1800 revolutions per minute and a full-load speed of 1050 revolutions per minute. Drilling capacity in steel is ¼-inch.

## Motor Control

■ General Electric Co., Schenectady, N. Y., has placed on the market a new Thy-mo-trol electronic control system to provide stepless control of direct-current motors from alternating-current lines. It provides wide-range speed control without use of motor-generator sets or gear and pulley arrangements. A single-dial control, mounted in a heavy-duty push-button station, covers the complete speed range of the motor,



both above and below basic speed. The motor is automatically accelerated to preset speed quickly and smoothly without excessive current peaks. The same single dial also can be used to change speed to any desired value during operation. In operation, the change from alternating to direct current for the motor field and armature circuits is accomplished by two pairs of thyratron tubes. The thyratron tube panel can be furnished in various types of enclosures such as those for corrosive or dusty atmospheres.

## Camera for Producing Identification Photos

■ Photographic Equipment Inc., 210 East Park way, Pittsburgh, has introduced a new device for production of identification photographs for war industries. The machine is a preci-

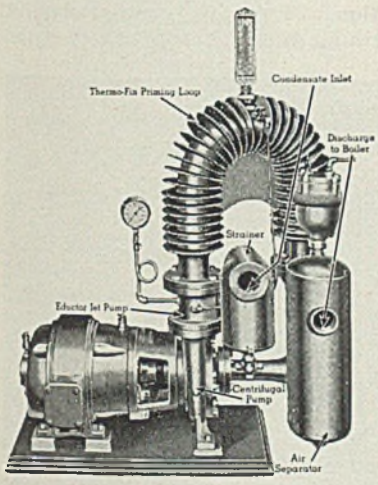
sion camera equipped with automatic focus, automatic timing, its own lighting system, identification

# Equipment

numbering system and a height indicator, which can be operated by untrained men, and which will produce as many as a thousand pictures per 8-hour day. Operation of the camera is fixed and there is no possibility for over or under exposure. It may be operated for as many or as few pictures as is necessary, and uses commercial 35 millimeter film in cartridges. The photograph may be applied to cards, badges or combination.

## Return System

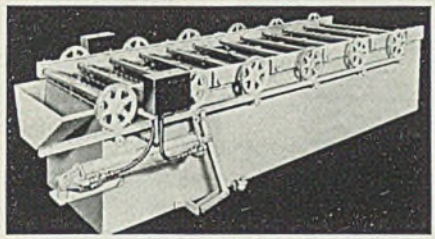
■ Cochrane Corp., Seventeenth and Allegheny avenue, Philadelphia, has introduced a high-pressure condensate return system which through its eductor principle of operation insures thorough condensate and air removal from process apparatus,




making increased production possible by maintenance of uniformly high temperatures. Thus, after expulsion of the air from the closed circuit, the condensate is returned to the boiler at temperatures close to that of process pressure without flash loss. The centrifugal pump draws water from the thermo-fin priming loop and discharges it as a high velocity jet through the jet pump nozzle. This jet, striking the returned hot condensate, induces condensate flow through the mixing tube into the thermo-fin priming loop. The additional volume of the returned condensate introduced into the constantly filled loop results in the discharge of an equal volume through the air separator to the boiler.

## Parkerizing Machine

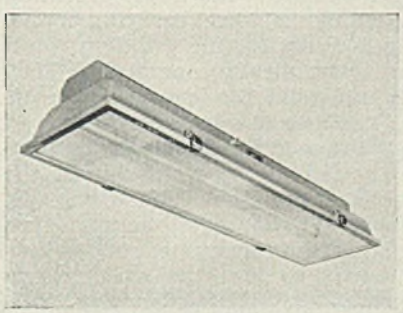
■ Udylite Corp., 1651 East Grand boulevard, Detroit, announces a new automatic parkerizing machine cap-



able of processing large quantities of small parts. It is said to be ideal for production of .30 and .50 caliber steel machine gun links, Garand rifle clips, miscellaneous machine gun parts and other small parts. Of the hopper type, the machine can either be air or hydraulically driven. Parts are loaded in batches at one end and are progressively transferred through the various dipping tanks. Each batch remains a separate unit throughout the entire cycle and one load cannot be mixed with another. The machine is completely hooded to conserve heat. All parts of the machine are easily accessible for replacement.

## Fluorescent Luminaire

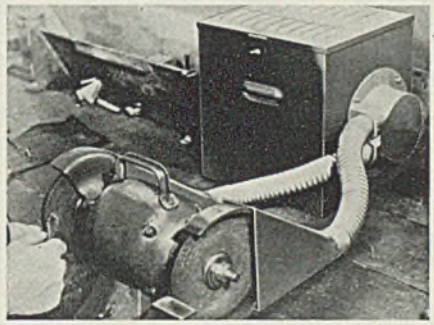
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a



new 40-watt high vision fluorescent luminaire for industrial plants. Known as type FPS-40, it uses two or three 40-watt fluorescent lamps per reflector and will provide lighting intensities of 30 to 100 footcandles, providing adequate visibility for close work. Design of luminaire makes it possible to construct any length of strip desired from four simple and compact types. Channels provide a continuous wireway which may be mounted on conduit, messenger cable, twin-rod suspension or directly on the ceiling. The units have twin-ballasts with built-in compensators providing power factor of 90 per cent or over.

## Dust Collector

■ Aget-Detroit Mfg. Co., 937 Book building, Detroit, announces a new dust collector which can be installed without tools in a few minutes. Being entirely self-contained, it is furnished with a flexible metal hose, and two exhaust intake hoods which can be attached to almost any portable type bench grinder. It employs a 1/6-horsepower, 110-volt, split phase motor to develop over 260 cubic feet per minute air intake. Approximately one square foot of space is needed for the unit itself. The flexible hose permits installation of the wheel hoods at any desirable angle with respect to the wheel and guard. Dust-laden air from the grinder wheels goes through the intake hose and intake flange of the unit, and is

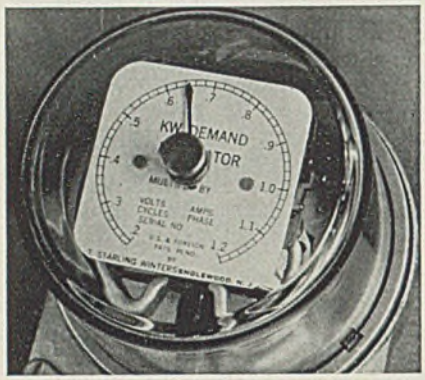


drawn through the sirocco type wheel, discharging through the horizontally placed spun glass filter. The dust, separated from the air, drops back into the removable pan.

## Demand Regulator

■ T. Starling Winters, 100 East Palisade avenue, Englewood, N. J., announces a continuously integrating demand regulator for use in connection with electric furnaces, ovens, heaters, hoists, refrigeration compressors, electric welders etc. According to the announcement, its function is to automatically reduce, and subsequently, automatically increase the load of the circuit to be controlled as frequently as may be necessary during any given demand interval so that the set maximum demand will not be exceeded, yet in such a manner that the greatest possible utilization of the permissible,

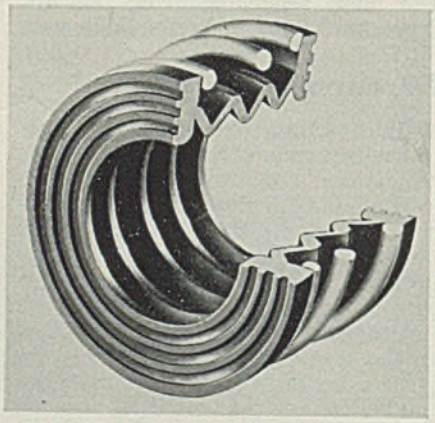
or "set" demand may be had. The unit continuously integrates the product of load and time on a differential, inverse-time-load basis, allow-



ing momentary heavy loads to be handled without any reduction. Entirely self-contained, it operates direct from instrument transformers. It employs a single, vacuum-sealed mercury switch to eliminate contact arcing and burning, chattering of electrode control contactor and false operation. As the unit does not periodically reset at the end of each 15 or 30-minute interval there is no possibility of faulty operation, it is claimed. Its wide range of demand adjustment (6 to 1) permits large changes in installed equipment capacity to be handled by the same instrument transformers. Other features include glass dust-tight cover and large nonloosening terminal blocks. The unit is normally furnished with 120-volt potential and 5-ampere current coils for use with instrument transformers on 60-cycle circuits.

## Water-Pump Seal

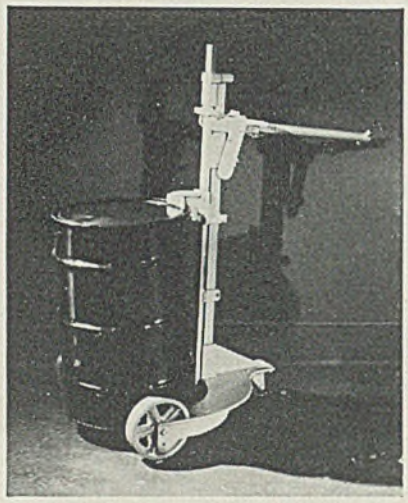
■ Crane Packing Co., 1800 Cuyler avenue, Chicago, reports a new water-pump bellows-type seal which is impervious to antifreeze and other fluids. Consisting of a bellows and spring, the unit operates as a driving coupling. The seal does not



touch or have a sliding contact with the shaft. The bellows connect two flanged ends. Placed in a fixed position against the inside shoulders of the flanged ends, the spring holds the contact facings against the sealing washer on the one end and the driving base on the other. The serrated contact facings are responsible for the positive seal at both the washer and driving base points. These are formed in a series of concentric grooves and flat-faced ribs, effecting seal with a suction-action.

## Dust Collector

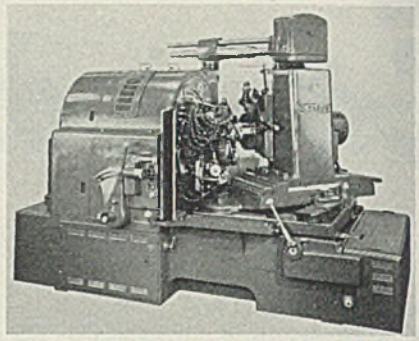
■ Ernest Magic Carrier Sales Co., 1456 Jefferson avenue, Buffalo, is offering a new Little Giant carrier for handling litherage drums which are principally used as containers of heavy materials. It features a simple lifting device and self-balancing



tri-wheel design which is said to prevent accidents in handling. For use in powder plants or explosive areas the truck is offered with copper silicon alloy metal wheels. It has a capacity up to 600 pounds.

## Hypoid Grinder

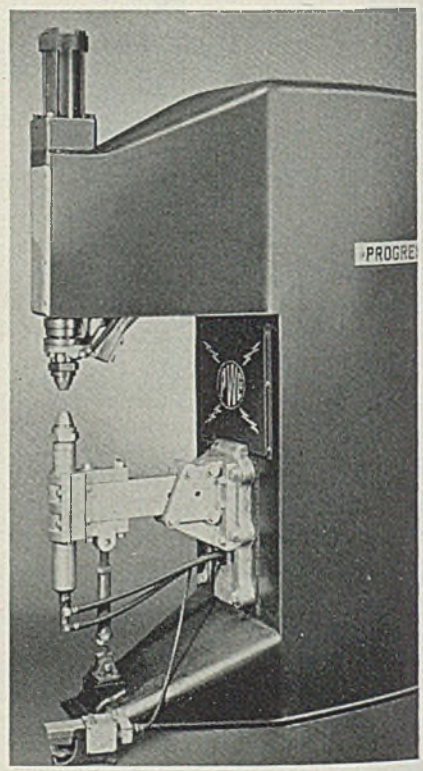
■ Gleason Works, Rochester, N. Y., announces a new No. 17 hypoid grinder which is said to finish teeth of generated curved-tooth, bevel and hypoid gears and pinions many times faster than possible by cutting. The generating motion employed on the new grinder is entirely different from any formerly used and combines continuous rotation of the work spindle with a reciprocating motion of the wheel carrying cradle. The dressers for the grinding wheel are hydraulically operated. They are adjustable for feed, pressure angle, radius and wheel diameter. In grinding a gear, the wheel is alternately fed to the work during the up-roll of the cradle and withdrawn during the down-roll action. The work, in the meantime, rotates continuously so that the wheel, when starting on the next up-roll, engages a following tooth. This cycle is repeated until all teeth are ground, at which time the machine stops automatically. Hydraulic movement of sliding base to and from cutting position and a new type hydraulic chuck provide speed and ease in



changing work. Change gears control indexing from tooth to tooth and wheel speed, while cams control the generating roll and the feed. The machine occupies a floor area of 65¾ x 111¾ inches .

## Forge-Welder

■ Progressive Welder Co., 3050 East Outer Drive, Detroit, has introduced a new No. 50-XX forge-welder which is said to obtain for the user excellent welds, free of blow holes on hot rolled sections, without necessity of removing scale or rust prior to the welding operation. Its forging pressure has been increased to a total available of 20,000 pounds per square inch, this pressure being superimposed on the normal electrode pressure to obtain the "forge-welding" action. The pressure is obtained through the incorporation of a mo-

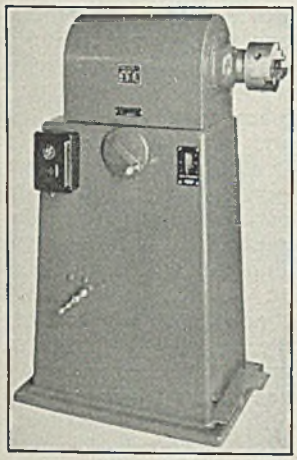


tor driven hydraulic pump unit. Both pressure and machine cycle are controlled through an improved sequence timer. Included in the con-

trols are a new phase-shift heat control and a new automatic current increase control. The latter unit is provided with three dials to permit preselecting of the following: 1. Value of initial - minimum - current (for first pulsation). 2. Value of final - maximum - current. 3. Rate of increase of current (time from minimum to maximum). Design of the unit has been completely revamped in order to increase rigidity. The "forge-welder" also is designed for the application of refrigeration to the welding tips.

## Speed Lathe

■ Schauer Machine Co., 2060 Reading road, Cincinnati, has placed on the market a new type variable speed lathe for polishing and finishing engine barrels on aircraft engines. It is equipped with an expanding mandrel for holding the work, the latter being air operated. The lathe can be controlled by either a hand air valve or by a foot control. It provides spindle speeds of 105 to 1155 revolutions per minute. Equipped with a 2-speed ½-horse-



power motor, the machine features an automatic brake that applies when the machine's foot treadle is depressed to open the motor circuit.

## Industrial Rectifiers

■ Weltronic Corp., 3080 East Outer drive, Detroit, has introduced a complete line of full-wave industrial rectifiers, in eleven models, ranging from 100 to 15,000-watt capacity. These are for use in the operation of such devices as magnetic chucks, variable speed direct-current motors, telephone switch boards, etc. Two long life high-capacity single plate tubes, one for each half cycle, with a 2000-hour guarantee, are used in the units. These are housed in enclosed cabinets designed for wall mounting. On and off switches for controlling the operation of each rectifier are mounted on the cabinet door.

## Mercury-Vapor Plant

(*Continued from Page* 53)

porcupine tubes 5½ feet long and 3⅛ inches outside diameter.

In 1932, two mercury-vapor plants were built, one for the Schenectady Works of the General Electric Co. and the other for the Kearny station of the Public Service Electric & Gas Co. of New Jersey—each rated 20,000 kilowatts. The mercury boiler temperature and pressure were increased to 970 degrees Fahr. and 140 pounds per square inch. The Schenectady plant, an outdoor station, has passed through several severe winters without any operating difficulties.

The latest development is a new mercury-vapor boiler at the Kearny station of the Public Service Electric & Gas Co. of New Jersey. It produces 21,000 kilowatts from the mercury-turbine generator and 292,000 pounds per hour of steam at 365 pounds per square inch gage and 750 degrees Fahr.—a total power output near 50,000 kilowatts. This furnace is of octagonal shape in plan for the purpose of conserving mercury and better to equalize the heat absorbed by all the furnace tubes. Coal-oil burners are located on each of the eight sides. Uniformly distributed flame can be carried by proper selection of burners throughout the load range. Either coal or oil may be used.

A new development is to cover the furnace walls almost completely with mercury tubes. These are practically contiguous, having a minimum inside diameter of 13/16 inch and 1 inch at the top of the vertical run. At the beginning of the arch at the top of the vertical run, the tubes are supported by hangers so they hang vertically and in turn partly support the bottom, which is formed as a unit with a structural steel frame. Large coil springs on the under side aid in supporting the bottom. So no single tube may be overstressed by this hanging load, tubes are attached through small springs to the structural bottom, which allows for a reasonably individual motion consistent with possible temperature differences between tubes. At full load, the tubes expand downward 2 13/16 inches.

Sufficient experience in regard to pumping or circulating ability of high vertical furnace wall tubes was not available at the time the original Kearny boiler was built. The Hartford boiler was the first large boiler, and it had no mercury-wall tubes. The next large boilers, at Kearny and Schenectady, had mercury-wall tubes over the upper half of the fire box and water walls forming the lower half. The new Kearny boiler completes the evolution, and the tubular lined firebox is now quite similar to those of modern water-wall steam boilers.

The porcupine tubes used for many years in mercury boilers were ingenious in design and functioned quite well, but the small passages were a potential source of plugging by foreign material, were hard to clean and expensive to manufacture so their elimination in the new boiler is regarded as a distinct advance. By substituting wall tubes for the former porcupine tube surface, it becomes possible to remove the complication of seven drums which involved equalizing difficulties and other disadvantageous features.

The new boiler has a single drum 54 inches inside diameter with 4½-inch thick walls. It is 30 feet long, weighs 90,000 pounds. Fig. 2, a section through the drum, reveals the arrangement of baffles which are functioning so well there is no measurable moisture carryover.

To form the slag screen shown in Fig. 5, which is a view upward from below, 288 of the furnace wall tubes are continued across the reduced section or neck of the furnace, being attached at one end to a movable panel and at the other end to the drum. The 1 11/16-inch outside diameter x 1⅛-inch inside diameter tubes are arranged in 36 sections, eight tubes high on 8¾-inch horizontal centers. The catenary shape helps to keep the stresses low. The panel, moved by the expansion of four tubular columns heated by circulating boiler mercury, maintains a low stress throughout the tube structure for all temperature con-

**TABLE II—Field Welding Specifications for Tubular Elements and Pressure Parts**

| Material | Welding Process | Electrode or Wire | Preheating Temp., Deg. F. | Heat Treatment | B & W Welding Specifications* |
|---|---|---|---|---|---|
| Croloy 5M-Si to Croloy 5M-Si | Atomic hydrogen | Croloy 5M-Si | 600 | 1350-1425°F. 60 minutes | 113 |
| Croloy 5M-Si to Croloy 3M | Atomic hydrogen | Croloy 5M-Si | 600 | 1350-1425°F. 60 minutes | 113 |
| Croloy 5M-Si to Croloy 2 | Atomic hydrogen | Croloy 5M-Si | 600 | 1350-1425°F. 60 minutes | 113 |
| Croloy 3M to Croloy 3M | Acetylene | Croloy 5M | 600 | 1350-1425°F. 30 minutes | 107 |
| Croloy 2 to Croloy 2 | Acetylene | Croloy 2 | 500 | 1350°F. 30 minutes | 106 |
| Carbon-moly. to Carbon-moly. | Metal arc | Molex | 150 | 1200°F. | 109 |
| Carbon-moly. to Carbon-moly. | Acetylene | Carbon-moly. | 150 | 1200°F. | 105 |
| Carbon steel to carbon steel | Metal arc | Vertex | 150 | 1200°F. | 105 |
| Carbon steel to carbon steel | Acetylene | Oxweld No. 1 Hi-Test | 70 | 1200°F. | 104 |

*See Table III for data on B & W welding specifications that correspond to these numbers.

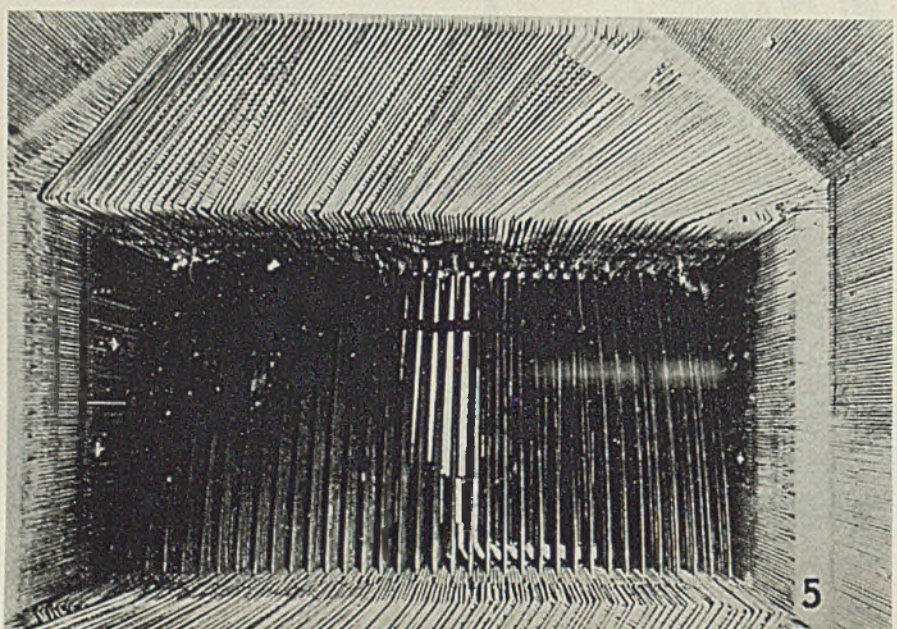


Fig. 5—View showing slag screen and arch (from below) in Kearny mercury boiler

# Helpful Literature

### 1. Packaging

Hinde & Dauch Paper Co.—12-page illustrated bulletin is No. 2 of series offering condensed package handling information. Entitled "How To Stack And Load," bulletin lists eight rules that will help manufacturers to conserve time, space and money, while decreasing damage in transit and storage of packaged merchandise.

### 2. Milling Machines

Cincinnati Milling Machine Co.—16-page illustrated bulletin M-965 deals with Nos. 2-18 and 2-24 plain automatic milling machines. Each part of machines is fully described with close-up illustrations. Seven charts show principal automatic cycles that can be obtained with machines. Tables list complete specifications.

### 3. Foundry Ovens

Gehnrich Corp.—16-page catalog No. 108 discusses value of properly baked cores for sound castings and points out how company's line of core baking ovens provide advantages for correct core treating. Several pages picture oil, gas and electric fired models with various types of charging mechanisms.

### 4. Ladle Linings

United States Graphite Co.—8-page illustrated bulletin describes advantages of "Mexaloy" graphite product for lining ladles, spouts, runners and cupolas. Detailed instructions for mixing, wetting and curing are given.

### 5. Induction Heating

Induction Heating Corp.—Two-fold bulletin describes "Thermonic" principle and apparatus of induction heating for selective surface hardening, brazing, melting, annealing and forging. Operation and applications are fully described.

### 6. Wire Screen Cloth

Robins Conveying Belt Co.—8-page illustrated bulletin No. 113 gives information on woven wire screen cloth for vibrating screens. One section tells how to select proper screen cloth for any specific use. Section views show various types of construction and meshes.

### 7. Shop Truck

W. F. Hebard & Co.—2-page catalog section No. 340J deals with Model J232 shop mule tractor which is equipped with "International" gasoline engine, fan, clutch, four-speed transmission and drive axle as used in "International" trucks. Specifications and line drawings of principal dimensions are included.

### 8. Valves & Piping

Crane Co.—Two-fold broadside is No. 3 of series designed to help industrial maintenance men keep piping systems working at peak efficiency. This bulletin outlines salient features of globe and gate valves and describes applications best suited for each. Installation recommendations are included.

### 9. Unit Dust Collectors

Aget-Detroit Mfg. Co.—4-page illustrated folder describes low cost self-contained unit dust collectors. Included are specifications, cutaway views showing details of construction, and illustrations indicating how unit is located to collect dust from surface, tool, pedestal, and bench and cutter grinders.

### 10. Tubing Performance Data

Babcock & Wilcox Tube Co.—158-page technical bulletin No. 6-D is entitled "Properties Of Carbon and Alloy Steel Tubing For High Temperature High Pressure Service." Some of subjects covered are requirements of tubing for high pressure high temperature service, influence of alloy elements, room temperature properties, allowable stresses for superheater, boiler tubes, steam and refinery piping, and steels for sub-zero applications.

### 11. Heat Treating Compounds

National Copper Paint Corp.—6-page bulletin offers details information on uses, advantages, preparation and application of "Sel-Car" heat treating compounds which, when applied to steel, minimize decarburization, provide means for selective heat treatment, and eliminate water cracks in water quenched parts. Six compounds are obtainable, each of which performs specific heat treating function.

### 12. Machine Tool Motors

General Electric Co.—4-page illustrated bulletin GEA-3685 describes general features of line of totally enclosed fractional horsepower motors for machine tool use. They are built in heavy duty designs to withstand frequent start-stop service, plugging and metal-dust atmospheres.

### 13. Control Devices

Brown Instrument Co.—56-page illustrated bulletin No. 8301 deals with forty-four industrial controls and safeguards such as temperature controllers, float switches, combustion controls, and pressure regulators. Complete specifications are given for all types, covering what they are, why they are used, features, capacities, construction and operation.

### 14. Colloidal Graphite

Acheson Colloids Corp.—2-page loose-leaf section No. 242.5 presents technical information pertaining to application of colloidal graphite to industry. This sheet discusses the product as inert adjunct lubricant for alloy bearings of the cadmium-silver and copper-lead types. Reference bibliography is included.

### 15. Bearings

Norma-Hoffmann Bearings Corp.—84-page engineering catalog F-958-AA-3 lists ball, roller and ball thrust bearings, lock nuts and washers, pillow blocks and cup mountings. Detailed mounting instructions are given for all types together with engineering data on sizes, tolerances, load ratings and recommended usage. Line drawings show principal dimensions.

### 16. Gas Burners

Continental Equipment Co.—4-page illustrated bulletin No. 20-1 contains information on "Universal" gas burners which are made in sizes from 250,000 to 8,000,000 British thermal unit inputs per hour. Sectional views show how burners can be adjusted by means of micrometer head-air orifice to give either luminous, semi-luminous or pre-mix types of flames.

### 17. Low Temperature Welding

Eutectic Welding Alloys, Inc.—Three-fold bulletin describes use of "Castolin" low temperature welding rods for fabrication or reclamation welding on ferrous and non-ferrous metals. Usage, color of finished weld, binding temperature, melting temperature and other data are given for 29 grades of this welding rod. Illustrations show typical parts fabricated and repaired.

### 18. Heat Treating Containers

American Manganese Steel division, American Brake Shoe & Foundry Co.—16-page illustrated bulletin 1041-A catalogs heat treating containers, retorts and furnace fixtures made of nickel-chromium alloys. Several pages deal with facilities of company for developing and testing these heat resisting alloys. Balance of bulletin depicts typical specimens of heat treating containers produced.

### 19. High Speed Steels

Cleveland Twist Drill Co.—24-page bulletin No. AD111 contains technical discussion on molybdenum-tungsten high speed steels marketed under general trade name "Mo-Max." Covered are forging, annealing, welding and brazing, hardening, quenching, and tempering.

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## 20. Steel Stamps

M. E. Cunningham Co.—4-page illustrated bulletin describes variety of types of steel marking stamps which are designed to minimize spalling, mushrooming and hazards associated with these conditions. Several different types of these stamps are pictured.

## 21. Electric Plants

Ready-Power Co.—4-page illustrated bulletin No. 96 describes gasoline electric plant which is designed for mounting on truck body. Model S is equipped with "Chrysler" self-starting six-cylinder gasoline engine and delivers 4.32 kilowatts of 36, 48 or 60 volt power. It is intended for installation on 3 to 8 ton trucks.

## 22. Copper-Silicon Alloys

American Brass Co.—8-page bulletin No. E-5 is devoted to "Everdur" copper-silicon alloys. Development history and general applications are covered. Tables list nominal compositions of four grades, general physical constants, standard specifications and physical properties of sheet, plate, strip, rods, wire, bars and shapes, pipe, tubing and castings.

## 23. Arc Welding

Lincoln Electric Co.—32-page illustrated bulletin No. 420 is titled "How To Change Over To Welded Design For Profits." It pictures many welded parts and tells how these parts offer advantages over cast parts. Cost comparisons are made between welded and cast parts. Features of company's welding equipment are described in detail.

## 24. Dampproofing Compounds

Koppers Co.—2-page catalog section Form TB-4 deals with methods and means of dampproofing cement concrete to protect it from action of water. Recommended method of application for various types of structures is fully explained. Locations where dampproofing should be used are enumerated.

## 25. Rubber Putty

B. F. Goodrich Co.—One-page catalog section 9765 describes "Plasticon" rubber putty for glazing use in chemical plants, plumbing, air-conditioning of buildings or rooms, marine service, general construction and automotive work. Covered are properties, directions for use and list of applications in which product has proved successful.

## 26. Centrifugal Pumps

Pennsylvania Pump & Compressor Co.—8-page illustrated bulletin No. 237 describes multi-stage centrifugal pumps as furnished in two and three-stage types. These pumps are available in 2, 2½, 3, and 4-inch sizes for capacity range from 50 to 850 gallons per minute and for heads up to 1050 feet. Cross-sectional drawing indicates construction features.

## 27. Hand Operated Cranes

Shaw-Box Crane & Hoist division, Manning, Maxwell & Moore, Inc.—8-page illustrated catalog No. 203-A describes line of hand operated cranes which will handle loads of 1000 pounds to 50 tons in weight. Dimensions, capacities and other information are given for swinging bracket jib cranes, single and double girder bridge cranes and other types.

## 28. Microphotometer

Leeds & Northrup Co.—12-page catalog E-90(1) describes microphotometer which mechanically scans spectrographic plates or films and which, by means of "Speedomax" recorder, automatically records on wide strip chart the relative positions and densities of spectrum lines. Sample specimen of recorder chart is reproduced.

## 29. Lighting Equipment

Fostoria Pressed Steel Corp.—12-page illustrated bulletin is titled "Balanced Lighting." Explained are balanced lighting and benefits accruing from its use. Several pages contain action photographs showing different types of work being carried on with various types of lighting equipment. Two pages depict line of lighting equipment.

## 30. Aluminum Bronze Alloys

Ampco Metal, Inc.—24-page illustrated catalog No. 22 deals with aluminum bronze alloys. It contains photomicrographs, factory views and pictures of some of parts made of these alloys. Each grade is described in detail with tables of physical properties and illustrations of castings made from particular grade under discussion.

## 31. Electric Hoist

Yale & Towne Manufacturing Co.—8-page bulletin describes "Midget King" electric hoist in ⅛, ¼, ½ and 1-ton capacities. Design, construction and features are listed together with prices. Construction features are shown by means of cut-away views and photographs of component parts.

## 32. Hand Pumps

Watson-Stillman Co.—4-page illustrated bulletin No. 240-A describes hand operated, high pressure pumps for testing purposes and for operating hydraulic jacks and other small hydraulic tools. Pressures, plunger, diameters, strokes, pipe connections diameters and code numbers are tabulated for 19 different sizes of pumps shown.

## 33. Automatic Arc Welding

Una Welding Inc.—16-page illustrated bulletin outlines principle and features of "Unamatic" process of shielded automatic and continuous welding of carbon and alloy steels. Applications, auxiliary equipment and typical applications are covered. Line drawings amplify text.

## 34. Water Conditioning

Hall Laboratories, Inc.—8-page illustrated bulletin is trade paper reprint entitled "Co-ordination of Water Conditioning With Operating Problems." It discusses maintenance of protective film, control of alkalinity, and prevention of embrittlement and deposits in boiler.

## 35. Machine Tool Drive

Reeves Pulley Co.—6-page illustrated bulletin G-421 explains features of machine tool drive which consists of constant speed driving motor, variable speed unit and mounting bracket. By means of adjustable handwheel, infinitely variable speed selection is obtainable.

## 36. Stress Relief Furnace

Mahr Manufacturing Co.—4-page illustrated bulletin No. 650 outlines important features of car bottom, convection type, recirculating stress relief furnaces with refractory interior ducts. Design, construction, and operation are enumerated.

## 37. Wiring Devices

Pyle-National Co.—Illustrated general catalog No. 1100 contains specifications, descriptions and prices of "Pylet" plugs and receptacles and electrical wiring devices for locomotives and railway cars. Miscellaneous industrial wiring fixtures and devices are also cataloged.

## 38. Government Finishes

Roxalin Flexible Lacquer Co.—Folder file contains data sheets on most used Army and Navy specification finishes and tells how and where they are applied. Eight pages list drying properties, uses, thinning, and methods of application for each of eight finishes.

## 39. Portable Electric Tools

Independent Pneumatic Tool Co.—64-page illustrated catalog No. 37 gives complete specifications, descriptions and prices on "Thor" line of universal type electric drills, drill stands, screw drivers, nut setters, tappers, saws, hammers, nibblers, grinders, sanders, polishers and

## 40. Protective Coatings

Protective Coatings, Inc. — 42-page bulletin lists line of compounds for providing protective coatings to metals, fabrics, wood, and concrete. Each page lists a protective coating, tells what it does, how it is applied and coverage. Price schedule is included.

## 41. Small Lathes

South Bend Lathe Works—56-page illustrated catalog 50-B lists lathes in bench and floor leg types for production of small accurate parts in manufacturing plants, for precision work in tool room and for general use in machine shop, auto service shop, laboratory, school shop, repair shop and home workshop. Attachments are also described.

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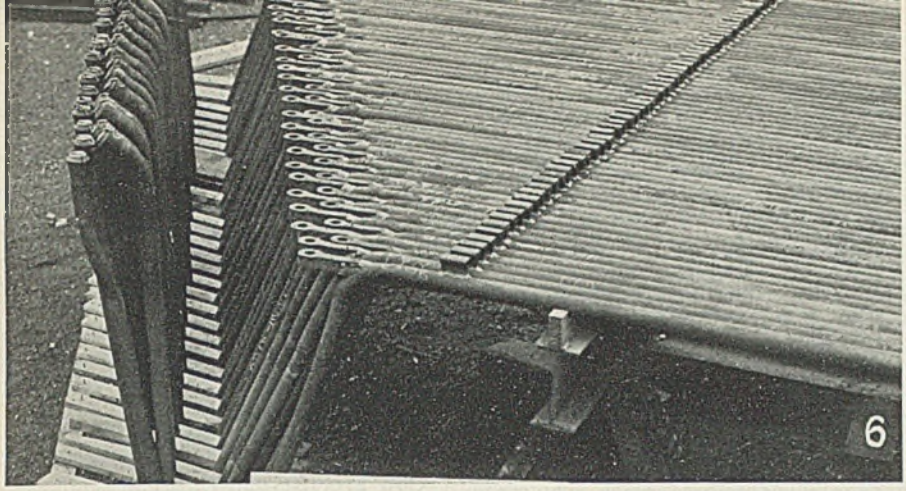

Fig. 6—Tubes with ends flanged for field welding and with supports attached

ditions including those encountered during starting and shutting down the boiler.

The fog convection surface consists of six bundles of tubes above the drum, separated for soot blowers and for accessibility. The tubes are individually supported by vertical tube supports cooled by water circulating thermally from the condenser drums from the floor above.

The mercury convection tubes are 2⅜-inch outside diameter by 1⅞-inch inside diameter in the lower bank and 2¾-inch outside diameter by 2¼-inch inside diameter in the two upper banks. They are fed from 180 of the furnace wall tubes at the top of the upper and lower bundles. The middle bundles are in series with the upper bundles.

The Kearny boiler with its 392,000 pounds of mercury develops 21,000 kilowatts in the mercury turbine and 29,000 kilowatts in the steam turbine—a total of 50,000 kilowatts. Since auxiliary equipment requires 1200 kilowatts, total mercury in the boiler amounts to 8 pounds per net kilowatt.

**Tube Material Critical:** Up to the time of the Lynn boiler which had chromium-molybdenum steel tubes, all previous mercury boilers were made of ordinary low-carbon steel, and in most cases were calorized by the dip method and heat treated. This was done before much was known of the long time rupture strength of such material at high temperature. In 1937, test machines were started to study the long-time rupture strength under high temperature of carbon steel and many kinds of alloy steel. The General Electric Co. now has seven such furnaces in operation at different temperatures, each holding 12 samples.

Results of these rupture tests, together with other considerations, led to the selection of an alloy called Croloy 5M-Si for the Kearny boiler tubes. This alloy contains 0.12 per cent carbon, 0.50 per cent molybdenum, 5 per cent chromium and 1.5 per cent silicon. While 3000 pounds per square inch is the 100,000 hour rupture strength of low-carbon steel at 975 degrees Fahr., the Croloy 5M-Si is equally good at 1140 degrees Fahr. The alloy contains sufficient chromium and silicon to resist oxidation at the operating temperature with the usual coal ash. In cooler passes of the boiler, Croloy 3 is used for the lower bundles of the fog bank, giving required protection.

**Solubility of Iron in Mercury at High Temperatures:** This phenomenon has been a fundamental obstacle in developing the mercury cycle as this action reduces the thickness of the metal. Too, the disintegrated iron and iron oxide was deposited in places on the heating surfaces in the lower temperature regions, frequently restricting or stopping the flow of mercury or vapor.

Steel specifications were altered and various alloys developed in an effort to find a material that would, if possible, entirely eliminate the loss of metal by dissolving in the mercury. Some success was attained as the Croloy 5M-Si in actual service offered more resistance to mercury attack than the carbon steel. See Table I for analysis.

However, a parallel investigation did bring complete success. *One part per million of metallic titanium and one hundred parts per million of metallic magnesium, by weight, added to the boiler mercury completely stopped the loss of steel by dissolving.* A further and equally important effect was realized as reliable heat transfer between the heated tube and the boiling mercury was secured as the mercury-titanium-magnesium alloy produces perfect wetting of the mercury coated surfaces.

**Welding Joints:** As will be seen in the section, Fig. 2, boiler tubes are welded into the mercury boiler drum. In addition, downcomers, mercury feed and gage connections, vapor outlets, and other connections also are welded. There are approximately 5000 field and factory welds in the boiler. In this total, no leaks were found in the hydrostatic tests or during operation.

Obtaining absolutely tight joints is of utmost importance in this type of plant because the total volume of mercury only is 455 cubic feet and the most minute leaks must be avoided or the mercury would be lost.

In the vacuum portions of the system, air infiltration must be maintained at less than 1 cubic foot per hour to prevent oxidation and loss of the active magnesium and titanium metals in the mercury.

The factory and field welding of the various alloy tubes used in the boiler required the adoption of very complete specifications and rigid inspection as welding proceeded.

While the manufacture and erection of the boiler was by Babcock & Wilcox Co., Barberton, O., the selection of furnace tube materials and welding procedure was a joint responsibility with General Electric Co.

The welding specifications and welding procedure as followed in welding the tubes for the Kearny boiler for both factory production and field erection are shown by Tables II and III and Fig. 4. These were made up in chart form, which were readily followed by the welders, as well as the supervisors. It will be noted that the tube material, welding process, heat treat-

Fig. 7—Left, calrod electric annealing unit, hinged to go around weld. Right, welding jig used for field welding joints in Croloy 5M-Si tubes for the Kearny boiler



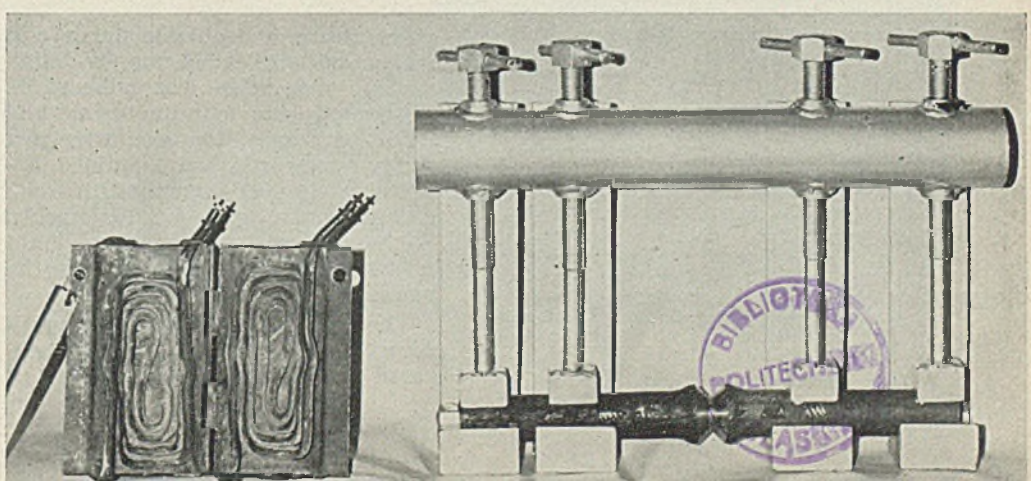

**TABLE III—Condensed Procedure Specifications**

**Specification No. 104:**

**Material:** Carbon steel pipe or tubing with carbon content not exceeding 0.35 per cent.

**Process:** Oxyacetylene welding, backhand and/or forehand deposition, all positions. Welding Rods: Diameter of welding rod shall not be greater than $\frac{3}{16}$-inch. Oxweld No. 1 High Test, Airco No. 1 or their equivalents shall be employed as filler metal.

**Edge Preparation:** Edges shall be prepared, properly cleaned and aligned to form vee-shaped groove adapted to backing rings of the annular ridge type.

**Preheat:** None when the base material is 70°F. or above or thickness less than ½-inch.

**Heat Treatment:** 1100 to 1250°F. for period corresponding to 1 hour per inch of section.

**Specification No. 105:**

**Material:** Carbon-molybdenum steel pipe or tubing with carbon content not exceeding 0.25 per cent or molybdenum 0.65 per cent.

**Process:** Oxyacetylene welding, backhand and/or forehand deposition, all positions.

**Welding Rods:** Diameter of welding rod shall not be greater than $\frac{3}{16}$-inch. Rod of 0.5 per cent molybdenum shall be used except for welding carbon-molybdenum to carbon steels, wherein Oxweld No. 1 High Test, Airco No. 1 or their equivalents shall be employed.

**Edge Preparation:** Edges shall be prepared and properly cleaned and aligned to form vee-shaped groove adapted to backing ring of the annular ridge type.

**Preheat:** Between ¼ and ½-inch wall thickness a preheat temperature of 150°F. minimum shall be employed.

**Heat Treatment:** 1150 to 1250°F. for period corresponding to 1 hour per inch of section, but not less than 20 minutes.

**Specification No. 106:**

**Material:** Chromium-molybdenum steels of not over 0.15 per cent carbon content, molybdenum not above 0.65 per cent and nominal chromium contents 1.25, 1.75 and 2.0 per cent, respectively. Silicon-molybdenum steel of not over 0.15 per cent carbon content, molybdenum not above 0.65 and nominal silicon content of 1.50 per cent.

**Process:** Oxyacetylene welding, backhand and/or forehand deposition, all positions.

**Welding Rods:** Diameter of welding rod shall not be greater than $\frac{3}{16}$-inch. The 2.0 per cent chromium, 0.50 per cent molybdenum rod shall be used except that where materials of specification 104 or 105 are used with those of 106, the rods indicated in the specification of lower number shall be used.

**Edge Preparation:** Edges shall be prepared and properly cleaned and aligned to form a vee-shaped groove adapted to backing rings of the annular ridge type.

**Preheat:** A preheat temperature of 400°F. minimum shall be employed.

**Heat Treatment:** 1300 to 1450°F. for 1 hour per inch of section, but not less than 20 minutes.

**Specification No. 107:**

**Material:** Chromium steel pipe or tubing with 5 per cent chromium and with specified additions of 0.5 per cent molybdenum, 1.0 per cent tungsten, 1.5 per cent silicon and titanium or columbium for stabilization. Chromium steel of the 9 or 13 per cent chromium content.

**Process:** Oxyacetylene welding backhand or forehand deposition, all positions.

**Welding Rods:** Diameter of welding rod shall not be greater than $\frac{3}{16}$-inch. Rods comparable to the specific grades to be welded shall be required, except that those of the lower alloy content shall be used where one of the base materials is of this order.

**Edge Preparation:** Edges shall be prepared, properly cleaned and aligned to form a vee-shaped groove adapted to backing rings of the annular ridge type.

**Preheat:** A preheat temperature of 600°F. shall be required.

**Heat Treatment:** 1350 to 1425°F. for 1 hour per inch of section, but not less than 20 minutes.

**Specification No. 108:**

**Material:** Carbon steel pipe or tubing with carbon content not exceeding 0.35 per cent.

**Process:** Metal-arc welding, string beads or weaving, all positions.

**Welding Rods:** Vertex, Lincoln No. 5 or equivalent electrodes shall be used for filler metal.

**Edge Preparation:** Edges shall be prepared, properly cleaned and aligned to form a vee-shaped groove adapted to backing rings of the annular ridge type.

**Preheat:** Preheat to 150°F.

**Heat Treatment:** 1100 to 1250°F. for 1 hour per inch of section, but not less than 20 minutes.

**Specification No. 109:**

**Material:** Carbon-molybdenum steel pipe or tubing with carbon content not exceeding 0.25 per cent or molybdenum 0.65 per cent.

**Process:** Metal-arc welding, string beads or weaving, all positions.

**Welding Rods:** Molex, Lincoln No. 85 electrodes or equivalents shall be used except that for welding carbon-molybdenum to plain carbon steels Vertex or Lincoln No. 5 or their equivalents shall be employed.

**Edge Preparation:** Edges shall be prepared, cleaned and aligned to form vee-shaped groove adapted to backing ring of annular ridge type.

**Preheat:** Preheat to 150°F. for wall thicknesses between ¼ and ½-inch.

**Heat Treatment:** 1100 to 1250°F. for a period corresponding to 1 hour per inch of section, but not less than 20 minutes.

**Specification No. 113.**

**Material:** Chromium steel pipe or tubing with 5 per cent chromium and with specified additions of 0.5 per cent molybdenum, 1.0 per cent tungsten, 1.5 per cent silicon and titanium or columbium for stabilization. Chromium steel of the 9 or 13 per cent chromium content.

**Process:** Metal-arc welding string beads or weaving, all positions.

**Welding Rods:** Rods comparable to the specific grades to be welded shall be required, except that those of the lower alloy content shall be used where one of the base materials is of this order.

**Edge Preparation:** Edges shall be prepared, properly cleaned and aligned to form a vee-shaped groove adapted to backing rings of the annular ridge type.

**Preheat:** Preheat to not less than 600°F.

**Heat Treatment:** 1350 to 1425°F. for 1 hour per inch of section thickness, but for no less than 1 hour.

ment, inside and outside finish, and inspection are called for in detail.

Close inspection was adhered to throughout the manufacturing and field operations. Representative test welds were made and examined, approximately every twenty-fifth weld, except drum and header welds. Each weld was stamped for identification by the welder doing the work.

The results were extremely gratifying, as the assembled boiler withstood hydrostatic pressure test of 1660-pound gage with no leaks in any of the thousands of welds.

No leaks of any kind have developed in the tubes or tube welds after more than a year's operation at metal temperatures from 985 to 1150 degrees Fahrenheit and internal mercury pressures from 140 to approximately 400-pound gage.

Undoubtedly, the selection of a boiler design to give low stresses in the tubes and tube welds, along with the use of proper tube materials, weld metal, welding technique, heat treatment, and careful inspection are the contributing factors to the success of the Kearny boiler. These same important considerations should give to the Kearny boiler a life expectancy equal to that of the modern high-pressure steam units.

Fig. 6 shows assembly of portion of furnace tubes of Croloy 5M-Si with upset ends arranged for field welding, and with supporting lugs and guides welded in place.

## Issues First Standard On Toxic Materials

■ Because of increasing importance of toxic materials in connection with the war program, and greater hazards to workers due to increased production, the American Standards Association, 29 West Thirty-ninth street, New York, has placed several of these materials on its emergency list of projects. The first standard of this group—that for allowable concentration of cadmium—has just been published.

The new standard describes properties of cadmium, states the permissible concentration as 1 milligram of cadmium per 10 cubic meters of air and outlines the sampling procedure and analytical methods to be followed in determining the concentration.

The material, according to the association, is toxic when absorbed either through the lungs or the gastro-intestinal tract, and in some cases causes generalized pneumonia. Copies of the standard are available from association headquarters for 20 cents each.

## Charts for Chemists

■ Three reference charts published recently by Technical Service Bureau Inc., 6805 North Clark street, Chicago, offer considerable practical utility to chemists, superintendents and others using caustic soda and sucrose solutions or buffering salts.

One of these, the chart showing the pH of 21 buffers which are used in the food, detergent and other industries, contains much data not previously published. All three of these charts, A-101, A-102 and A-103, are offered free of charge.

## Water-Cooled Equipment

(*Concluded from Page 72*)

inch diameter and 1¼ inches long. The vertical pipe is of extra heavy grade and 2 inches diameter. The header is standard 4-inch pipe. It is thought there is better water circulation with this type of construction.

Several of these doors are in service at the present time. The cost is comparable to doors built with a solid back.

A bridgewall construction in a natural gas fired furnace is shown in Fig. 9. The water cooler extends across the furnace and is covered with plastic chrome ore. It is important with this kind of fuel and construction to make sure that the original height of the bridgewall be maintained to prevent premature combustion by air and gas mixing too soon. These coolers are left in place when rebuilding of the bridgewall is necessary.

Fig. 4 shows a port burner cooler which is used with liquid fuel. The illustration at the right depicts the arrangement of the studs; the one at the left shows the plastic chrome ore rammed in place on the hot side.

The studs used for this unit are ⅝-inch diameter and 1½ inches long. The refractory layer is 1½ inches thick.

Another type of port cooler, for burning liquid fuel, employing stud application design, is shown in Fig. 5. The studs in this case are ¾-inch diameter and 4½ inches long.

### Brick Covering Provided

A protected port cooler is shown in position in Fig. 10. A bare cooler usually is covered with brick, as shown by the dotted lines. The brickwork of the protected cooler, as shown by the solid lines, starts 18 to 24 inches back from the nose, and thus opens up the passage for the outgoing gases. This arrangement affords a desirable contour and also eliminates the danger of brick falling down in front of the burner, and thus cause the flame to be diverted.

An archless water-cooled door frame, one half studded, and the other half rammed with plastic chrome ore is shown in Fig. 6. This is a new development only one frame being in service at present. The studs, ⅜-inch diameter and 1¼ inches long, are installed on 2-inch centers.

Two open-hearth bulkheads, similar to that shown in Fig. 7 were installed at one end of a furnace. The studs are ⅜-inch diameter and 1¼ inches long. The pipes are 2 inches outside diameter. The unit installed at the rear lasted for 391 heats which is about equal to basic brick in the same position; the other installed at the front lasted for 533 heats. Both were taken out due to water leaks. The first cost of these bulkheads is rather high. Further tests will show whether they are economical.

Just what economy of this new development is in trying to cover all water-cooling media in an open-hearth, is difficult to say, but as a whole, it is desirable to cover the water cooling for better efficiency of the furnace. In the case of doors and bulkheads, a direct comparison of the refractories can be made, but with port coolers, door frames and skewback coolers, which have usually been exposed to the flame, it can only be proved worthwhile if the furnace seems to work better, and there are less renewals of the cooling units.

It is hoped that in time, more will be learned about the proper size and spacing of the studs and the best thickness of the plastic chrome ore. Furnace equipment makers are prepared to send out new cooling units already studded which will help to cut down the amount of welding particularly at a time when there is a shortage of welders in some plants.

## Manganese Consumption Can Be Reduced 10-20%

(*Concluded from Page 44*)

specifications and giving publicity to them. Such specifications might be similar to General Motors compositions Y1335 and Y1340, which call for 1.35 to 1.65 per cent manganese with 0.05 per cent maximum sulphur.

Steel bars and forging billets, carbon and alloy, required 29.3 per cent of the total manganese consumed in 1940; therefore efforts made to decrease manganese consumption are vitally important from the standpoint of total manganese consumed. In attacking the problem of manganese conservation in these grades there are three items to be considered:

1. In the past the consumer-producer relationships have been of paramount importance in developing proper specifications. In considering manganese conservation those relationsh ps become even more important in determining modifications of standard specifications which will permit the manufacture of a satisfactory product with a decreased manganese content.

2. With proper consideration of the whole problem of manganese conservation it is evident that the most logical substitute for manganese in these grades is carbon, and this deserves most serious consideration of both producer and consumer.

3. If it were economically advantageous for the consumer to use a steel lower in manganese than that which is now standard practice for any given product, there is very little question that the result would be a real decrease in the manganese requirements in these grades which, as pointed out above, consume almost one-third of the total manganese consumed by the industry.

### 0.35 Per Cent Satisfactory

Consumption of ferromanganese in the manufacture of sheet steel and strip steel products is the lowest per ton of all the products listed in Table I, but because those products consume about one-fifth on the ingot output, even a small reduction per ton in manganese consumed would be significant. For example, a decrease of one point (0.01 per cent) in the average manganese content of sheets and strips will result in a saving of about five per cent for the product and one per cent of the total ferromanganese for the industry.

It is the opinion of the committee that an average manganese content of 0.35 per cent maximum should be satisfactory for those products, except for special cases, and that on present products steelmakers should decrease the manganese specifications as far as practicable.

If the manganese consumption per ton of ingots could be reduced from 10 pounds to 7.5 pounds for sheet steel and strip steel products such a reduction would amount to a saving of 25 per cent in the product and 5 per cent in the total manganese required by the steel industry. Such a reduction of 2½ pounds per ton would, however, necessitate lowering by about five points (0.05 per cent) the average manganese content now required by sheet steel and strip steel specifications. No such reduction can be considered without considering changes in design of finished products to give workability in a steel of lower manganese content. For example, if the general designs in use five years ago were again used for products now made from sheet steel it is the opinion of the committee that the reduction referred to above would be practicable.

### Ask No Cut for Forgings

Steels used in the manufacture of wheels, axles, and heavy forgings consumed only 2.9 per cent of the total ferromanganese used in 1940, and it is the opinion of the committee that because of the importance of these products in the fields of public safety, that no changes in specification requirements for manganese be recommended.

Pipe, lap weld, and butt weld, falls into class A. In general, requirements for manganese in pipe specifications can probably be reduced to 0.25 per cent minimum, and the producers of such products can work as close to that figure as is possible, consistent with surface quality requirements and physical property requirements.

Seamless tubing falls into classes A and B. It is the opinion of the committee that the carbon, manganese, and silicon contents of steels used in the manufacture of seamless tubing can be adjusted to give the desired physical properties and piercing properties, consistent with the individual characteristics of producing mills. Such an adjustment would involve lowering the manganese content requirements with suitable increases in carbon and silicon content requirements.

Carbon steel plates and structural shapes fall into Class A. There are two distinct problems involved in considering manganese conservation in specifications for carbon steel plates and structural sections: First the problem of physical properties; and second, the problem of surface requirements.

With respect to physical properties, it has been demonstrated that except for material which is to be welded, the manganese content can be decreased and the carbon content increased. In the case of steel which has to be welded, 0.25 per cent carbon is accepted generally as the upper limit and it is not possible to reduce the manganese content of such steels without lowering physical properties. This is particularly true of the heavier sections for which there is but a limited demand.

Steel piling falls into Class A. Because of the relatively small tonnage involved and the difficulties encountered in rolling some of the more intricate piling sections it is the opinion of the committee that reductions in manganese specifications, if any, should be worked out by the respective producers.

Tin plate falls into Class B. It is the opinion of the committee that little can be done to lower the manganese content of steel used in the manufacture of tin plate because of the danger of producing bad edges in material produced on high speed cold reducing mills.

Standard tee rails fall into class A. It is the opinion of the committee that a reduction can be made in the manganese content of rails at the possible sacrifice of some wearing quality and a possible slight increase in seconds, but that for emergency purposes this qualification might be neglected. It is therefore recommended that an emergency specification of 0.50 to 0.80 per cent manganese be written instead of the present 0.70 to 1.00 per cent manganese specification.

As a result of contacts with various steel castings producers, it is the opinion of the committee that steel castings can generally be made with a 0.70 per cent maximum manganese content, except for certain special products. It is recommended that the producers of steel ingots produce their castings with this maximum content of manganese. The committee suggests that this conclusion be called to the attention of the American Foundrymen's Association with the request that it consider some similar recommendation for the steel castings industry.

## Timken Keeps Cars Moving; Saves Demurrage

■ Timken Roller Bearing Co., Canton, O., reports it has eliminated all railroad car demurrage at its plants so that freight cars may be released immediately for further use. Each department head is charged with the duty of seeing that no car, incoming or outgoing, is detained in the plant more than 48 hours, and cars are unloaded in less than 24 hours when possible. Walter C. Sanders, general manager of Timken railway division, finds the company profits, as demurrage charges are several times more costly than storage in warehouses.

# New Records Set in Steel, Iron Output

*Enlarged production indicates ability to meet war demand. Scrap still handicap to fullest performance. New plan for plates.*

**MARKET IN TABLOID ★**

**Demand**
*Heavy in all lines.*

**Prices**
*Ceilings well observed.*

**Production**
*Down 1 point to 96½ per cent.*

■ UNDER the spur of a vastly enlarged war program, as outlined by the President last week, the steel industry is preparing in every possible way to meet the demand incident to such an undertaking.

Steel ingot and pig iron production figures for December and the entire year have set new records, an earnest of the industry's all-out effort to meet whatever demands are made on its capacity.

For the present, until the situation becomes clearer and actual war demands are understood, civilian users have little chance of obtaining steel. It is believed that capacity is sufficient to meet armament needs and also provide considerable tonnage for non-war use. This belief rests on the assumption that facilities for fabricating steel into ships, combat tanks and munitions are not sufficient to take the entire output indefinitely. During the period of changing over and adjusting to the new condition mills are unable to fill much demand outside the highest priorities.

Inability to obtain sufficient raw material, principally scrap, for peak steel production is cutting into the total possible otherwise, but this cut falls first on civilian supplies and will not affect war needs until it has progressed much further than is expected. Survey of the entire situation indicates that even under this handicap sufficient steel will be available to meet all war requirements.

Steelmaking declined 1 point last week, to 96½ per cent, the dip being almost entirely due to lack of scrap, open hearths in practically all districts being idle from that cause. Chicago increased its rate ½-point to 102 per cent and Cleveland had a net gain of 1 point to 95 per cent. Pittsburgh dropped 1 point to 95 per cent, Detroit 8 points to 82, Buffalo 2 points to 79½, New England 8 points to 92, Wheeling 1 point to 90 and Youngstown 2 points to 90. Unchanged rates prevailed at Eastern Pennsylvania, 89; Cincinnati, 91½; Birmingham, 90; St. Louis, 76.

Lack of scrap is the greatest deterrent to enlarged production of steel, practically every producer having open-hearth capacity idle. Operation of active furnaces is hand-to-mouth with possibility of curtailment ever present. No steelmaker has reserves sufficient for more than a few days' production and receipts of scrap are meager. Recent revision of the ceiling schedule has helped somewhat in bringing out better supply of steelmaking grades, but the improvement is slight. On the other hand, the new schedule for cast grades has lowered prices and supply is no better, in some cases worse.

Iron and Steel Branch, OPM, has announced a plan to produce as much plate as possible on continuous strip and sheet mills, to release output of plate mills for urgent war production. Consumers are asked to change design of their products to utilize fully the continuous mill product. Mills producing universal and sheared plates will be used as far as possible in serving ship, combat tank and other direct war uses.

A total of 82,927,557 net tons of open-hearth, bessemer and electric furnace steel castings was produced in 1941, nearly 25 per cent more than the previous peak output, 66,981,662 tons, in 1940. The industry operated at an average rate of 97.4 per cent for the year, compared with 82.1 per cent in 1940. December production was 7,163,999 tons, slightly more than 6,969,987 tons made in November but a little below the all-time high of 7,242,683 tons made in October, 1941.

Pig iron production in December broke all previous records for daily rate and monthly total and carried the total for the year to a new high of 55,918,086 net tons, 19.24 per cent over 46,894,675 tons in 1940 and 58.36 per cent over the 1939 output. December total was 5,014,995 tons, 6.97 per cent greater than 4,707,194 tons made in November. The daily production rate was 161,774 tons, exceeding the previous all-time record of 157,378 tons in September, 1940. Three more stacks were in production than in November, the total being 218. The rate of operation, production related to estimated capacity, was 104.06 per cent.

Automobile assembly last week totaled 58,990 units, compared with 18,530 the preceding week. In the corresponding week in 1941 production was 115,935 cars. Increase of the January quota to 208,000 has allowed builders to make use of more of their stocks of parts.

Composite prices come over into the new year unchanged from the latter part of 1940. Finished steel composite is $56.73, semifinished steel $36, steelworks pig iron $23.05 and steelworks scrap $19.17. Recent revisions of the scrap ceiling schedule had no effect on the latter.

# COMPOSITE MARKET AVERAGES

| | Jan. 10 | Jan. 3 | Dec. 27 | One Month Ago Dec., 1941 | Three Months Ago Oct., 1941 | One Year Ago Jan., 1941 | Five Years Ago Jan., 1937 |
|---|---|---|---|---|---|---|---|
| Finished Steel | $56.73 | $56.73 | $56.73 | $56.73 | $56.73 | $56.73 | $55.18 |
| Semifinished Steel | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 | 36.20 |
| Steelmaking Pig Iron | 23.05 | 23.05 | 23.05 | 23.05 | 23.05 | 22.80 | 19.96 |
| Steelmaking Scrap | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 21.00 | 18.45 |

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

## Finished Material

| | Jan. 10, 1942 | Dec. 1941 | Oct. 1941 | Jan. 1941 |
|---|---|---|---|---|
| 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 | 2.17 |
| 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

| | Jan. 10, 1942 | Dec. 1941 | Oct. 1941 | Jan. 1941 |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $25.34 | $25.34 | $25.34 | $25.34 |
| Basic, Valley | 23.50 | 23.50 | 23.50 | 23.50 |
| Basic, eastern, del. Philadelphia | 25.34 | 25.34 | 25.34 | 25.34 |
| No. 2 fdry., del. Pgh., N.&S. Sides | 24.69 | 24.69 | 24.69 | 24.69 |
| No. 2 foundry, Chicago | 24.00 | 24.00 | 24.00 | 24.00 |
| 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 | 26.215 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 24.00 |
| Malleable, Chicago | 24.00 | 24.00 | 24.00 | 24.00 |
| Lake Sup., charcoal, del. Chicago | 31.34 | 31.34 | 31.34 | 30.34 |
| Gray forge, del. Pittsburgh | 24.19 | 24.19 | 24.19 | 24.17 |
| Ferromanganese, del. Pittsburgh | 125.33 | 125.33 | 125.33 | 125.33 |

## Scrap

| | | | | |
|---|---|---|---|---|
| Heavy melting steel, Pitts. | $20.00 | $20.00 | $20.00 | $22.15 |
| Heavy melt. steel, No. 2, E. Pa. | 17.75 | 17.87 | 17.75 | 19.31 |
| Heavy melting steel, Chicago | 18.75 | 18.75 | 18.75 | 20.15 |
| Rails for rolling, Chicago | 22.25 | 22.25 | 22.25 | 24.40 |
| No. 1 cast, Chicago | 20.00 | 21.33 | 21.50 | 19.35 |

## Coke

| | | | | |
|---|---|---|---|---|
| Connellsville, furnace, ovens | $6.25 | $6.25 | $6.25 | $5.50 |
| Connellsville, foundry, ovens | 7.25 | 7.25 | 7.25 | 6.00 |
| Chicago, by-product fdry., del. | 12.25 | 12.25 | 12.25 | 11.75 |

# 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, B'ham., base .. 3.05c
Granite City, base ..... 3.15c
Detroit, del. ..... 3.15c
Other Mich. pts., del. ... 2.25c
Pacific ports ..... 3.70c

**Galvanized Sheets, No. 24**

Pittsburgh, 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, Buffalo, Youngstown, Sparrows Point, Middletown, 29 gage, per square ..... 3.31c
Granite City ..... 3.38c
Pacific Ports ..... 3.73c

**Culvert Sheets**

Pittsburgh, Gary, Birmingham, 16-gage, not corrugated, copper steel 3.60c, copper iron 3.90c, pure iron 3.95c.
Pittsburgh, 24-gage, zinc-coated, hot-dipped, heat-treated 4.25c.
Granite City, copper steel 3.70c, copper iron 4.00c, pure iron 4.05c.
Pacific ports, copper steel 4.25c, copper iron 4.55c, pure iron 4.60c.

**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 |
|---|---|---|---|
| Field gr. | 3.20c | 3.95c | 3.30c |
| Armat. | 3.55c | 4.30c | 3.65c |
| Elect. | 4.05c | 4.80c | 4.15c |
| Motor | 4.95c | 5.70c | 5.05c |
| Dynamo | 5.65c | 6.40c | 5.75c |
| Transformer 72 | 6.15c | 6.90c | ..... |
| Transformer 65 | 7.15c | 7.90c | ..... |
| Transformer 58 | 7.65c | 8.40c | ..... |
| Transformer 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
Other Mich. pts. del. ... 2.25c
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
Other Mich. pts. del. ... 2.95c

**Commodity C.R. Strip**

Pittsburgh, Cleveland, Youngstown, base 3 tons and over ..... 2.95c
Worcester, base ..... 3.35c
Detroit, del. ..... 3.05c
Other Mich. pts. del. ... 3.10c

**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

## Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

| TYPE | BARS | PLATES | SHEETS | H. R. STRIP | C. R. STRIP |
|---|---|---|---|---|---|
| 302 | 24.00c | 27.00c | 34.00c | 21.50c | 28.00c |
| 303 | 26.00 | 29.00 | 36.00 | 27.00 | 33.00 |
| 304 | 25.00 | 29.00 | 36.00 | 23.50 | 30.00 |
| 304-20% clad | ..... | *18.00 | 19.00 | ..... | ..... |
| 308 | 29.00 | 34.00 | 41.00 | 28.50 | 35.00 |
| 309 | 36.00 | 40.00 | 47.00 | 37.00 | 47.00 |
| 310 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 311 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 312 | 36.00 | 40.00 | 49.00 | ..... | ..... |
| 316 | 40.00 | 44.00 | 48.00 | 40.00 | 48.00 |
| 317 | 50.00 | 54.00 | 58.00 | 50.00 | 58.00 |
| 347 | 33.00 | 38.00 | 45.00 | 33.00 | 42.00 |
| 403 | 21.50 | 24.50 | 29.50 | 21.25 | 27.00 |
| 410 | 18.50 | 21.50 | 26.50 | 17.00 | 22.00 |
| 416 | 19.00 | 22.00 | 27.00 | 18.25 | 23.50 |
| 420 | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 430 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| 430F | 19.50 | 22.50 | 29.50 | 18.75 | 24.50 |
| 431 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| 442 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 446 | 27.50 | 30.50 | 36.50 | 35.00 | 52.00 |
| 501 | 8.00 | 12.00 | 15.75 | 12.00 | 17.00 |
| 502 | 9.00 | 13.00 | 16.75 | 13.00 | 18.00 |

*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, Gary No. 24 unassorted ..... 3.80c
Pacific Ports ..... 4.55c

**Special Coated Mfg. 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, Chicago, Gary, Cleveland, Birmingham,

Youngstown ..... 2.10c
Coatesville, Sparrows Point, Claymont ..... 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, Bethlehem, Chicago, Buffalo, 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

| Alloy S.A.E. | Diff. | Alloy S.A.E. | 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
T 1300, 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**

Pitts., Chicago, Gary, Cleveland, Buffalo, base 3.35c
Detroit ..... 3.45c
Galveston, add $0.25; Pacific Coast, $0.50.

**Turned, Ground Shafting**

Pitts., Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) ..... 2.65c
Detroit ..... 2.70c

**Reinforcing Bars** (*New Billet*)

Pitts., 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
Detroit, del. ..... 2.25c

**Reinforcing Bars** (*Rail Steel*)

Pitts., Chicago, Gary Cleveland, Birm., base. 2.15c
Gulf ports, dock ..... 2.50c
All-rail, Houston from Birmingham ..... 2.59c
Pacific ports, dock ..... 2.80c
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 at Birmingham)*

Bright bess., basic wire. 2.60c
Galvanized wire ..... 2.60c
Spring wire ..... 3.20c
Worcester, Mass., 10c higher on bright basic and spring wire.

## Cut Nails

Carload, Pittsburgh, keg. $3.85

## Alloy Plates (Hot)

Pitts., Chicago, Coatesville, Pa. ..... 3.50c

## Rails, Fastenings

*(Gross Tons)*

Standard rails, mill .... $40.00
Relay rails, base, 35 lbs. and over.....28.00-30.00
Light rails, billet qual., Pitts., Chicago, Bham. $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., ⅝ 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 .....60 off

**Square Head Set Screws**

Upset, 1-in., smaller ... 68 off
Headless, ¼-in., larger ..55 off
No. 10, smaller .....60 off

## Piling

Pitts., Chgo., Buffalo .. 2.40c

## Rivets, Washers

*F.o.b. Pitts., Cleve., Chgo., Bham.*

Structural ..... 3.75c
⅜-inch and under .....65-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l .....$3.50 off

## Tool Steels

*Pittsburgh, Bethlehem, Syracuse, base, cents per lb.*

Carb. Reg. 14.00 Oil-hardening .. 24.00
Carb. Ext. 18.00
Carb. Spec. 22.00 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 |
| 5.50 | 4.50 | 4 | 4.50 | 70.00 |

## 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**

| In. | Steel Blk. | Steel 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 ..... | 28½ | 12 |

**Line Pipe, Plain Ends**

| | Steel |
|---|---|
| 1 to 3, butt weld..... | 68½ |
| 2, lap weld ..... | 63 |
| 2½ to 3, lap weld ..... | 66 |
| 3½ to C, lap weld ..... | 65 |
| 7 and 8, lap weld ..... | 64 |

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 ⅝-in. incl. 2.15
Worcester up $0.10, Galveston up $0.25 and Pacific Coast up $0.50 on water shipments.

**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. .. 12.00
Milwaukee, ovens... 12.25
New England, del. .. 13.75
St. Louis, del. ..... 12.02
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.) ..... 14.75
Do. (1000 lbs. or over) 13.00

*Eastern Plants, per lb.*

Naphthalene flakes, balls, bbls. to jobbers ..... 7.00c

*Per ton, bulk, f.o.b. port*

Sulphate of ammonia ....$29.00

# 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 | nominal |
| Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail | $25.00 |
| Do., barge | 25.00 |
| No. 2 lump | 25.00 |

# Ferroalloy Prices

**Ferromanganese, 78-82%,**

| | |
|---|---|
| Carlots, duty pd., seab'd | $120.00 |
| Carlots, del. Pittsburgh | 125.33 |
| Carlots, f.o.b. So. f'ces. | 140.00 |

Add $10 for ton, $13.50 for less ton, $18 for less than 200-lb. lots.

**Spiegeleisen, 19-21%,** gross ton, Palmerton $36.00

**Manganese Briquets,** Contract carloads, bulk freight allowed, per lb. 5.50c
Packed 5.75c
Ton lots 6.00c
Less-ton lots 6.25c
Less 200-lb. lots 6.50c
Spot ¼c higher.

**Manganese Electro, 99.9+%,** less car lots 42.00c

**Chromium Metal,** per lb. contained chromium

| | Contract | Spot |
|---|---|---|
| 98% Cr. ton lots | 80.00c | 85.00c |
| 88% Cr. ton lots | 79.00c | 84.00c |

**Ferrocolumbium, 50-60%** f.o.b. Niagara Falls, per lb. contained Cb on contract $2.25
Less-ton lots 2.30
(Spot 10c higher)

**Chromium Briquets,** per lb., freight allowed

| | Contract | Spot |
|---|---|---|
| Carlots | 8.25c | 8.50c |
| Packed | 8.50c | 8.75c |
| Ton lots | 8.75c | 9.00c |
| Less-ton lots | 9.00c | 9.25c |
| Less 200 lbs. | 9.25c | 9.50c |

**Ferrochrome, 66-70%,** freight allowed, 4-6% carbon, per pound contained (chrome)
Carloads 13.00c
Ton lots 13.75c
Less-ton lots 14.00c
Less than 200-lb. lots 14.25c

**67-72%, low carbon,** cts. per pound:

| | Car loads | Ton lots | Less ton | Less 200 lbs. |
|---|---|---|---|---|
| 2% C. | 19.50 | 20.25 | 20.75 | 21.00 |
| 1% C. | 20.50 | 21.25 | 21.75 | 22.00 |
| 0.20% C. | 21.50 | 22.25 | 22.75 | 23.00 |
| 0.10% C. | 22.50 | 23.25 | 23.75 | 24.00 |

Spot is ¼c higher.

**Ferromolybdenum, 55-75%,** per lb. contained molybdenum, f.o.b. furnace 95.00c

**Calcium Molybdate (Molyte),** 40-45% Mo., per lb. contracts, f.o.b. producers plant 80.00c

**Molybdic Oxide Briquets, 48-52% Mo.** per lb. contained, f.o.b. producers plant 30.00c

**Molybdenum Oxide,** (In 5 and 20 lb. mo. contained cans) 53-63 mo. per lb. contained f.o.b. producers' plants 80.00c

**Molybdenum Powder, 99%,** f.o.b. York, Pa., per lb. in 200-lb. kegs $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

**Ferrophosphorus, 17-19%,** gross ton carloads, f.o.b. sellers' works, $3 unitage, freight equalized with Rockdale, Tenn. for 18% phos.
Contract $58.50
Spot 62.25
23-26%, $3 unitage, freight equalized with Mt. Pleasant, Tenn., for 24% phos.
Contract 75.00
Spot 80.00

**Ferrosilicon,** Gross tons, freight allowed, bulk

| | Carloads | Ton lots |
|---|---|---|
| 50% | $ 74.50 | $ 87.00 |
| Unitage | 1.50 | 1.75 |
| 75% | 135.00 | 151.00 |
| Unitage | 1.80 | 2.00 |
| 85% | 170.00 | 188.00 |
| Unitage | 2.00 | 2.20 |
| 90-95% | 10.25c | 11.25c |

(Above for contracts; spot ¼c higher)

**Silicon Metal,** Spot ¼-cent higher (Per Lb., Contracts):

| | 1% Iron | 2% Iron |
|---|---|---|
| Carlots | 14.50c | 13.00c |
| Ton lots | 15.00c | 13.50c |
| Less-ton lots | 15.25c | 13.75c |
| Less 200 lbs. | 15.50c | 14.00c |

**Silicon Briquets,** Contract carloads, bulk freight allowed, per ton $74.50
Packed 80.50
Ton lots 84.50
Less-ton lots, per lb. 4.00c
Less 200-lb. lots 4.25c
Spot ¼c higher on less ton lots; $5 higher on ton lots and over.

**Silicomanganese,**

| | 1½% Carloads (contract) | 2½% Ton Lots (contract) |
|---|---|---|
| Carbon | $128.00 | $118.00 |
| | 140.50 | 130.50 |

Freight allowed spot $5 above contract

**Ferrotungsten,** (All prices nominal) Carlots, per lb. contained tungsten $1.90

**Tungsten Metal Powder,** (Prices Nominal) 98-99 per cent, per pound, depending upon quantity $2.60-$2.65

**Ferrotitanium, 40-45%,** f.o.b. Niagara Falls, per lb. contained in ton lots $1.23
Less ton lots 1.25
20-25%, C. 0.10 max., in ton lots per lb. contained Ti 1.35
Less-ton lots 1.40
(Spot 5c higher)

**Ferro-Carbon-Titanium, 15-20% Titanium,**

| | 6-8% C | 3-5% C |
|---|---|---|
| Carlots, contract, f.o.b. Niagara Falls, freight allowed to destinations east of Mississippi and north of Baltimore and St. Louis | $142.50 | $157.50 |

**Ferrovanadium, 35-40%,** contract per pound contained vanadium $2.70-$2.80-$2.90
(Spot 10c higher)

**Vanadium Pentoxide,** Per lb. contained, contracts 1.10
Do., spot 1.15

**Zirconium Alloy, 12-15%,** carloads, contract, bulk $102.50
Packed 107.50
Ton lots 108.00
Less ton lots 112.50
Spot $5 a ton higher
35-40%, contract, carloads, bulk or package, per lb. alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot is ¼-cent higher

**Alsifer,** Per lb., f.o.b. Niagara Falls.

| | Contract | Spot |
|---|---|---|
| Carlots | 7.50c | 8.00c |
| Ton lots | 8.00c | 8.50c |

**Simanal,** Per lb. of alloy, contracts, freight allowed (approx. 20% Si, 20% Mn, 20% Al)

| Carlots | Ton Lots | Ton Lots |
|---|---|---|
| 10.50c | 11.00c | 11.50c |

# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941*

| | 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 | 4.65 | 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 | 3.50 | 3.75 | 8.40 | 6.75 |
| Twin Cities | 3.75 | 3.85 | 3.85 | 3.80 | 3.80 | 5.40 | 3.50 | 4.35 | 5.00 | 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 | 5.68 | 3.75 | .... | 4.50 | .... | 4.39 | .... | .... |
| Tulsa, Okla. | 4.44 | 4.34 | 4.34 | 4.49 | 4.49 | 6.09 | 4.19 | .... | 5.54 | .... | 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 | 3.85 | 3.85 | 5.50 | 4.20 | .... | 5.25 | .... | 6.90 | .... | .... |
| Seattle | 4.00 | 4.00 | 5.20 | 4.00 | 4.00 | 5.75 | 4.00 | 6.50 | 5.25 | .... | 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 | 4.50 | 5.00 | 6.80 | 4.50 | 4.50 | 6.75 | 4.65 | 6.50 | 5.85 | .... | 6.60 | 10.55 | 9.55 |
| San Francisco | 4.10 | 4.60 | 6.35 | 4.25 | 4.25 | 5.95 | 4.25 | 6.40 | 6.00 | .... | 6.80 | 10.80 | 9.80 |

| | 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 | 5.85 | .... | 8.00 | 7.85 | 8.65 |
| 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 | 5.60 | 9.80 | 8.80 | 8.65 | 9.05 |

**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; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

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; 150-1049 in Los Angeles; 300-4999 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; 25 to 49 bundles 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; 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 | 2.95c | 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 | 12.00 |

**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 |
| 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, 50% | 68.00-70.00 |
| Indian, 50% | 68.00-70.00 |
| Brazilian, 46% | 68.00-70.00 |
| Chilean, 47% | 68.00-70.00 |
| Cuban, 50-51%, duty free | ..... |

**Molybdenum**

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

# MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

**Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.**

(Gross Tons)

| OTHER THAN RAILROAD GRADES | *Pittsburgh | Johnstown, Pa. Sharon, Canton, O. | Steubenville | Youngstown | Warren | Weirton | Cleveland | Cincinnati | Middletown | Portsmouth | Ashland, Ky. | Buffalo | Claymont, Del. | Coatesville | Conshohocken, Pa. | Harrisburg | Phoenixville, Pa. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Open Hearth | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 | 19.25 | 18.75 | 18.75 | 18.75 | 18.75 | 18.75 |
| Machine Shop Turnings | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 15.50 | 15.50 | 15.50 | 15.50 | 15.50 | 15.25 | 14.75 | 14.75 | 14.75 | 14.75 | 14.75 |
| Blast Furnace | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 16.00 | 15.50 | 15.50 | 15.50 | 15.50 | 15.50 | 15.25 | 14.75 | 14.75 | 14.75 | 14.75 | 14.75 |
| Elec. furnace and foundry | | | | | | | | | | | | | | | | | |
| Low phos billet, bloom, forge crops | 25.00 | 25.00 | 25.00 | 25.00 | 25.00 | 25.00 | 24.50 | 24.50 | 24.50 | 24.50 | 24.50 | 24.25 | 23.75 | 23.75 | 23.75 | 23.75 | 23.75 |
| Low phos bar crops and smaller | 22.50 | 22.50 | 22.50 | 22.50 | 22.50 | 22.50 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 21.75 | 21.25 | 21.25 | 21.25 | 21.25 | 21.25 |
| Low phos punchings and plate scrap | 22.50 | 22.50 | 22.50 | 22.50 | 22.50 | 22.50 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 21.75 | 21.25 | 21.25 | 21.25 | 21.25 | 21.25 |
| Heavy cut structural, plate, 3 feet, under | 21.00 | 21.00 | 21.00 | 21.00 | 21.00 | 21.00 | 20.50 | 20.50 | 20.50 | 20.50 | 20.50 | 20.25 | 19.75 | 19.75 | 19.75 | 19.75 | 19.75 |
| Heavy cut structural, plate, 2 feet, under | 21.50 | 21.50 | 21.50 | 21.50 | 21.50 | 21.50 | 21.00 | 21.00 | 21.00 | 21.00 | 21.00 | 20.75 | 20.25 | 20.25 | 20.25 | 20.25 | 20.25 |
| Heavy cut structural, plate, 1 foot, under | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 21.50 | 21.50 | 21.50 | 21.50 | 21.50 | 21.25 | 20.75 | 20.75 | 20.75 | 20.75 | 20.75 |
| Cut automotive steel scrap, 3 feet, under | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 | 19.25 | 18.75 | 18.75 | 18.75 | 18.75 | 18.75 |
| Cut automotive steel scrap, 2 feet, under | 20.00 | 20.00 | 20.50 | 20.50 | 20.50 | 20.50 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 19.75 | 19.25 | 19.25 | 19.25 | 19.25 | 19.25 |
| Cut automotive steel scrap, 1 foot, under | 21.00 | 21.00 | 21.00 | 21.00 | 21.00 | 21.00 | 20.50 | 20.50 | 20.50 | 20.50 | 20.50 | 20.20 | 19.75 | 19.75 | 19.75 | 19.75 | 19.75 |
| Alloy free low phos, sulphur turnings | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 17.50 | 17.50 | 17.50 | 17.50 | 17.50 | 17.25 | 16.75 | 16.75 | 16.75 | 16.75 | 16.75 |
| First cut heavy axle and forge turnings | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 | 19.00 | 19.00 | 19.00 | 19.00 | 19.00 | 18.75 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 |
| Electric furnace bundles | 21.00 | 21.00 | 21.00 | 21.00 | 21.00 | 21.00 | 20.50 | 20.50 | 20.50 | 20.50 | 20.50 | 20.25 | 19.75 | 19.75 | 19.75 | 19.75 | 19.75 |

| | Sparrows Point, Md. | Chicago | Bethlehem | Kokomo | Duluth | Detroit | Toledo | St. Louis | Atlanta | Alabama City | Birmingham | Los Angeles | Pittsburg, Calif. | San Francisco | Minnequa, Colo. | Seattle | Portland |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Open Hearth | 18.75 | 18.75 | 18.25 | 18.25 | 18.00 | 17.85 | ..... | 17.50 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 16.50 | 14.50 | ..... |
| Machine Shop Turnings | 14.75 | 14.75 | 14.25 | 14.25 | 14.00 | 13.85 | 13.85 | 13.50 | 13.00 | 13.00 | 13.00 | 13.00 | 13.00 | 13.00 | 12.50 | 10.50 | ..... |
| Blast Furnace | 14.75 | 14.75 | 14.25 | 14.25 | 14.00 | 13.85 | 13.85 | 13.50 | 13.00 | 13.00 | 13.00 | 13.00 | 13.00 | 13.00 | 12.50 | 10.50 | ..... |
| Elec. furnace and foundry | | | | | | | | | | | | | | | | | |
| Low phos billet, bloom, forge crops | 23.75 | 23.75 | 23.25 | 23.25 | 23.00 | 22.85 | ..... | 22.50 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 21.50 | 19.50 | ..... |
| Low phos bar crops and smaller | 21.25 | 21.25 | 20.75 | 20.75 | 20.50 | 20.35 | ..... | 20.00 | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 | 19.00 | 17.00 | 15.50 |
| Low phos punchings and plate scrap | 21.25 | 21.25 | 20.75 | 20.75 | 20.50 | 20.35 | ..... | 20.00 | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 | 19.50 | 19.00 | 17.00 | 15.50 |
| Heavy cut structural, plate, 3 feet, under | 19.75 | 19.75 | 19.25 | 19.25 | 19.00 | 18.85 | ..... | 18.50 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 17.50 | 15.50 | 14.00 |
| Heavy cut structural, plate, 2 feet, under | 20.25 | 20.25 | 19.75 | 19.75 | 19.50 | 19.35 | ..... | 19.00 | 18.50 | 18.50 | 18.50 | 18.50 | 18.50 | 18.50 | 18.00 | 16.00 | 14.50 |
| Heavy cut structural, plate, 1 foot, under | 20.75 | 20.75 | 20.25 | 20.25 | 20.00 | 19.85 | ..... | 19.50 | 19.00 | 19.00 | 19.00 | 19.00 | 19.00 | 19.00 | 18.50 | 16.50 | 15.00 |
| Cut automotive steel scrap, 3 feet, under | 18.75 | 18.75 | 18.25 | 18.25 | 18.00 | 17.85 | ..... | 17.50 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 17.00 | 16.50 | 14.50 | 13.00 |
| Cut automotive steel scrap, 2 feet, under | 19.25 | 19.25 | 18.75 | 18.75 | 18.50 | 18.35 | ..... | 18.00 | 17.50 | 17.50 | 17.50 | 17.50 | 17.50 | 17.50 | 17.00 | 15.00 | 13.50 |
| Cut automotive steel scrap, 1 foot, under | 19.75 | 19.75 | 19.25 | 19.25 | 19.00 | 18.85 | ..... | 18.50 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 17.50 | 15.50 | 14.00 |
| Alloy free low phos, sulphur turnings | 16.75 | 16.75 | 16.25 | 16.25 | 16.00 | 15.85 | ..... | 15.50 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 14.50 | 12.50 | 11.00 |
| First cut heavy axle and forge turnings | 18.25 | 18.25 | 17.75 | 17.75 | 17.50 | 17.35 | ..... | 17.00 | 16.50 | 16.50 | 16.50 | 16.50 | 16.50 | 16.50 | 16.00 | 14.00 | 12.50 |
| Electric furnace bundles | 19.75 | 19.75 | 19.25 | 19.25 | 19.00 | 18.85 | ..... | 18.50 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 17.50 | 15.50 | 14.00 |

*Includes Brackenridge, Butler, Monessen, Midland, Pa.

| GRADES ORIGINATING FROM RAILROADS | *Pittsburgh | Youngstown | Cincinnati, Cleveland, Middletown, O. Ashland, Ky. | Los Angeles, San Francisco | Birmingham | Buffalo | Chicago | Detroit | Duluth | Kansas City, Mo. | Kokomo, Ind. | Philadelphia | Portsmouth, O. | Seattle, Wash. | Sparrows Pt., Md. | St. Louis | Wilmington, Del. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. 1 Railroad Heavy Melting | 21.00 | 21.00 | 20.50 | 18.00 | 18.00 | 20.25 | 19.75 | 18.85 | 19.00 | 17.00 | 19.25 | 19.75 | 20.50 | 15.50 | 19.75 | 18.50 | 19.75 |
| Scrap Rails | 22.00 | 22.00 | 21.50 | 19.00 | 19.00 | 21.25 | 20.75 | 19.85 | 20.00 | 18.00 | 20.25 | 20.75 | 21.50 | 16.50 | 20.75 | 19.50 | 20.75 |
| Rails for Rerolling | 23.50 | 23.50 | 23.00 | 20.50 | 20.50 | 22.75 | 22.25 | 21.35 | 21.50 | 19.50 | 21.75 | 22.25 | 23.00 | 18.00 | 22.25 | 21.00 | 22.25 |
| Scrap Rails, 3 ft., under | 24.00 | 24.00 | 23.50 | 21.00 | 21.00 | 23.25 | 22.75 | 21.85 | 22.00 | 20.00 | 22.25 | 22.75 | 23.50 | 18.50 | 22.75 | 21.50 | 22.75 |
| Scrap Rails, 2 ft., under | 24.25 | 24.25 | 23.75 | 21.25 | 21.25 | 23.50 | 23.00 | 22.10 | 22.25 | 20.25 | 22.50 | 23.00 | 23.75 | 18.75 | 23.00 | 21.75 | 23.00 |
| Scrap Rails, 18-in., under | 24.50 | 24.50 | 24.00 | 21.50 | 21.50 | 23.75 | 23.25 | 22.35 | 22.50 | 20.50 | 22.75 | 23.25 | 24.00 | 19.00 | 23.25 | 22.00 | 23.25 |

*Includes Wheeling, Steubenville, Sharon, Canton.

**Maximum Price at Shipping Point.** Where the shipment of the scrap to the consumer is wholly or partially by rail, or vessel, or combination of rail and vessel, the scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel for shipment to the consumer.

Where shipment of the scrap to the consumer is solely by motor vehicle, the scrap is at its shipping point when it has been loaded on such vehicle.

The shipping point price for grades 1 of cast iron scrap at the following shipping points in the United States shall be:

| | Group A | Group B | Group C |
|---|---|---|---|
| No. 1 Cupola Cast | $18.00 | $19.00 | $20.00 |
| No. 1 Machinery Cast, Drop Broken, 150 lbs. & under | 18.00 | 19.00 | 20.00 |
| Clean Auto Cast | 18.00 | 19.00 | 20.00 |
| Stove Plate | 14.00 | 15.00 | 16.00 |
| Heavy Breakable Cast | 16.50 | 17.50 | 18.50 |
| Charging Box Size Cast | 17.25 | 18.25 | 19.25 |

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes all states not named in groups A and B.

**Maximum Price Delivered to a Consumer.** Scrap is at its point of delivery to a consumer when it has arrived for unloading at the plant of the consumer.

Open Hearth grades refer to No. 1 Heavy Melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers No. 2 bundles and No. 1 busheling.

Blast Furnace grades refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings.

On open hearth grades, blast furnace grades, electric furnace and foundry grades the maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. In no case is any grade deemed by buyer or seller or both to be superior to any grade listed above but sold at a premium above the corresponding listed grade except upon approval by the OPA. No special preparation charges may in any case be added to the prices listed above.

On electric furnace and foundry grades whenever any of these grades is purchased for open hearth or blast furnace consumption the price paid, therefore, may not exceed the price listed herein for the corresponding open hearth grade.

No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage; the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or subbroker, or with the consumer. No commission is payable to a person for scrap which he prepares. No person who has not acted as a broker prior to April 3, 1941 is allowed a brokerage commission.

## Sheets, Strip

Sheet & Strip Prices, Page 92

In spite of cancellation of sheet orders for automobile manufacture sheet mill order books have so much tonnage compared with capacity available for sheet production that they can accept only highest rated orders. This is contrary to expectation that considerable tonnage for unrated consumers would be made available. This is due in part to increasing volume of plates being rolled on continuous sheet mills and also to rapid increase in sheet tonnage for the war program. The latter probably will absorb most sheet tonnage through first quarter. A substantial tonnage is being shipped each month under A-9 and A-10 ratings, much of which goes to warehouses. Some tonnage also has been shipped under B rating or no rating. New placements of highly rated tonnage will cut into this or perhaps cut it off entirely, though warehouse supply is considered important.

While sellers generally have not been booking tonnage without priority from regular customers for much beyond one month they have been accepting preference tonnage for months in advance if necessary. Manufacturers of stoves, refrigerators, washing machines and other products under production limitations are not receiving sufficient tonnage to allow operation at the reduced limit.

Substantial inquiry is out for thin-gage sheets for incendiary bombs and bomb container linings. Long terne sheets are in particular demand for this work.

Galvanized sheet supply is tightly restricted and some producers have not been in a position for some time to furnish them to non-preference customers, although some had been able to book such tonnage up to a month ago. This situation promises to become tighter.

Broader distribution of defense work through subcontracting is developing rapidly in New England, which, coupled with an increase in prime contracts for new products and parts is influencing demand and distribution of steel. Fabricating shops normally consuming sheets, strip or plates of certain specifications are revising the latter to meet new requirements, the same applying to bars, alloys and numerous other finished steel products, practically all of which is highly-rated volume.

This situation is sharply revealed in numerous contracts for torpedo parts being placed with New England shops, the value of such already mounting to several millions of dollars, with complete deliveries on most of this business wanted by October, 1942. Pantex Pressing Machine Inc., Central Falls, R. I., produces normally a line of steam clothes pressing machines, but has taken a $300,820 order for torpedo parts. Other torpedo parts contracts include: Beaton & Corbin Mfg. Co., South-

ington, Conn., radiator valves and floor plates; Narragansett Machine Co., Pawtucket, R. I., steel lockers, shelving and gymnasium apparatus; Russell & Erwin Mfg. Co., New Britain, Conn., builders' hardware; Byron D. Miller Co., Portland, Me.; Milliken Machine Co., West Newton, Mass., turret heads; The Bristol Co., Waterbury, Conn., recording, indicating and control instruments; Lowell Equipment Co. Lowell Mass., automobile accessories.

## Plates

Plate Prices, Page 92

Fabrication of steel plates is at a peak with deliveries against allocations and highly rated priorities about even with last month, a large proportion going to shipyards. Shops supplying equipment have practically blanket ratings, much taking A-1-a, and in some instances deliveries are larger than in recent months.

Occasional scattered carlots are available for low-rated buyers, some going to warehouses. The latter normally would benefit by decentralizing of procurement by the war department, allowing local contracting officers to make small tonnage awards without submission to Washington. Light plates are in strong demand but even important needs are filled with difficulty.

Because of heavy pressure for shipyard, army and lease-lend requirements an eastern producer of sheared plates believes he will be unable to produce any tonnage in January for other than A-1-a priority. Other sheared plate producers are in much the same position and even in universal plate and strip mill tonnage little will be available for lower priorities. Increase in completed ships in 1942 does not call for a corresponding increase in steel tonnage, as much work to be completed is already well under way. However, requirements undoubtedly will be larger and platemakers have sufficient work booked to keep them at capacity as far ahead as can be seen.

Plate production is limited by steel supply and some additional tonnage could be rolled if sufficient ingots were available, by added working turns. OPM is understood to be shifting plate mill schedules to obtain 20 per cent increase in plates for the Maritime Commission.

### PLATE CONTRACTS PLACED

150 tons, elevated steel water tank, Fort Gulick, Canal Zone, to Chicago Bridge & Iron Co., Chicago, $57,095, pro. 6313-38, United States engineer.

### PLATE CONTRACTS PENDING

300 tons, estimated, seven 75,000-gallon elevated steel water tanks, auxiliary fields, near Eglin Field, Valpariso, Fla.; bids about Jan. 14, army, inv. 569-42-378.

150 tons, navy yard, Philadelphia, supply officer, bldg. 83, inv. 10616; bids Jan. 8.

100 tons or more, 1500 feet thirty-inch steel pipe for pipe line, Key bridge, Washington; Maryland Culvert & Pipe Co., Baltimore, low.

Unstated tonnage, 100,000-gallon elevated steel water tank, airfield, Hattiesburg, Miss.; bids Jan. 16, United States engineer, Mobile, Ala., inv. 380.

## Bars

Bar Prices, Page 93

Acceleration of war demand to meet expanded requirements for munitions is being reflected in higher pressures on bar mills. Cold finishers, forgers and machinery builders are flooding producers with so much high priority tonnage that allocations seem the only way to obtain proper distribution. Requirements are also expanding for shells, bombs, combat tanks, marine work and equipment installations.

Cessation of automobile manufacturing has caught many parts makers considerable stocks of finished goods and no market, at least for the present. Backlogs of forgings orders are increasing, a direct reflection of heavier ordnance production.

Inventories of hot and cold carbon steel bars held by consumers supplying civilian or low-rated products are nearly depleted or badly broken. To secure replacements, more shops are taking on or seeking higher-priority defense contracts, new tonnage otherwise being uncertain. One of the most impressive programs for subcontracting is being drawn up by a builder of steel mill equipment with heavy backlog. Releases against defense contracts, notably by small arms builders, tend to mount monthly. With an A-1-a rating small lots of forging material can be secured in six to eight weeks in some cases.

A number of bar consumers, who regard themselves as eligible for limited blanket ratings have applied for priorities under the production requirements plan, which became effective Jan 1. However, action has been slow, apparently because of the number of applications. Some manufacturers, such, for instance, as makers of hand tools, are running short of steel.

Meanwhile, bar sellers generally are experiencing an upsurge in priority specifications. Deliveries on rounds up to four or five inches have become greatly extended as a result, with only highest ratings obtaining shipment within six to eight weeks. Certain descriptions of flats also are in especially active demand.

For delivery, Boston, the bureau of supplies and accounts, Navy Dept., Washington, takes bids Jan. 16 under sch. 9927, on 437 tons, 2¾ and 2⅞-inch round steel bars, this in addition to 750 tons bid Jan. 6.

## Pipe

Pipe Prices, Page 93

Plumbing and building trade demand for merchant pipe has declined but buying by industrial and utility consumers is maintained. Cast pipe buying is inclined to lag, a seasonal condition. Production is limited by pig iron and scrap supply. This makes difficult small purchases by municipalities for repair work, for prompt shipment. Pipe foundries are unable to maintain inventory to meet this class of demand from stock. Some contracting is being done for annual requirements but activity is less than usual, as cities are keeping their requirements low. Much of current output goes to government projects.

### CAST PIPE PLACED

4000 tons, various sizes, ordnance plant, Chattanooga, Tenn., to United States Pipe & Foundry Co., Burlington, N. J., Stone & Webster Engineering Corp., Boston, contractor; latter also bought approximately one mile 30-inch steel pipe.

1262 tons, defense public works at Vallejo, Calif., to Pacific States Cast Iron Pipe Co., Provo, Utah.

518 tons, defense public works at Vallejo, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

325 tons, 24-inch, class 150, Concord, N. H., to Warren Pipe Co., Everett, Mass.

300 tons, defense work at Paso Robles, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

188 tons, defense work at San Miguel, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

150 tons, small sizes, Panama sch. 5757, to American Cast Iron Pipe Co., Birmingham, Ala.

### CAST PIPE PENDING

2200 tons, 2 to 10-in., Defense Public Works, Tacoma to Tillicum, Wash., placed on transite pipe basis to Valley Construction Co., 8423 48th avenue South, Seattle.

200 tons, 20-inch, Panama, sch. 5862; bids Jan. 9.

### STEEL PIPE PLACED

Unstated tonnage, 100 18-foot lengths, 12-inch steel shore pipe, United States engineer, Washington, to Lancaster Iron Works, Lancaster, Pa., $31.15 per length, serial 106, bids Dec. 23.

Unstated tonnage, steel tubing booms, Bureau of Supplies and Accounts, Navy department, to North American Iron & Steel Co., Brooklyn, N. Y., $199,318, schedule 8859, delivery by May, 1942.

### STEEL PIPE PENDING

151 tons, Bluestone Reservoir dam, New River, near Hinton, W. Va.; also 79 tons, wrought pipe and 100 tons, electrical conduit; Seaboard Construction Co., Mt. Kisco, N. Y., low, bids to United States engineer, Huntington, W. Va., inv. 516-42-81.

## Wire

Wire Prices, Page 93

Moderate decline in civilian demand for wire is offset by heavier volume of defense tonnage and incoming tonnage reaching mills is about equal to last month. Most material unshipped to the automobile trade is being diverted to other channels and spring wire departments are somewhat relieved from pressure as a result. Although heavy, requirements for rope stranding are being well covered. Because of lack of rods more eastern independent mills and even several integrated units will probably produce less finished tonnage than last month. Consumers of bessemer wire rods have increasing difficulty in buying without high priorities. Leading producer of rods reports bessemer sales fully 10 per cent above last year.

## Rails, Cars

Track Material Prices, Page 93

An increase in buying of freight cars late in December brought domestic awards in 1941 to 121,499 units, the highest in many years. This compares with 66,889 in 1940 and 57,775 in 1939. Awards in December were 8406, the highest monthly total since June, when 32,749 were bought. Comparisons follow:

| | 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 |
| Aug..... | 2,668 | 7,525 | 2,814 | 182 |
| Sept..... | 4,470 | 9,735 | 23,000 | 1,750 |
| Oct..... | 2,499 | 12,195 | 19,634 | 2,537 |
| Nov..... | 2,222 | 8,234 | 2,650 | 1,232 |
| Dec..... | 8,406 | 7,181 | 35 | 2,581 |
| Total .. | 121,499 | 66,889 | 57,775 | 16,303 |

Despite difficulty in obtaining steel during the latter part of the year it is estimated commercial shops built 62,500 cars in 1941 and railroad shops 15,500, a total of 78,000. Under allocations of steel it is believed 36,000 cars will be built during first quarter, 8000 to 9000 in January.

Lacking sheared plates for car construction builders are adapting themselves to use of universal and strip mill plates and it is estimated that more than 80 per cent of plates now being used are not more than 72 inches wide, although at least two strip mills are rolling plates up to 90 inches.

Locomotive builders have been promised sufficient steel and other materials to allow production of 1026 units during first quarter.

### CAR ORDERS PLACED

Baltimore Transit Co., Baltimore, 30 trolley coaches, to Pullman-Standard Car Mfg. Co., Chicago.

Boston Elevated Railroad Co., 50 trolley coaches, to Pullman-Standard Car Mfg. Co., Chicago.

Louisville & Nashville, 3325 cars, 725 box and 750 fifty-ton hopper cars going to Pullman Standard Car Mfg. Co., Chicago; 750 fifty-ton steel twin hopper, 500 fifty-ton steel sheathed box and 100 seventy-ton covered hopper cars to American Car & Foundry Co., New York; and 500 fifty-ton hopper cars to Pressed Steel Car Co., Pittsburgh.

Navy, 89 box cars, to Greenville Steel Car Co., Greenville, Pa.

War Department, 4966 freight cars; 1500 gondolas and 1000 four-wheel box cars, to Pullman Standard Car Mfg. Co., Chicago; 2000 box and 166 caboose cars, to American Car & Foundry Co.; and 300 tank cars to General American Transportation Co., Chicago; cars are for export to Egypt and Iran.

### LOCOMOTIVES PENDING

Chesapeake & Ohio, fifteen 0-8-0 locomotives; bids asked.

### BUSES BOOKED

A.c.f. Motors Co., New York: Twenty-six 39-passenger for Scranton Transit Co., Scranton, Pa.; ten 36-passenger for San Diego Electric Railway Co., San Diego, Calif.; ten 41-passenger for Boston Elevated Railway Co., Boston; ten 33-passenger for Southeastern Greyhound Lines, Lexington, Ky.; nine 41-

passenger for Aronimink Transportation Co., Llanerch, Pa.; six 33-passenger for Valley Public Service Co., Columbus, O.; five 33-passenger for Bowen Motor Coaches, Fort Worth, Tex.; three 33-passenger for Sunshine Bus Lines Inc., Dallas, Tex.; three 36-passenger for Gary Railways Co., Gary, Ind.; two 37-passenger for Interurban Transportation Co., Alexandria, La.

Yellow Truck & Coach Mfg. Co., 210 buses for Public Service Co-ordinated Transport & Public Service Interstate Transportation Co., Newark, N. J.

## Structural Shapes

Structural Shape Prices, Page 93

Heavier demand for structural shapes is appearing and this is expected to increase as enlarged war projects reach the bidding stage. It is understood the projected increase in armament production will require more plants and additions to those already built.

At the moment bridge requirements are small, although fabricators have considerable work of this character on books. Shipyards are taking a steady volume of light plain material. Considerable structural steel is going into overhead cranes, bids closing Jan. 15 on four of 50-ton capacity for the arsenal at Watertown, Mass.

Fewer inquiries are being received for steel piling but tonnages are larger. A recent contract for 6000 tons of piling for a graving dock at South Boston, Mass., was divided between two mills.

### SHAPE CONTRACTS PLACED

15,000 tons, tank parts plant, American Steel Foundries, East Chicago, Ind., to American Bridge Co., Pittsburgh; Albert Kahn, Detroit, engineer; bids Jan. 2.

6000 tons, piling, dry dock part 4, navy yard, South Boston, Mass., evenly divided between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh; United Construction Co., Winona, Minn., contractor.

2000 tons, plant addition for Brewster Aeronautical Corp., Hatboro, Pa., to Belmont Iron Works, Philadelphia.

1900 tons, building for American Locomotive Co., Schenectady, N. Y., to American Bridge Co., Pittsburgh, through Walter Kidde Co., New York, contractor.

1900 tons, depot supply building No. 2, Rome, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., New York, and L. Mayersohn, Brooklyn, N. Y., joint contractors.

1590 tons, penstock coaster gates, Specification 1010, Grand Coulee dam, Washington, to American Bridge Co., Pittsburgh, Pa.

1400 tons, pier, storage and facilities, naval training station, Newport, R. I., to Phoenix Bridge Co., Phoenixville, Pa.; P. T. Cox Construction Co. and Spearin, Preston & Burrows, New York, joint contractors.

1225 tons, Spokane street state viaduct, Seattle, to Pacific Car & Foundry Co., Seattle; MacRae Bros., Seattle, contractors.

1200 tons, steel sheet piling, Robins dry dock, Brooklyn, N. Y., divided between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh.

1000 tons, estimated, steel sheet piling, firing pier, Goulds Island naval training station, Newport, R. I., divided between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Pittsburgh; through P. T. Cox Contracting Co. and Spearin, Preston & Burrows, New York, joint contractors.

550 tons, new building, Exolon Co. Inc., Tonawanda, N. Y., to Buffalo Structural Steel Co., Buffalo.

500 tons, estimated, girders, naval magazine, Washington, to Simon Holland & Son., Brooklyn; spec. 10760, Bureau of Yards & Docks, Navy Department; bids Dec. 10.

400 tons, building 230, Rock Island arsenal, Rock Island, Ill., for War Department, to International Steel Co., Evansville, Ind.

350 tons, bridge, Pennsylvania railroad, Plain City, O., to American Bridge Co., Pittsburgh.

285 tons, boiler plant and facilities, Rome, N. Y., to F. L. Heughes Co.,

### SHAPE AWARDS COMPARED

| | Tons |
|---|---|
| Week ended Jan. 10 | 36,562 |
| Period ended Dec. 31 | 21,986 |
| Week ended Dec. 27 | 10,918 |
| This week, 1941 | 24,480 |
| Weekly average, 1942 | 36,562 |
| Weekly average, 1941 | 27,373 |
| Weekly average, Dec. 1941 | 17,619 |
| Total, 1941 | 24,480 |
| Total, 1942 | 36,562 |

Includes awards of 100 tons or more.

Rochester, N. Y., through Turner Construction Co., New York, contractor.

243 tons, spillway bridge, TVA, Gilbertsville, Ky., to Worden-Allen Co., Milwaukee.

225 tons, scrap metal shop and craneway, Navy yard, Brooklyn, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh.

200 tons, additional shop unit, Chapman Valve Mfg. Co., Indian Orchard, Mass., to Haarmann Steel Co., Holyoke, Mass.; Stone & Webster Engineering Corp., Boston, contractor; this in addition to 1500 tons awarded Lehigh Structural Steel Co., Allentown, Pa., reported previously.

154 tons, addition, Fairbanks, Morse & Co., Beloit, Wis., to A. C. Woods & Co., Rockford, Ill.

140 tons, conveyor house, coke plant, Great Lakes Carbon Corp., Calumet City, Ill., to Duffin Iron Co., Chicago; Macdonald Engineering Co., Chicago, contractor.

100 tons, shapes and bars, additional building, Wickwire-Spencer Steel Co., Palmer, Mass., to West End Iron Works, Boston, and Bethlehem Steel Co., Bethlehem, Pa.; Aberthaw Co., Boston, contractor.

100 tons, fabricated structural and miscellaneous steel for 100-foot extension to storehouse, Panama, sch. 5783 to Park Steel & Iron Co.

100 tons or more, addition, inside machine shop, navy yard, Portsmouth, N. H., to Waghorne-Brown Co., Boston, (Bethlehem Fabricators Inc.,) and Joseph T. Ryerson & Son Inc., Cambridge, Mass.; Tocci Bros., Newtonville, Mass., contractor.

Unstated tonnage, corpsmen's barracks and recreation building, naval station, Newport, R. I., to Bethlehem Steel Co., Bethlehem, Pa., and Joseph T. Ryerson & Son Inc., Cambridge, Mass.; Platt Contracting Co., Newport, contractor.

**SHAPE CONTRACTS PENDING**

2000 tons, inert storehouses for navy, Hawthorne, Nev.; bids opened.

1400 tons, torpedo firing pier and structures, Goulds Island, naval training station, Newport, R. I., Tower Iron Works, Providence, R. I., low.

1200 tons, additional unit, McKiernon & Terry Corp., Harrison, N. J.

1000 tons or more, hydraulic hoists, three penstock coaster gates, Grand Coulee dam; Willamette Iron & Steel Co., Portland, low to Denver Sch. No. 1, $168,841; Schs. 2 and 4, $166,341; Joshua Hendry Iron Works, San Francisco, low on combination bid, $809,600.

760 tons, Bluestone Reservoir dam, New River, near Hinton, W. Va.; Seaboard Construction Corp., Mt. Kisco, N. Y., low; work also takes 195 tons, miscellaneous steel; 100 tons, rails for gantry and push car; 1100 tons, sluice gates and conduit lining installation only; 2125 tons, crest gates and accessories, installation only, bids to U. S. Engineer, Huntington, W. Va., Inv. 516-42-81.

560 tons, power house, Fort Peck dam, Montana; general contract to Feglis Construction Co., Minneapolis; bids to United States Engineer, Kansas City, Mo., Dec. 12.

550 tons, bridge No. 4, Arlington, Va., Cayuga Construction Co., New York, contractor.

500 tons, Hyatt Roller Bearing division General Motors Corp., Newark, N. J.

450 tons, kvw towers atop Bonneville powerhouse; bids to U. S. engineer, Portland, Jan. 12.

417 tons, galvanized structural steel, switch structures, Bonneville dam, Oreg., Invitation 698-42-403; bids Jan. 14.

300 tons, plant addition, By-Products Steel Corp., Coatesville, Pa.

280 tons, compressor building, Navy yard, Brooklyn, N. Y.; Dreier Structural Steel Co. Inc., New York, low.

250 tons, addition to machine shop No. 18, Philadelphia navy yard; Barclay, White & Co., Philadelphia, general contractors.

215 tons, fuze shop, Frankford arsenal; bids Jan. 7.

100 tons, tunnel supports, also reinforcing bars, two irrigation tunnels near Bend, Oreg.; Kern & Kibbe, Portland, apparently low to Reclamation Bureau, $188,597.

Unstated, government munitions plant on 10,000-acre site, in towns of Porter and Lewiston, Niagara county, N. Y.

Unstated, fishway gates and beams for Bonneville dam; bids to U. S. engineer, Portland, Jan. 30; Spec. 698-42-411.

Unstated, nine buildings, warehouse, storage, heating plant, magazines, igloos, etc., McChord air field, Washington state; bids to Col. B. C. Dunn, United States engineer, Seattle, Jan. 13.

## Reinforcing Bars

**Reinforcing Bar Prices, Page 93**

Compared with recent weeks demand for reinforcing bars is on the increase and a number of important projects connected with war

work are coming out. A Navy program at Sutland, Md., involving five office buildings, is expected to take 12,000 to 15,000 tons. Contracts requiring nearly 2000 tons for warehouse and other structures at that point have been awarded.

Civilian demand has dropped to practically nothing as war projects crowd producers to the point they can take nothing outside rated tonnage, of which they have sufficient on books to keep them busy for a long time.

### REINFORCING STEEL AWARDS

2550 tons, Bureau of Reclamation, Inv. D-38,212-A, Odair, Wash.; 1150 tons to Republic Steel Corp., Cleveland; 650 tons to Bethlehem Steel Co., Bethlehem, Pa.; 500 tons to Inland Steel Co., Chicago; 250 tons to Colorado Fuel & Iron Corp., Denver; bids to Denver, Dec. 23.

1500 tons, Bureau of Reclamation invitation A-33,457-A-5, Coram, Calif., to Republic Steel Corp., Cleveland.

1500 tons, navy warehouse, Sutland, Md., to Lipscomb Construction Co., Washington.

1400 tons, dry dock part 4, navy yard, South Boston, Mass., to Concrete Steel Co., Boston; United Construction Co., Winona, Minn., contractor.

838 tons, Panama, sch. 5772, to Bethlehem Steel Export Co., New York, $50,468.75; bids Dec. 9.

350 tons, addition to federal building No. 3, Sutland, Md., to American Steel Engineering Co., Philadelphia, through McCloskey & Co., Philadelphia.

325 tons, bars and mat for Groton approaches to Thames river bridge, Groton, Conn., to Truscon Steel Co., Youngstown, O., through A. I. Savin Construction Co., Hartford, Conn., contractor.

300 tons, additional shop unit, Chapman Valve Mfg. Co., Indian Orchard, Mass., to Truscon Steel Co., South Boston, Mass.; Stone & Webster Engineering Corp., Boston, contractor.

210 tons, building, Iowa Packing Co., Des Moines, Iowa, to Bethlehem Steel Co., Bethlehem, Pa.; J. S. Sweitzer & Son, St. Paul, contractor; bids Dec. 12.

200 tons, defense projects Washington state, to Bethlehem Steel Co., Seattle.

200 tons, concrete silos, Great Lakes Carbon Corp., Calumet City, Ill., to Carnegie-Illinois Steel Corp., through Concrete Steel Co., Chicago; Macdonald Engineering Co., Chicago, contractor; bids Dec. 2.

175 tons, wind tunnel, Carderock, Md., to Truscon Steel Co., Youngstown, O., through Lieb Construction Co., New York.

150 tons, barracks, Philadelphia navy yard, to Taylor-Davis Inc., Philadelphia.

### REINFORCING STEEL PENDING

8200 tons, Pacific Coast Defense projects.

3080 tons, Bluestone Reservoir dam, New River, near Hinton, W. Va.; Seaboard Construction Corp., Mt. Kisco, N. Y., low, $10,195,575; quotation on reinforcing in place 5.00c per pound, bids to U. S. Engineer, Huntington, W. Va., inv. 516-42-81.

1814 tons, viaduct, Spokane street, Seattle, Wash.; general contract to MacRae Bros., 2733 Fourth avenue South, Seattle, at $968,885.

1288 tons, housing project, No. Illinois 2-2S, Chicago Housing authority; Patrick Warren Construction Co., Chicago, low on general contract; bids Dec. 30.

1200 tons, navy storage depot, Mechanicsburg, Pa.; Brann & Stuart Co., Philadelphia, general contractor.

1000 tons, federal laboratory, Sutland, Md.; McCloskey & Co., Philadelphia, contractors.

1000 tons, estimated, pier, storage building and facilities, naval station, Newport, R. I.

900 tons, power house, penstocks and surge tanks, Fort Peck dam, Montana; general contract to Fegles Construction Co., Minneapolis; bids to United States Engineer, Kansas City, Mo., Dec. 12.

800 tons, wire mesh, United States engineer office, San Francisco for delivery at Oakland, Calif., invitation 414-42-307; bids opened.

600 tons, building for Bakelite Corp., Bound Brook, N. J.

200 tons or more, reclamation project, Weiser, Idaho; Bethlehem Steel Co., Carnegie-Illinois and Inland Steel Co., low to Denver on various schedules.

150 tons, two warehouses, Ft. Mifflin, Pa.; bids Jan. 14.

150 tons, elementary school, Seaford, Del.; bids Feb. 4.

100 tons, pile shoes, mooring posts,



### CONCRETE BARS COMPARED

| | Tons |
|---|---|
| Week ended Jan. 10 | 9,698 |
| Period ended Dec. 31 | 1,121 |
| Week ended Dec. 27 | 2,070 |
| This week, 1941 | 17,400 |
| Weekly average, 1942 | 9,698 |
| Weekly average, 1941 | 13,609 |
| Weekly average, Dec., 1941 | 7,362 |
| Total, 1941 | 17,400 |
| Total, 1942 | 9,698 |

Includes awards of 100 tons or more.

hardware, etc. for Whittier, Alaska, railroad terminal; bids to United States engineer, Seattle, Jan. 21.

Unstated, shop at Frankford arsenal; Barclay, White & Co., Philadelphia, general contractors.

Unstated, runways and aprons, Payne Field, Washington; Northwest Construction Co., Seattle, award at $228,-735.

## Pig Iron

Pig Iron Prices, Page 94

With pig iron output in December setting a new mark melters with war work expect January allocations to reflect the condition in better allotments. Pig iron sellers are urging customers to file their PD-70 forms promptly by Jan. 12. Despite the fact the allocation has been in effect several months a number of melters have been late in filing, causing much inconvenience.

It is apparent that additional iron production capacity has offset increased demand from consumers whose stockpiles have been going down since the beginning of the allocation program. Additional stacks have been blown in each of the past few months and rehabilitation work has put some old stacks back in production. Others are almost ready to start production, including the old Chester furnace at Chester, Pa., and the old Warner Iron Co. stack at Cumberland, Tenn. Relining work on several stacks is in progress and return of these to the active list will further aid the situation.

Several large New England consumers of pig iron, including some in the textile equipment field, who have not yet received iron under allocation since mandatory distribution became effective, will need supplies within the next few weeks. That defense work is a requisite for favorable action in securing allotments is indicated by increased activity for priority business. One textile equipment foundry is turning out more castings for machine tool trade and others are taking on more such tonnage. It is evident some of these consumers had from six to eight months supplies on hand when mandatory distribution started.

## 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

## Scrap

Scrap Prices, Page 96

Onset of winter weather in the North last week interrupted collection and preparation of scrap and shipments were reduced somewhat. This factor will be effective only until temperature moderates. Shortage already has caused curtailment in various districts and further cuts are expected. A large producer recently had only 2500 tons in stockpile, equivalent to about one day's consumption at the curent rate. Hand-to-mouth operation has prevented severe curtailment but long continuance of this practice seems impossible. Decline in shipments will be reflected immediately in loss of steel production.

Results of the new alignment of scrap prices are appraised in various ways in the several consuming districts. The St. Louis district finds the area from which it draws supplies is enlarged and shipments have improved, though not sufficiently to allow idle open hearths to be restored to service.

Detroit steelmakers are suffering from lack of scrap, a number of open hearths being idle and others on the verge of being dropped. In absence of reserves steel production is on a day-to-day basis. This results largely from

sharp curtailment of automobile production since Dec. 15 and diversion of allocated scrap to other consuming centers. One interest has been operating its 150-ton open hearths as high as 200 tons to a heat to boost production for war purposes. Its production is earmarked about 98 per cent for defense and curtailment is a serious matter.

Conditions in the Buffalo district give hope of holding the present rate of melt. Somewhat better deliveries have enabled at least one interest to build a small reserve but are not sufficient to resume steel production at full rate.

## Sintered Ore, Borings To Help Scrap Squeeze

To relieve the shortage of scrap, a new development in open hearth practice is the use of a dense sintered mixture of fine iron ore, cast iron borings and fine steel turnings, according to Ralph H. Sweetser, New York, consultant in blast furnace practice. This combination makes a heavy lump mixture that can be used as "lump ore" in the open hearth. Such lump ore produced in the Grenewalt sintering pan has been partially bessemerized so that the carbon is burned out from the cast iron borings and the mixture is partly FeO and partly Fe.

This, he said, gives a rich mixture, something between iron ore and scrap, so that in oreing down, a larger proportion of this mixture must be used than if iron ore were used alone. However, this is equivalent to a part of the scrap mixture.

In this country, he pointed out, the open-hearth practice is to use only 50 per cent hot metal or pig iron, whereas in Australia as high as 80 per cent pig iron is being used in the open-hearth charge. This is because of the scarcity of scrap in Australia.

Due to the increasing shortage of scrap here, it was his opinion that it may be necessary for open-hearth operators in this country to change their practice and use more pig iron. The use of sintered iron ore for the bottom of the furnace and the new dense sinter for oreing down may help considerably in relieving this shortage, he believed.

## Warehouse

Warehouse Prices, Page 95

Warehouse stocks are badly depleted and consumers dependent on them for material find difficulty in obtaining sufficient for ordinary needs. Producers of sheets and other steel products are being pressed so hard for delivery at high priority that they are notifying warehouses that disappointment probably awaits them in their quotas for first quarter.

Many distributors found December sales were larger than in November in dollar value and about on a parity as to tonnage.

Jobber quotas of merchant pipe will be somewhat larger for first quarter, based on the average for the entire year 1941, but will be lower for later quarters. Jobber turnover is large but inventory is kept down by close mill supervision. Most ordinary requirements are being met.

## Pacific Coast

**Seattle**—Plans are maturing for extensive expansion by the Bonneville Power Administration in Oregon, Washington and Idaho. Administrator Paul J. Raver announces that the second 183-mile, 230,000-volt transmission line from Coulee dam to the substation near Covington, Wash., will be erected as soon as steel is available. Total cost will be $4,500,000, with $2,319,400 already allocated. The first line over the same route is now under construction. For the second 115,000-volt line, Covington to Tacoma, $125,000 has been allocated, with wooden poles specified. This will tie in with Tacoma's municipal system and serve the aluminum reduction plant in that city. For a 115,000-volt line between Spokane and Colfax, Wash., $650,000 has been allocated to connect Coulee and Spokane.

Warehouses have announced a new price list involving adjustments to harmonize prices with new regulations. This includes some reductions and advances on other items and is intended to stabilize the market as between water and rail shipments, practically all prices now being based on rail.

Reinforcing materials and shapes are in sharp demand. Defense agencies have been trying to place two orders for concrete bars, 5000 and 8200 tons, but local mills are unable to accept any business for delivery within reasonable time.

**San Francisco** — Demand continues strong in all lines and little steel is finding its way into the hands of private interests. The structural market was the most active one and 15,001 tons were booked. This compares with only 4676 tons for the first week in 1941.

The largest plate letting went to an unstated interest and involves 2500 tons for a penstock for the Fort Peck dam, Montana. The largest new inquiry calls for 200 tons for a 500,000-gallon tank and tower for the airfield at Roswell, New Mex., bids on which are being taken by the United State engineer, Caddoa, Colo. To date this year 2525 tons have been booked, compared with only 2000 tons for the same period a year ago.

While few new inquiries of size have developed so far this year in the cast iron pipe market, heavy tonnages for various municipalities are expected to come out soon.

Practically all Pacific Coast reinforcing bar rolling mills are booked well in advance on national defense projects and considerable tonnage for private use has been turned down. More steel from

mills east of the Mississippi is finding its way into the hands of interests devoted to defense work on the Pacific Coast who originally hoped to secure the material from producers on the coast and thus save heavy freight charges

## Canada

**Toronto, Ont.**—New restrictions on use of steel by non-defense industries have been put into effect. The materials affected include plates and structural shapes, and it is stated that further action of this nature is pending. The use of steel and other metals in non-war production will be sharply curbed at the end of this quarter with the result that about the only consumers of these materials at the beginning of April will be direct war industries. Co-operating with the United States government, Canada is going all-out on war materials production which will result in depletion from the markets of all goods in which steel or metals are the principal components.

Canada opened year with iron and steel production at an all time peak, and with capacity increased by about 40 per cent over 1939. Despite this sharp gain in output steel requirements for war needs will be more than 40 per cent over domestic production. Government sources announce that all lines of war production are to be extended.

Canadian mills have backlogs on plates and sheets that will take all output for the remainder of the year, with shipments only against government approved orders. Steel mill representatives state they are accepting no new orders on sheets.

Record backlogs are reported on all lines of merchant bars and despite the many inquiries no consideration is being given unless approved by the steel controller. Some smaller users have been scouring the used steel markets for supplies but find only limited quantities available.

Structural steel lettings continue to fall off with awards for the past week reported about 2000 tons, against the average for the earlier part of last year of around 15,000 tons.

Brisk action continues the dominating feature in iron and steel scrap. Demand is absorbing all available supplies and dealers are making every effort to stimulate offerings. Mill consumption continues to take all offerings and are pressing for larger deliveries of heavy melting steel.

## Fluorspar

Fluorspar Prices, Page 94

Demand for fluorspar is active and prices have been advanced by Illinois and Kentucky producers to $25 for domestic washed 85-5 per cent f.o.b. mines for rail delivery, for barge delivery to Ohio river landings and for No. 2 lump f.o.b. mines.

Unless fluorspar importations can be resumed, and the early prospects are not promising, eastern consumers will have to pay more for their supplies.

Taking Harrisburg, Pa., as a typical eastern consuming center, the rate from midwestern mines is around $7.60. On the basis of the $25 f.o.b. mine price or 85-5 per cent fluorspar, this brings the delivered market up to $32.60.

The last export price on washed fluorspar was around $25, duty paid. This figure plus a freight rate of $1.80, brought the delivered price up to $26.80.

## Carboloy Makes Second Tool Price Reduction

Completing its second plant extension in six months Carboloy Co. Inc., Detroit, announces its second price reduction on standard tools and tips since these were developed and put into mass production a little over a year ago.

The company is seeking to convert a greater percentage of its cutting tool and tip production from special to standard tools. It is expected this freeing of special tool facilities will provide a higher output rate for standards and increase output of the latter to a point where 100 per cent of standard tool shipments can be made from stock.

Reductions, effective from Jan. 1, affect standard tools above ¾-inch and standard tips over three grams. Reductions on blanks also affect special tools on which such blanks are used. Reductions in minimum prices of typical standard tools based on a style 1 turning tool are: ½-inch square from $1.60 to $1.50; ¾-inch square $4.20 to $3.50; 1¼-inch square $9.60 to $7.90. Minimum price is now reached at five tools on all standard tools.

Reductions in minimum prices of typical standard blanks are as follows: 3/32 x ⅜ x 9/16 from $.48 to $.43; 3/16 x ½ x ¾ from $1.70 to $1.31; ⅜ x ⅝ x 1 from $5.80 to $3.89. Minimum price is now reached at only ten blanks on all standard blanks.

## Tin Plate

Tin Plate Prices, Page 92

Some relief from shortage of tin will result from changes in manufacture of tin plate to produce lighter coatings. Standard practice in the past has been to use 1.50 pounds of tin to each base box of tin plate. Recently this was reduced to 1.35 pounds at the request of the government. The electrolytic tinning process now in use further cuts weight of tin to ½-pound per box and research indicates that satisfactory coatings for many purposes can be obtained by use of 0.1-pound per base box.

## Nonferrous Metal Prices

| Jan. | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-9 | 12.00 | 12.12½ | 11.75 | 52.00 | 52.00 | 5.85 | 5.70 | 8.25 | 15.00 | 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 | 13.15 |

**Tubes**

| | |
|---|---|
| High yellow brass | 22.23 |
| Seamless copper | 21.37 |

**Rods**

| | |
|---|---|
| High yellow brass | 15.01 |
| Copper, hot rolled | 17.37 |

**Anodes**

| | |
|---|---|
| Copper, untrimmed | 18.12 |

**Wire**

| | |
|---|---|
| Yellow brass (high) | 19.73 |

**OLD METALS**

*Dealers' Buying Prices*

**No. 1 Composition Red Brass**

| | |
|---|---|
| New York | 10.12½-10.25 |
| Cleveland | 10.25-10.50 |
| Chicago | 10.25-10.50 |
| St. Louis | 10.50 |

**Heavy Copper and Wire**

| | |
|---|---|
| New York, No. 1 | 10.00 |
| Cleveland, No. 1 | 10.00 |
| Chicago, No. 1 | 10.00 |
| St. Louis | 10.00 |

**Composition Brass Turnings**

| | |
|---|---|
| New York | 9.37½-9.75 |

**Light Copper**

| | |
|---|---|
| New York | 8.00 |
| Cleveland | 8.00 |
| Chicago | 8.00 |
| St. Louis | 8.00 |

**Light Brass**

| | |
|---|---|
| Cleveland | 6.00 |
| Chicago | 6.00-6.25 |
| St. Louis | 6.25 |

**Lead**

| | |
|---|---|
| New York | 5.25-5.50 |
| Cleveland | 5.00-5.25 |
| Chicago | 4.75-5.00 |
| St. Louis | 4.75-5.00 |

**Old Zinc**

| | |
|---|---|
| New York | 5.00-5.25 |
| 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 | 14.50 |

## Nonferrous Metals

**New York**—Metal production and consumption programs are being geared to the national 59 billion dollar budget for 1942-3. The government tightened its control over distribution of metals through a tin and lead scrap allocation order M-72; an order M-1-d which makes segregation of aluminum scrap mandatory; a revision of order M-9-a which places all copper supplies, including imported metal, under full priority; revision of order M-9-b which imposed comprehensive rules on the delivery for red metal scrap; and a voluntary agreement establishing maximum prices for brass and bronze ingots.

**Copper**—Several negotiations between the government and producers are in progress to increase production. In addition, Metals Reserve Co. negotiated for purchase of the first quarter 1942 production of copper in Latin America at a price representing about ½-cent above the previous contract price.

**Lead** — A congressional committee, investigating the domestic supply, may name a higher price for refined lead and may recommend that OPA approve this price as the new maximum. An increase in production of 20,000 to 25,000 tons a month is necessary to meet essential requirements.

**Zinc**—Smelter output established a new high record in December at 78,635 tons. Additional production facilities will be placed in operation this year.

**Tin** — Six new detinning plants will be erected by the Metal & Thermit Corp. and the Vulcan Detinning Co. for the purpose of recovering an estimated 12,000 tons of tin annually. Drastic restrictions on the civilian use of tin have been imposed in order to conserve the country's reserve stocks of 116,000 tons (as of Dec. 1) for essential war work.



## Equipment

**New York**—Another spurt in machine tool buying to supplement sustained heavy demand and speed up armament production is developing. One of the largest dealers in the country, representing several leading builders had the best week's bookings in the long history of the company, one day establishing a record. With the flow of materials, including steel, fixtures and parts generally ample and steady better deliveries are possible on some tools despite large backlogs and additional buying. This is true of milling machines and where this obtains it is made possible by additional production facilities and longer work schedules. New plants and extensions are now getting into capacity production. More units will also be built this year than was generally expected. Buying of lathes is notably active, arsenals included.

## Steel in Europe

**Foreign Steel Prices, Page 95**

**London** — (*By Cable*) — Iron and steel production in Great Britain is receiving considerable impetus as the year opens. The raw materials situation is satisfactory, permitting expansion of output. Scrap requirements are least easy to meet.

Demand is greater for shipbuilding materials, tank and boiler plates, special steels, colliery equipment and wire. Tin plate is active but limited by steel supply. Sheets and galvanized sheets are fairly active.

## Ferroalloys

**Ferroalloy Prices, Page 94**

Watertown, Mass., arsenal has covered through first quarter and into second on ferroalloys, approximately 525 tons, four items in the inquiry to be furnished by Electro Metallurgical Sales Corp. and one by Climax Molybdenum Co., New York, bids Dec. 20, inv. 73.

## Reaffirm Steel Prices For First Quarter

*WASHINGTON*

■ At the urging of the Army and Navy budgeters, the leading steel companies have re-affirmed present prices on their products through the first quarter of this year. The budgetmakers have complained that on steel company books are contracts for future delivery with no definite price named, merely noting "price prevailing at time of delivery."

In the meantime a proposed price-control bill is passing through Congress and the steel companies are awaiting its final issuance as a law to determine what they can or cannot do under its provisions.

## Kearney & Trecker Files Common Stock Offering

Kearney & Trecker Corp., Milwaukee, is distributing to the public 198,083 shares of its $3 par value common stock, its only outstanding security. This stock represents the holdings of Mrs. Ella M. Kearney, widow of one of the company's founders, and of certain family trusts. Recapitalization became effective Dec. 1 when the $10 par value stock was changed to $3 par value on the basis of 3 1/3 shares for one and authorized capital was increased to 700,000 shares. The company is one of the three largest manufacturers of milling machines and has a heavy backlog of orders.

## General American Marks Fortieth Anniversary

■ General American Transportation Corp., Chicago, marks its fortieth anniversary this year. It was organized as a small freight car leasing company, the first of its kind, and has grown by adding large and diversified commercial activities. It now has car building and plate and welding shops at Sharon, Pa., a car building plant at East Chicago, Ind., and an Aerocoach plant at Hegewisch, Ill. Car repair shops are located at strategic points and bulk liquid storage terminals at Goodhope and Westwego, La., Carteret, N. J., Galena Park and Corpus Christi, Tex.

# Government Inquiries

**The following prime contracts are pending, with closing dates for bids as indicated. QR refers to quantity required. Bidding forms on these items can be obtained only by wiring, mentioning schedule number, to the Procurement Branch of the service heading the list of requirements. Field offices of Division of Contract Distribution, OPM, generally have available for inspection and examination, schedules, invitations, specifications and drawings (where required) concerning these contracts.**

**BUREAU OF SUPPLIES, ACCOUNTS NAVY DEPARTMENT, WASHINGTON**

**9893—Sockets, Steel,** for Morse Taper Shank Tools, Reducing, Chucking and Extension Types, Misc. sizes, QR-Large. Bids Jan. 16.

**9895—Cranes,** airplane engine hoisting, portable knock-down type, 3,000 lbs. cap. QR-100. Bids Jan. 20.

**9900—Valves, Steel,** Flanged, Misc. Sizes, QR-Small to Moderate. Bids Jan. 13.

**9905—Chisels and tools,** pneumatic-tool, 9" long, width of cutting edge, from 5/16" to 1¼", QR-71,000; Blanks, chisel, pneumatic-tool, chipping, calking and scaling, 8" length, QR-238,050, 9", 19,-700; Chisels, machinists', hand, cold, cape, diamond point, round nose, and side-cutting, QR-Large. Bids Jan. 16.

**9917—Containers,** anode ball, cadmium, QR-625. Bids Jan. 20.

**9924—Pullers,** nail, length approx. 18", QR-4130. Bids Jan. 22.

**9926—Cutters,** glass, single, renewable wheel type, Type B, QR-4070; turret head type, Type C, QR-5836; Cutters, gage glass, plier handle type, Type B, ¼" dia. QR-1872. Bids Jan. 22.

**9927—Steel, bar,** round, hot rolled, 2¾" dia. in commercial lengths, QR-194,000 lbs.; in multiples of 26", QR-380,000 lbs.; Steel, bar, round, hot rolled, 2⅞" dia. to be in multiples of 19½", QR-300,000 lbs. Bids Jan. 16.

**9934—Chain, anchor,** 1" stud link wrought iron commercial type; links, detachable; pieces, swivel; and shackles, anchor; Chain, anchor, 12½ fathom shots, QR-24; 6¼, QR-16; Links, detachable for 1" die-lock chain, QR-44; Pieces, swivel, for use with 1" stud link chain, QR-8; Shackles, anchor, for use with 1" stud link chain, QR-4. Bids Jan. 13.

**9957—Shovels,** general purpose, plain back, strap pattern, D-handle, square and round points, QR-6024; long-handle, QR-7226, shovels, moulders' plain-back, strap pattern, sq. point, D-handle, Type VI, Size No. 2, QR-580; Spades, garden, plain back, strap pattern, square point, Type XI, Size No. 2, QR-400; Scoops, general purposes, eastern pattern hollow back, square point, D-handle, Type 11, QR-1032, rd. point, QR-100. Bids Jan. 22.

**9958—Screwdrivers,** common, heavy duty, jeweler's pocket, and spiral ratchet, QR-Large. Bids Jan. 22.

**9959—Pipe,** lead, heavy, sizes from ⅛" to 2½", QR-55,780 pounds; Pipe, lead, lining, for tubing, steel, dia. for 1.5 to 6.25, QR-31,000 pounds. Bids Jan. 22.

**9960—Pipe,** conduit, steel, enameled, rigid, ½" to 2", QR-Large. Bids Jan. 22.

**9961—Anchors,** stockless, 25,000 pounds ea., QR-15; 2,200 pounds ea., QR-8. Bids Jan. 16.

**9986—Lighters,** garbage, self-propelled, QR-2. Bids Jan. 30.

**9996—Cable,** marine use, lighting and power, armored, duplex, on reels, circular mils per conductor 9030, QR-20,-000', 14,350, QR-6,000'. Bids Jan. 13.

**9942—Sprayers,** liquid, pest-exterminator, iron, galvanized, 1 qt. capacity, QR-19,568. Bids Jan. 22.

**9965—Pipe,** soil, cast iron, extra heavy, coated, in 5' laying lengths, nominal inside dia. 2", QR-8200', 4", QR-14950', 6", QR-13900', Pipe, water, cast iron, bell and spigot, coated, Types I, II, or III, Class 150, nominal dia. 6", QR-400. Bids Jan. 22.

**9969—Tools,** packing etxracting, Type A, screw and flexible shaft, dia. screw bit from ¼" to 1", QR-31,200. Bids Jan. 29.

**9971—Valves,** high pressure, air, ¼", QR-197, ⅜", QR-859; angle, globe and cross, various sizes, QR-104. Bids Jan. 20.

**9972—Machines,** stencil-cutting, height of letters ¾", QR-82. Bids. Jan. 29.

**9988—Knives,** and cases, diving apparatus, for use with outfits 1 and 2, QR-500. Bids Jan. 29.

**9949—Cable,** electric, QR-Large. Bids Jan. 20.

## Canadian Contracts

(*Concluded from Page* 45)

Sports, Ltd., Montreal, $47,020; Eastern Steel Products Ltd., Montreal, $14,850; Laurentide Equipment Co. Ltd., Montreal, $5931; Dominion Rubber Co. Ltd., Ottawa, $18,424; International Harvester Co. of Canada Ltd., Ottawa, $5875; General Motors Products of Canada Ltd., Oshawa, Ont., $29,864; Goodyear Tire & Rubber Co. of Canada Ltd., New Toronto, $85,495; Metallic Roofing Co. of Canada Ltd., Toronto, $14,051; Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, $11,-633; Dominion Chain Co. Ltd., Niagara Falls, Ont., $13,610; Ford Motor Co. of Canada, Ltd., Windsor, $6170.

**Aircraft:** Overseas Requisition, London, Eng., $33,921; Canadian Pratt & Whitney Aircraft Co. Ltd., Longueuil, Que., $118,334; Fairchild Aircraft, Ltd., Longueuil, $159,885; Aviation Electric Ltd., Montreal, $7653; Canadian Car & Foundry Co. Ltd., Montreal, $11,419; Canadian Vickers Ltd., Montreal, $19,738; Noorduyn Aviation, Ltd. Montreal, $15,-038; Switlik Canadian Parachute Ltd., Montreal, $456,210; Irvin Air Chute Ltd., Ottawa, $456,368.

**Instruments:** Overseas Requisition, London, Eng., $12,000; Goldsmiths Co. of Canada Ltd., Toronto, $20,703.

**Electrical Equipment:** Northern Electric Co. Ltd. Ottawa, $43,674; Phillips Electrical Works, Ltd., Brockville, Ont., $106,899; Alpha Aracon Radio Co. Ltd., Toronto, $10,153; Exide Batteries of Canada Ltd., Toronto, $8502; General Dry Batteries of Canada Ltd., Toronto, $5789; Sutton-Horsley Co. Ltd., Toronto, $10,268.

**Machinery:** Kendall Bros., Ltd., Montreal, $9596; T. E. Ryder Machinery Co., Montreal, $11,321; Canadian Ornamental Iron Co. Ltd., Toronto, $30,240; J. & J. Taylor Ltd., Toronto, $9523; London Concrete Machinery Co. Ltd., London, $5501.

**Fire Fighting Equipment:** Walter Kidde & Co. of Canada Ltd., Montreal, $14,507; LaFrance Fire Engine & Foamite Ltd., Toronto, $14,507.

**Munitions:** Overseas Requisition, London, Eng., $21,000; Canadian Industries Ltd., Montreal, $60,602; Mis-Can-Ada Mfg. Co. Ltd., Ottawa, $8960; Carton Specialties Ltd., Leaside, Ont., $17,974; N. Slater Co. Ltd., Hamilton, $31,335; Wm. Gerry & Sons, London, Ont., $9612.

**Ordnance:** Dominion Rubber Co. Ltd., Ottawa, $135,675; John Inglis Co. Ltd., Toronto, $25,230; Wright Industries Ltd., Toronto, $5312; Otis-Fensom Elevator Co. Ltd., Hamilton, $31,000.

**War Construction Projects:** Collet Freres Ltd., Montreal, $51,201; M. R. Campbell, M. R. Chappell, Sydney, N. S., $96,000; Atlantic Construction Co. Ltd., Halifax, N. S., $71,000; W. C. Brennan Contracting Co., Hamilton, $85,808; Bird Construction Co. Ltd., Winnipeg, Man., $112,700; Carter-Halls-Aldinger Co. Ltd., Winnipeg, $177,000; Dominion Construction Co., Winnipeg, $46,307; Poole Construction Co. Ltd., Edmonton, Alta., $268,000.

**Miscellaneous:** Canadian Ice Machine Co. Ltd., Montreal, $5212; Howard Automatic Heat & Air Conditioning Ltd., Montreal, $5600; Moncton Plumbing & Supply Co. Ltd., Moncton, N. B., $5000; New Idea Furnace Ltd., Ingersoll, Ont., $115,351; Dominion Rubber Co., Ltd., Ottawa, $74,200; Hobbs Glass Ltd., Ottawa, $9180; Duplate Safety Glass Co. of Canada Ltd., Oshawa, Ont., $65,520; B. F. Goodrich Rubber Co. of Canada Ltd., Kitchener, Ont., $11,890.

# Construction and Enterprise

### Ohio

AKRON, O.—Star Drilling Machine Co., 474 Washington avenue, will install additional equipment in present buildings, to facilitate handling of a $727,000 order for gun tube forgings. M. A. Macbeath is vice president and general manager.

CLEVELAND—Metal Finishers Inc., V. R. Sutjak, president, 1725 East Twenty-seventh street, is adding 5000 square feet of production space and loading dock facilities.

CLEVELAND—W. & F. Zagar Tool & Mfg. Co., 23880 Lakeland boulevard, Euclid, O., is adding 2800 square feet to its plant.

CLEVELAND—Bunell Machine & Tool Co. will erect a $25,000 building adjacent to present plant at East Twenty-fourth street. E. B. Bunell is president and treasurer.

CLEVELAND—Mooney Iron Works Co., John L. Mooney, president and treasurer, is expanding production space at 3319 East Eightieth street with a 9720-square foot addition to its factory.

DAYTON, O.—Chandler-Evans Corp., Meriden, Conn., will erect a two-story structure here containing about 40,000 square feet of floor space, for inspection, packing and shipping of carburetors, cost of which is estimated at $1,145,000, including equipment. The carburetors are to be manufactured by National Cash Register Co., under a subcontract arrangement.

NEWTON FALLS, O.—Village, W. Elmo Bailey, mayor, H. Spencer Hoak, clerk, plans enlargement of power plant, including addition to building, installation of two 300-kw. Fairbanks-Morse diesel engines, direct connected generator and exciter, etc. Estimated cost over $85,000.

RAVENNA, O.—City, Karl M. Dussoll, service director, plans sewage disposal system repairs and improvements, including tanks, motor equipment, piping, control house, etc. Cost $290,000. Floyd Browne & Associates, Marion building, Marion, O., engineers.

ST. CLAIRSVILLE, O.—Belmont Electric Co-operative, Harry McAllister, superintendent, has REA allotment of $147,000 for construction of transmission lines to serve 705 customers.

SOUTH POINT, O. — Atmospheric Nitrogen Co., subsidiary of Allied Chemical Corp., 61 Broadway, New York, and United States War Department, Washington, plan chemical ordnance works here, to manufacture ammonia and other chemicals. Cost estimated between $17,000,000 and $20,000,000.

WINCHESTER, O.—Village, W. C. Neal, clerk, has plans for municipal waterworks treatment plant and distribution system costing $180,000. Burgess & Niple, 568 East Broad street, Columbus, O., consulting engineers.

### Pennsylvania

MEADVILLE, PA.—Talon Inc. is changing over part of its production to defense contracts, and has added 27,000 square feet to its manufacturing space with the purchase of a warehouse on Mead avenue, which will be converted for factory purposes.

PITTSBURGH—Blaw-Knox Co., Farmers Bank building, Pittsburgh, is having plans prepared for a mill building at Sixty-second and Butler streets, here, to cost approximately $100,000. Hunting, Davis & Dunnells, Century building, Pittsburgh, architects.

WILLIAMSPORT, PA.—Lycoming Motors Division of Aviation Mfg. Corp. has let contract for a $630,000 plant addition, exclusive of equipment, to Sordoni Construction Co., Forty Fort, Pa. The building will be one-story, 380 x 425 feet.

### New York

BUFFALO—National Smelting, Refining & Machine Corp. has been incorporated with capital of 200 shares, by Walter F. Lockwood, Samuel R. Goetz and Rose Sartori, all of Buffalo.

WEST POUGHKEEPSIE, N. Y.—Schatz Mfg. Co., manufacturer of aircraft ball bearings for the government, will expand its plant facilities by 50 per cent.

WEST POUGHKEEPSIE, N. Y.—Federal Bearings Co. is expanding its plant facilities by 50 per cent. It is working on government orders for aircraft ball bearings.

### Michigan

DEARBORN, MICH.—Dearborn Stamping Co., Dearborn, has awarded contract to Talbot & Meier Inc., Detroit, for additions to factory and office. H. H. Esselstyn Detroit, is engineer.

HASTINGS, MICH.—Hastings Mfg. Co. has begun construction of an addition to its plant.

MANISTIQUE, MICH.—Frank LeMaire, Hiawatha, Mich., is erecting a plant here for the manufacture of machine tools and other defense products. The plant, to be operated under the name of Manistique Tool & Mfg. Co., will be 35 x 60 feet. John Larson, Manistique, is contractor.

RIVER ROUGE, MICH.—Great Lakes Engineering Works has let contract to the Barton-Malow Co., Detroit, for an addition to its plant and office building at River Rouge.

**Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 101 and Reinforcing Bars Pending on page 102 in this issue.**

### Illinois

CHICAGO—Jordan Co. has purchased about five acres at the northwest corner of Merrimac avenue and West Fifty-first street, on which it will erect a large addition to its plant. A. E. Jordan is president.

CHICAGO—International Rolling Mill Products Co., 3136 West Fifty-first street, is enlarging its expansion program started in 1940 by acquiring 35,000 square feet of land, and plans have been completed for additional construction scheduled to begin in 1942.

CHICAGO—Central Pattern & Foundry Co., 3737 South Sacramento avenue, is expanding plant facilities. A new building, now being erected, will contain about 12,000 square feet of space, bringing plant total to 47,000 square feet.

### Maryland

BALTIMORE—Bartlett Hayward Division, Koppers Co., has awarded contract to Morrow Bros., Fidelity building, for construction of addition to assembly shop at Ramsay and McHenry streets.

CRISFIELD, MD.—Mayor and town council have filed application with Public Service Commission for permission to issue $500,000 bonds for construction of municipal electric plant.

SPARROWS POINT, MD.—Bethlehem Shipbuilding Co. has let contract to McLean Contracting Co., 1301 Fidelity building, Baltimore, for three shipways and shop building, to cost approximately $2,000,000.

### District of Columbia

WASHINGTON—Bureau of Supplies and Accounts, Navy Department, will open bids Jan. 16, schedule 9861, 16 gasoline engine driven crawler type tractors, delivery New York and Pearl Harbor, T. H.; Jan. 20, schedule 9872, 86 welding resistor units, delivery Boston, Washington and Mare Island, Calif.

WASHINGTON—Bureau of Supplies and Accounts, Navy Department, will open bids Jan. 13, schedule 9754, turbogenerators, spare parts and tools, delivery Brooklyn, N. Y., Mobile, Ala., and Washington; schedule 9776, two turbogenerators, circuit breakers, spare parts, tools and wrenches; Jan. 16, two motor-driven brake presses, delivery Charleston, S. C., and Mare Island, Calif.

### Kentucky

OWENSBORO, KY.—Green River Rural Electrification Co-operative Corp. has REA allotment of $143,000 for rural lines.

PADUCAH, KY. — Jackson Purchase Rural Electric Co-operative Corp. has REA allotment of $175,000 for rural lines.

### Florida

JACKSONVILLE, FLA. — Merrill-Stevens Drydock & Repair Co., James C. Merrill, president, has received allotment of $3,000,000 from Navy for expansion to plant facilities, including 12,000-ton floating dock; entire plant modernization and installation of equipment.

MARATHON, FLA.—Florida Keys Electric Co-operative Association Inc. has been granted REA allotment of $208,000 for rural lines.

### Georgia

JASPER, GA.—Amicalola Electric Membership Corp. has received REA allotment of $165,000 for rural lines.

LOUISVILLE, GA.—Georgia Rural Power Reserve Electric Membership Corp. has been granted REA allotment of $3,750,000 for rural lines.

SAVANNAH, GA.—Savannah Machine & Foundry Co., W. L. Mingledorff, president, 632 Indian street, plans installation of $350,000 equipment; building of one shipway; addition of welding machines, 30-ton gantry crane, 30-ton diesel machine motor crane, 500-ton press, and will double machine shop capacity, in connection with the $10,000,000 contract recently received for construction of five additional mine sweepers for the Navy.

### West Virginia

HINTON, W. VA.—United States Engineer office, Huntington, W. Va., will have plans and specifications available soon for designing, fabricating and delivering hydraulic turbines for Bluestone power house.

### Virginia

GLEN LYN, VA.—Appalachian Electric Power Co., Roanoke, Va., will double capacity of steam-electric generating station here in connection with new addition. Installation will include 80,000-kilowatt turbine-generator unit, high pressure boiler and auxiliary equipment.

HAMPTON, VA.—Elizabeth City county, R. E. Wilson, clerk, will open bids early in January for construction of sewer systems and erection of three pumping stations. Robert F. Pyle, 99 Twenty-eighth street, Newport News, Va., engineer.

MARTINSVILLE, VA.—City council

has authorized J. H. Pharis, superintendent of municipal hydroelectric power plant, to purchase new equipment, including static condenser.

### Missouri

JOPLIN, MO.—City, J. J. Saunders, commissioner, will vote soon on a $300,000 bond issue to aid financing construction of sewage disposal plant to cost $570,000. H. T. Lawrence, 3244 Northwest Fourteenth street, Oklahoma City, Okla., consulting engineer. (Noted Oct. 13.).

KENNETT, MO.—City officials plan purchase of diesel engine generating unit for municipal power plant, estimated to cost $60,000. Burns & McDonnell, 107 West Linwood boulevard, Kansas City, Mo., consulting engineers.

NORTH KANSAS CITY, MO.—American Brake Shoe & Foundry Co. is preparing plans for one-story, 60 x 80-foot machine shop addition and one-story, 70 x 100-foot foundry addition.

ROBERTSON, MO.—McDonnell Aircraft Corp., James S. McDonnell Sr., president, Lambert-St. Louis Air Field, has revised plans near completion and will soon call bids for airplane parts plant, to be financed by Defense Plant Corp. Palmer & Lamdin, 1020 St. Paul street, Baltimore, architect.

ST. LOUIS—E. H. Baare Mfg. Co., 1618 Tower Grove avenue, has let contract to W. C. Harting Construction Co., 722 Chestnut street for addition to shop.

ST. LOUIS—Rawlings Mfg. Co., 2301 Lucas avenue, has let contract to James H. Bright Contracting & Building Co., 1259 North Kingshighway, for addition to factory.

### Arkansas

CAMDEN, ARK.—REA, Tom Brown, co-operative director, will erect $4,000,000 steam plant here.

CAMDEN, ARK.—Arkansas-Louisiana Electric Co-operative, R. I. Davis, president, Natchitoches, La., has plans for power generating plant to cost $2,500,000, with equipment. It also plans 186-mile power line between Muskogee, Okla., and Hot Springs, Ark.

STAR CITY, ARK.—REA has allotted $141,000 to the C and L Rural Electric Co-operative, Lynn Thomasson, superintendent, to finance construction of 123 miles of rural transmission lines to serve 542 customers.

SWEET HOME, ARK.—Dulin Bauxite Co. plans bauxite drying plant to cost about $50,000.

### Oklahoma

TULSA, OKLA.—City, C. H. Veale, mayor, has voted favorably on $3,833,000 bond issue to finance construction of sewage disposal plant. Victor H. Cochrane, Wright building, Tulsa, consulting engineer.

### Wisconsin

CHIPPEWA FALLS, WIS.—WPA has allocated funds to city, L. C. Millard, clerk, to aid financing sewage pumping station, including equipment. Greely & Hansen, 6 North Michigan avenue, Chicago, consulting engineers.

### Iowa

GREENFIELD, IOWA—Southwestern Federated Power Co-operative, A. Ray, president, plans power generating plant here. Project will cost over $500,000.

### Texas

EL PASO, TEX.—Grant of $100,000 has been approved for extension of sewage treatment plant, including new pumping station.

EL PASO, TEX.—Headman, Ferguson & Carollo, Phoenix, Ariz., are engineers for improvements to waterworks. J. E. Anderson is mayor. PWA grant of $754,900 has been approved.

GALVESTON, TEX. — Gray's Iron Works Inc., Jack Walmsley, president, 1901 Water street, will spend approximately $200,000 for bulkheads and other facilities on the shipbuilding site, including installation of machinery.

HOUSTON, TEX.—Houston Lighting & Power Co. plans expansion program, and has received priority rating from OPM for a 35,000-kilowatt turbine for new plant.

LONGVIEW, TEX.—Stockholders of Madaras Steel Corp. of Texas have voted to increase preferred stock by 1000 shares to expedite completion of tests now being made here and for further expansion. When tests are completed company expects to apply for government loan to build other steel plants for which plans are now being prepared.

### California

LONG BEACH, CALIF.—Clarence N. Aldrich, 1834 Dawson avenue, Long Beach, architect, is preparing plans for industrial building in Orange county, including a hangar, 100 x 120 feet, factory 80 x 100 feet, and an office and laboratory 40 x 80 feet.

LOS ANGELES—Fruehauf Trailer Co. of California will erect an addition to its factory at 2160 East Twenty-fifth street, 70 x 765 feet, to cost $100,000.

LOS ANGELES—Pennsylvania Iron & Steel Co. will build an addition to its plant at 2451 East Twenty-third street.

LOS ANGELES—California Metals & Engineering Co. will erect a factory and office building, 90 x 140 feet, at 1016 North McCadden place.

LOS ANGELES—Firestone Tire & Rubber Co., 2525 Firestone boulevard, has building permit for an addition to its plant. Estimated cost $170,000.

### Washington

SEATTLE—Webster-Brinkley Co., 651 Alaska street, foundry operator and manufacturer, will build plant addition. Contract has been let to Boyle & Pettit, Seattle.

### Canada

NEW WESTMINSTER, B. C.—Pacific Veneer Co. Ltd., Braid street, will build plant addition to cost $35,000 and install machinery costing $25,000. General contract has been let to A. Ward & Son, 131 Eleventh avenue.

VANCOUVER, B. C.—Burke Lumber Co. Ltd., 8708 Yukon street, will build saw and planing mill here, building to cost about $20,000 and equipment about $45,000.

BRANTFORD, ONT.—Bay State Abrasive Products Co. Ltd., 188 Pearl street, will build plant addition to cost about $15,000, equipment extra. General contract has been given to Schultz Construction Co., 47 Albion street.

BRANTFORD, ONT.—Waterous Ltd., Market street South, maker of boilers, engines, etc., is having plans prepared for erection of two-story plant addition here to cost about $75,000.

BURLINGTON, ONT.—T. W. Hand Fireworks Co. Ltd., Cooksville, Ont., will erect two-story plant, 46 x 150 feet, here to cost $20,000, and has given general contract to A. S. Nicholson & Son Ltd., Burlington.

HAMILTON, ONT.—Otis Fensom Elevator Co. Ltd., Victoria avenue North, has let general contract to W. H. Yates Construction Co. Ltd., 400 Wellington street, for plant addition to include heat treating department; one-story storage building, and addition to plant proper. Estimated cost about $250,000.

KINGSTON, ONT.—City council is having plans and specifications prepared by Gore & Storrie, engineers, 1130 Bay street, Toronto, Ont., for filtration plant to cost about $3,500,000; sewage disposal plant to cost about $1,000,000, and installation of pumping system to cost $200,000.

LINDSAY, ONT.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, plans further addition to arsenal here to cost about $200,000.

LONDON, ONT.—Webster Air Equipment Co., 1161 King street, is considering plans for erection of plant addition to cost, with equipment, about $50,000.

OSHAWA, ONT.—General Motors Corp. of Canada Ltd., William street East, will build plant addition here and has given general contract to W. B. Sullivan Construction Co. Ltd., 30 Bloor street West, Toronto, Ont.

SCARBOROUGH TOWNSHIP, ONT.—Precision Tool Works Ltd., 49 Niagara street, Toronto, Ont., will erect factory building here to cost $30,000, equipment extra, and has given general contract to E. B. Reid, 87 Pleasant boulevard, Toronto.

ST. THOMAS, ONT.—British American Foundry Co., 102 Centre street, is considering plans for machine shop here to cost, with equipment, about $50,000.

TORONTO, ONT.—O. H. Johns Glass Co. Ltd., 219 Broadview avenue, will build plant addition to cost $15,000, and has let general contract to E. S. Martin, 16 Saulter street.

TORONTO, ONT.—James Morrison Brass Mfg. Co. Ltd., 276 King street West, has given general contract for plant addition to Chestnut McGregor Ltd., 96 Bloor street West. Cost, with equipment, about $60,000.

SYDNEY, N. S.—Atlantic Spring & Foundry Co. Ltd., Kings road will start work immediately on rebuilding plant destroyed by fire to cost with equipment, about $40,000.

BOURLAMAQUE, QUE.—Quebec Manitou Mines Ltd., 85 Sparks street, Ottawa, Ont., will install 600-ton mill unit here to cost, with equipment, about $400,000.

DRUMMONDVILLE, QUE. — Eastern Paper Box Co. is completing plans for erection of factory addition to cost $15,000 and will install equipment at $10,000.

HULL, QUE.—Hull Iron & Steel Foundries Ltd., Montcalm street; will erect foundry addition here to cost about $50,000 with equipment, and has let general contract to R. Brunet & Fils, 35 Aylmer road. Richards & Abra, 55 Metcalfe street, Ottawa, Ont., architects.

MONTREAL, QUE.—Zinc Oxide Co. of Canada Ltd., 6894 Notre Dame street East, has let general contract to Collet & Freres Ltd., 1978 Parthenais street, for plant addition to cost $20,000, equipment extra.

MONTREAL, QUE.—Montreal Locomotive Works Ltd., 215 St. James street West, will build hammer shop addition, 100 x 100 feet and extension to boiler room, 25 x 50 feet to cost about $100,000, and has let general contract to James W. Ross, 1010 St. Catharine street West. T. Pringle & Son Ltd., 485 McGill street, consulting engineer.

MONTREAL, QUE.—Soulanges Cartage & Equipment Co., 7150 Hochelaga street, plans to start work immediately on erection of machine shop addition here to cost, with equipment, about $25,000. J. B. Lemieux, manager.

ST. THERESE, QUE.—Department of Munitions and Supply, Ottawa, Ont., H. H. Turnbull, secretary, has given contract to Angus Robertson Ltd., 660 St. Catharine street West, Montreal, for erection of addition to munitions plant here to cost $1,000,000.

GLADMAR, SASK.—Sybouts Sodium Sulphate Co. Ltd. will erect plant and install equipment here to cost about $30,000 for processing sodium sulphate.

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