Lake freighters are again being built at Ashtabula, after a lapse of 25 years. Page 78



# CONTENTS


Volume 111—No. 24 STEEL December 14, 1942


## NEWS



## FEATURES



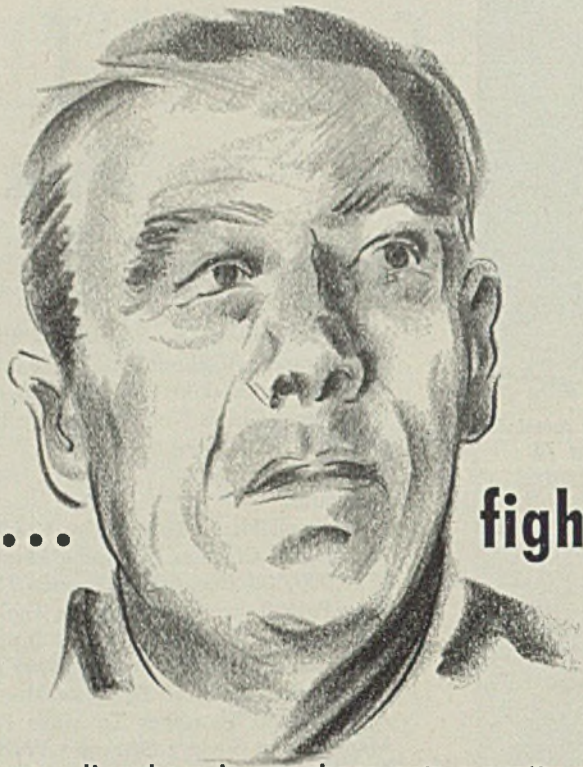
## TECHNICAL



## PRODUCTION



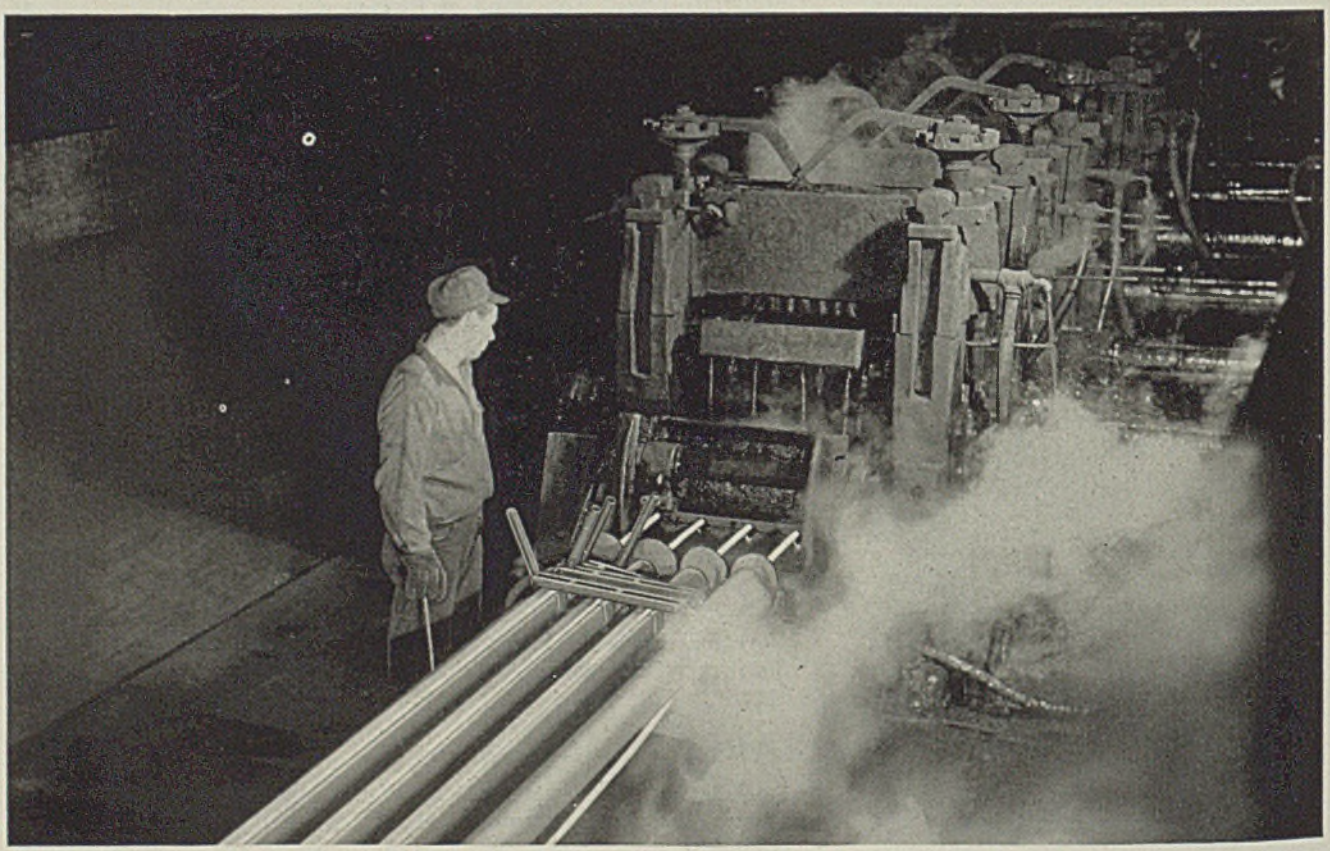
## MARKETS



# Sure I'm busy... fighting a War!

"You know, a fellow standing here in my shoes gets a pretty good idea of what this U. S. A. can do when it starts rollin'. I run the flying shear on a four-strand Morgan Roughing Mill . . . Sure I'm busy, fighting a war! And we're going to win it, too! We've got the men and the machines, and the brains . . . LET'S USE 'EM!"

R-109



## MORGAN CONSTRUCTION COMPANY • WORCESTER, MASS.

# HIGHLIGHTING

## this issue of STEEL

**LABOR** "Blueprints" which will enable industrial management to forecast their manpower problems and prospects with reasonable accuracy are contained in the manning tables (p. 46), soon to be placed in operation. These will provide information on which employes are likely to be inducted and offers a schedule for training of replacements. . . Shortages of workers now exist in 102 industrial areas, are anticipated in 77 others, while only 91 have surpluses (p. 68). . . Steelworkers now are earning 13 per cent more in direct wages per ton of steel produced than at this time last year (p. 69). This is due to last summer's wage increase and to more overtime. . . Time lost due to strikes dropped to the lowest level in five years (p. 68), according to National War Labor Board figures.

**THEY SAID:** Prime requisite for post-war prosperity is reform of those government policies which now depress business and discourage investment (p. 70), it was agreed at the War Congress of American Industry. Unnecessary concentration of industries was questioned by the manufacturers who held that "sacrifice is not an end in itself". . . "Fluidity of war"—swift changes in combat situations—was held responsible for the distress in those industries ordered to curtail armament schedules (p. 73); necessity for revisions was explained by the Army's chief of ordnance. . . Approaches to cost controls required by new and frequently altered production plans were discussed at the annual conference of the Society for Advancement of Management (p. 72). . . "We must shift the emphasis of national policy from waste and extravagance to economy and efficiency" if 1943 war production goals are to be achieved, warns E. L. Shaner (p. 45).

**NEW PLANS** WPB Steel Division last week was reorganized (p. 49) to enable it to handle increased responsibilities resulting from the Controlled Materials Plan. For complete official text of the plan see Section Two of this issue of STEEL. For sketch showing how the plan balances supply and demand see page 59. . . One step to help small businesses is a program to utilize their facilities (p. 59) to build special maintenance tools for combat vehicles. . . Ordnance officials are specifying a greater amount of steel in military equipment to conserve the relatively more scarce aluminum and copper (p. 52). No sacrifice in performance has resulted and in some applications improvement is noted. . . Builders' hardware lines (p. 53) are reduced to 3500 from 27,000 items in a drastic simplification program. . . Weeding out a mass of meaningless data, ambiguities and duplications in WPB request forms, the board's Committee for the Review of Data Requests from Industry has eliminated 120 forms and simplified 132 others, a 40 per cent reduction (p. 56).

**EXPANSION** United States Steel Corp.'s announcement that it is engaged in a $700,000,000 expansion program, (p. 60) was followed by a meeting of directors in Pittsburgh when it was disclosed $275,000,000 of that amount will be spent in that area (p. 52). . . Steel Institute reports that nearly $420,000,000 was spent by the steel industry in 1941 for repairs and maintenance (p. 53). . . Construction of the government-financed detinning plant in Chicago is about to start (p. 60). . . Studebaker Corp.'s three plants this year will pour forth $215,000,000 worth of war equipment, double its entire volume of war production from 1852 to 1919, "and next year the figure may be tripled" (p. 63). . . Machine tool production in October reached an all-time high (p. 61) at 30,000 units. Builders' schedules will be rearranged to eliminate unevenness in backlogs.

**TECHNICAL** Construction of 621-foot bulk freighters for the Great Lakes at Ashtabula, O., is illustrated (p. 78). Gerald E. Stedman tells how use of the oxypropane cutting process has been expanded by war demands. It has been utilized in scrapping such heavy structures as old battleships (p. 80) as well as in foundry work.

George E. Stringfellow describes some of the materials handling facilities employed at the huge Allis-Chalmers plant in Milwaukee (p. 84). Herbert E. Fleming concludes his presentation on low-temperature brazing of tools at International Harvester's Tractor Works (p. 88) detailing the alloys and procedure employed.

The film-refining process—something new and original in steelmaking—offers the advantages of a fast and continuous method of making good clean steel and alloy steels of exact composition. At the same time it simplifies the steelmaking operation to make its control more certain and almost automatic (p. 92).

Thomas A. Frischman presents a metallurgical study of some NE steels with results of many tests on such types as NE-8620, NE-8720 and NE-8817. This is the fifth in the new series on reports of users of NE steels. For latest list of NE steels, see Nov. 23 issue, p. 96.

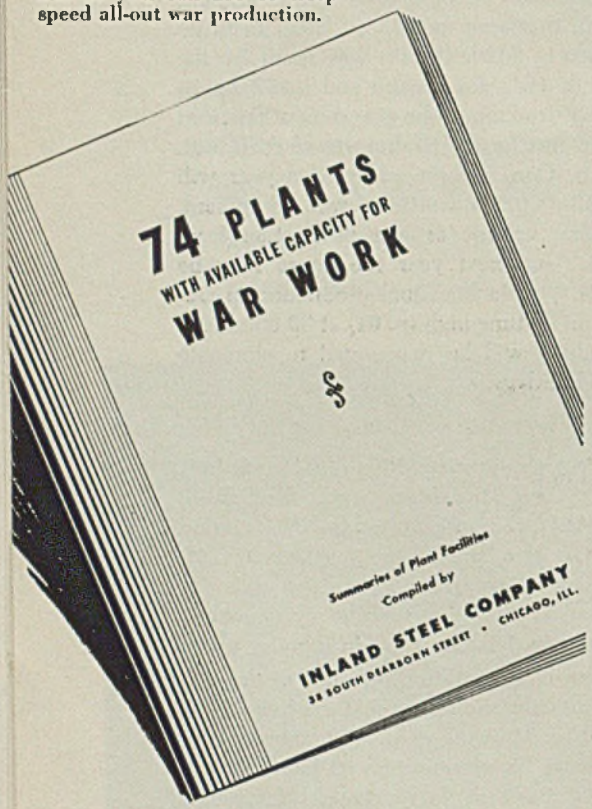
# New Booklet of Plants with Capacity for War Work

**Many contracts have been placed as the result of recent Inland advertisements which list plants with machinery and men available to produce for war. *These listings are now ready in booklet form.* If you are looking for metal-working plants to handle war contracts or subcontracts you will find immediate use for this Inland booklet.**

**The companies listed have had their normal peacetime business suspended or greatly curtailed. They are successful companies that are ready and anxious to turn their equipment and trained men to war effort. Most of these companies are located in the Middle West; many are long established firms, known throughout the world, and with experience in war work.**

***The following* new *summaries are typical of the comprehensive method of listing in this helpful booklet.***

Write, phone, or wire today for as many of these Inland booklets as you can use to help speed all-out war production.




Look over the facilities shown in the columns to the right. They are new—received after the Inland booklet went to press. Inland will gladly give you the names and addresses of any of the companies in which you are interested.

**IS-86** Ill. mfr. of cans, specialties and pierced tin ware, 200 emp., 160,000 sq. ft. fl. sp., own loading platform. Served by 12 railroads. Equip. includes: 22 humping horn presses, 3″ and 5″ dia., 8″ to 20″ length; gang slitters; square shears; tread rolling mach.; 8″ to 22″ swing, 24″ to 84″ bed lathes; 4 drill presses; surface grinder; 3 shapers; 2 milling machines; spray booths; can line for 2½″ x 2″ up to 19″ x 29″ cans; and, 68 power presses for forming and drawing 0.010″ to 0.105″ metal. Has performed on contracts for Army and Navy.

**IS-87** Ill. steel fabricator is ready to take on structural work. Have facilities for cutting bars, beams and angles squarely and accurately to size. Also for punching, riveting or welding. Carry a limited stock of angles, channels and beams available for quick delivery on fabricating orders with high priority ratings.

**IS-88** Mo. mfr. of electrical devices desires subcontracts. Has 28 punch presses, 6 drill presses, 9 riveting machines, 3 welders, 5 tapping machines, 8 auto. coil winders, 42″ power shears, 8′ brake, good electrical research laboratory, adequate tool room. Established 18 yrs. 18,000 sq. ft. space.

**IS-89** Wis. hvy. steel plate fabr.; over 50 yr. in business; 26,000 sq. ft. fl. sp.; 35,000 sq. ft. yard area; R. R. enters shop; 15-t. main crane 60 ft. span; precision flame cutting; 3 plate rolls #10 ga. to 1½″; apron brake 12 ft.; sq. shear ⅜″ x 10 ft.; throatless shear ¾″ cap.; large punch 5 ft. throat; comb. punch & shear; horizontal drill 5 ft. radius; 10 welding machines; bar & angle rolls; riveting presses; 6 x 6 high speed hack saw; air grinding & polishing; paint spray; assembling; maintenance mach. shop; engr. staff; financially able. Production or jobbing work wanted.

**IS-90** Ill. furnace & air conditioning mfr.; pl. fl. sp. over 105,000 sq. ft.; emp. 150; has two R. R. sidings. Equip. incl. shearing, blanking, drawing, pressing, bending, punching, riveting, welding and surface grinding. Sheet steel working up to ¼″ & hvr. Comp. cap. for war work contracts.

**IS-91** Minn. mfr. of furnaces, heaters, and air conditioners, emp. 100. Has had experience with war production. Factory sp. 75,000 sq. ft. on own R. R. siding. Complete sheet metal production equip., including punch presses, power brakes, folders, shears, crimper; welding, painting and finishing equip.; mounting dept. Machine shop, including lathes, grinders, drill presses, saws, milling machines and shaper.

**IS-92** Nationally known Ind. farm mchry. mfr. with capable engr. staff and 250 emp., modern plant—over 100,000 sq. ft. fl. sp., with additional 70,000 sq. ft. for whse. storage. Large machine shop with sheet metal and wood working depts., tool room, assembly, painting and shipping, gray iron foundry available.

**IS-93** Wis. fab. of struc. steel and plate work. Desires war work, begin at once. 30,000 sq. ft. fab. shop, blacksmith shop, templet shop with facilities for punching, shearing, forming, bending, riveting, electric welding and acetylene cutting equip. 32 yr. expr. in light, heavy riveted and welded structures and plate work.

**IS-94** Pa. gear and mach. mfr. has available capacity on 54″ bevel gear planer and rougher. Have been cutting large bevel gear rings for Army.

**IS-95** Ohio mfr. with facilities for iron, steel and wire fabrications desires war subcontract work. 350,000 sq. ft. sp., two R. R. sidings; 56 yrs. exp. Financial stability (highest commercial rating obtainable). Primarily interested in units or parts of units fabricated from angles, flats, tees, rounds, squares, sheets, strips, plates, etc. Equip. incl.: punch presses, power brakes, shears, spot and arc welders, drill presses, bull dozers, auto. saws, heat treating furnaces, tool room equip., etc.

*Dedicated to Victory*

# INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas Cit

STEEL
December 14, 1942

# Lost: The Habit of Efficiency!

*While this is no time for blind optimism or complacency, one cannot help but be encouraged by the OWI report on war production, issued on the eve of the first anniversary of Pearl Harbor. That in the year 1942 "we shall have produced approximately 49,000 planes, 32,000 tanks and self-propelled artillery, 17,000 anti-aircraft guns larger than 20 mm. and 8,200,000 tons of merchant shipping" is a noteworthy achievement, measured by any yardstick.*

*It is even more impressive when we take into account the fact that this production was accomplished at a time when a substantial portion of our effort was being directed toward plant conversion, expansion and other phases of the tooling-up process. As the problem of preparation diminishes and as the proportion of attention to smooth-running, big-scale production mounts, the nation's output of war goods should increase appreciably.*

*But it will not increase as much as it should unless everybody concerned with production snaps into a more realistic attitude toward efficiency and economy. Perhaps it has been necessary in some instances to sacrifice these virtues in order to get a quick start. Admittedly war imposes many conditions which make peacetime standards of efficiency difficult of attainment.*

*Nevertheless, we must get back into the habit of efficiency. We must shift the emphasis of national policy from waste and extravagance to efficiency and economy. It is downright foolishness to be pouring so much time, effort and money into the war program at the top when so much of it is leaking out at the bottom through sheer inefficiency.*

*The incentives for efficiency and economy should be self-evident to everybody. Right now the incentive is victory. The more efficient we are, the quicker the war will be won. After we have won the war, the incentive will be the establishing of a durable peace and a satisfactory postwar economy.*

*Efficiency—so sorely neglected these many recent years—is the most potent means to these two ends.*

E. L. Shaner

Editor-in-Chief

# Give Employers "Blueprint" For Solving Draft Problems

*Orderly plan for anticipating manpower losses and training replacements for potential inductees provided. Management to analyze jobs as to essentiality in war production*

"BLUEPRINTS" by which management of war industries can plan and work out their prime manpower problems in co-operation with the War Manpower Commission and the Selective Service soon will be made available by the WMC.

The blueprints are the manning tables, full details on the operation of which have just been announced. They offer a fairly definite means to chart which employes will be subject to military induction and offer a schedule for training replacements.

Copies of the tables soon will be distributed by regional WMC offices to employers whose plants are 75 per cent or more engaged in war production or who are performing some essential service, such as the railroads, public utilities, and similar jobs.

The manning tables are forms, which, when filled out, provide a realistic inventory of the personnel and job classifications in each plant. They determine how efficiently a plant is utilizing its working force, how adequate are its programs for training, upgrading and promoting employes, and provide a basis for planning improvements. They will provide each employer with complete information as to the number of employes who are subject to induction. A supplementary withdrawal and replacement schedule will offer him guidance in planning replacements so that his production will not suffer as his employes enter military service.

The manning table forms are relatively simple to fill out, and they offer a sensible method of evaluating the personnel and production problems of each plant and the best method of meeting them.

The employer must expend some time and effort in gathering the required information, but will in return receive information which will enable him to plan adequately to meet his labor needs of the future. The government will, in turn, receive information which will furnish the basis for the orderly withdrawal of workers, who must, under Selective Service, be released to the armed services.

The manning tables are one part of a four-part plan by which the War Manpower Commission and Selective Service intend to meet the withdrawal of inductees from industry through the planned training of replacements in a manner which will keep disruption of production at an absolute minimum. The other parts are:

1. The drawing up of a list of 35 industries designated as "essential activities," which are as follows:

Production of aircraft and parts.
Production of ships, boats and parts.
Production of ordnance and accessories.
Production of ammunition.
Agriculture.
Processing of food.
Forestry, logging and lumbering.
Construction.
Coal mining.
Metal mining.
Nonmetallic mining and processing and quarrying.
Smelting, refining, and rolling of metals.
Production of metal shapes and forgings.
Finishing of metal products.
Production of industrial and agricultural equipment.
Production of machinery.
Production of chemicals and allied products.
Production of rubber products.
Production of leather products.
Production of textiles.
Production of apparel.
Production of stone, clay and glass products.
Production of petroleum, natural gas and petroleum and coal products.
Production of finished lumber products.
Production of transportation equipment.

*Replacement of personnel has become one of war industry's major problems. How the aircraft industry is meeting it is depicted in this photo at a Douglas Aircraft Co. plant. It shows a typical group of new employes. Of Douglas personnel, more than one-third are women; among new employes, women outnumber men three to one*

REPLACEMENT SUMMARY

EXAMPLE A. List of Jobs – Selective Service Status of Workers

| Line No. or Code | LIST OF JOBS (Job Titles) | Number of Women | Number of Men not now to be considered for Replacement on Example – B | | | | | Number of Men to be considered for Replacement on Example – B | | | Total of all Workers | Anticipated Maximum Number of Workers (Optional) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Men with Minor Children | Class 4-F | Over Age | Under Age | Total | Single Men | Married Men without Children | Total | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| | DETAIL MFG. DEPT. MACHINE SHOP | | | | | | | | | | | |
| | Foreman | | 5 | | 2 | | 7 | | 1 | 1 | 8 | |
| | Sub-Foreman | | 6 | 1 | 3 | | 10 | 2 | 3 | 5 | 15 | |
| | Leadman | | 19 | 1 | 9 | | 29 | 6 | 2 | 8 | 37 | |
| | Milling Mach. Opr. | | 20 | 2 | 15 | | 37 | 10 | 11 | 21 | 58 | |
| | Automatic Screw Mach. Opr. | | 10 | 2 | 6 | 1 | 19 | 8 | 21 | 29 | 48 | |
| | Engine Lathe Opr. | | 7 | 3 | 7 | 3 | 20 | 27 | 11 | 38 | 58 | |
| | Drill Press Opr. | 42 | 20 | 5 | 10 | 61 | 138 | 32 | 41 | 73 | 211 | |
| | Assembler "C" | 824 | 550 | 69 | 179 | 231 | 1,853 | 237 | 294 | 531 | 2,384 | |
| | ENGINEERING DEPT. | | | | | | | | | | | |
| | Chief Engineer | | | | 1 | | 1 | | | | 1 | |
| | Administrative Engineer | | 1 | | | | 1 | | | | 1 | |
| | Project Engineer | | 3 | | 1 | | 4 | | 1 | 1 | 5 | |
| | Layout Draftsman | | 16 | 2 | 12 | | 30 | 8 | 14 | 22 | 52 | |
| | Detail Draftsman | 38 | 15 | 11 | 21 | 13 | 98 | 61 | 41 | 102 | 200 | |
| | Expediter | | 3 | 1 | | | 4 | 1 | 1 | 2 | 6 | |
| | Stock Clerk | | 4 | 1 | | 1 | 6 | 3 | 5 | 8 | 14 | |
| | Stock Chaser | | 4 | 1 | | 3 | 8 | 11 | 8 | 19 | 27 | |
| | TOTALS | 4,515 | 3,403 | 422 | 1,797 | 1,290 | 11,427 | 1,643 | 1,772 | 3,501 | 14,928 | |

EXAMPLE B. REPLACEMENT LIST

| Line No. or Code | Job Title | Name | Year of Birth | Sel. Ser. Class | Married or Single | Local Board No. County State | Order No. (opt) | We will be prepared to replace these men within the month or period checked below. | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1st | 2nd | 3rd | 4th | 5th | 6th | 6 to 12 Mos. | Over 12 Mos. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | DETAIL MFG. DEPT. MACHINE SHOP | | | | | | | | | | | | | | |
| 1 | Foreman | Smith, John R. | '04 | II-B | M | - | | | | | | | | | ✓ |
| 2 | Sub-Foreman | Jones, Thomas L. | '09 | III-B | S | - | | | | ✓ | | | | | |
| 3 | | Wilson, Jeffry R. | '12 | III-A | S | - | | | | | ✓ | | | | |
| 4 | | Bradon, John R. | '11 | II-B | S | - | | | | | | ✓ | | | |
| 5 | | Waite, Tim | '17 | II-B | M | - | | | | | | | ✓ | | |
| 6 | | Mann, Joseph W. | '17 | II-B | M | - | | | | | | | | ✓ | |
| 7 | Leadman | Nichols, Roger | '15 | III-A | S | - | | ✓ | | | | | | | |
| 1463 | | Colgan, Douglas | '22 | Uncl. | M | - | | | | | | | ✓ | | |
| | ENGINEERING DEPT. | | | | | | | | | | | | | | |
| 1464 | Project Engr. | Evans, John T. | '99 | III-B | M | - | | | | | | | | | ✓ |
| 1465 | | Allan, B. C. | '07 | II-B | S | - | | | ✓ | | | | | | |
| 1466 | Layout Draftsman | Martin, Chas. | '09 | II-B | S | - | | | ✓ | | | | | | |
| 1467 | | Park, Franklin | '09 | III-A | M | - | | | | ✓ | | | | | |
| 1468 | | Davis, Donald K. | '14 | II-B | M | - | | | | ✓ | | | | | |
| 3499 | Expediter | Furman, Oliver S. | '14 | II-B | S | - | | | | | ✓ | | | | |
| 3500 | | Winter, Wm. C. | '17 | III-A | M | - | | | | | | | | ✓ | |
| 3501 | Stock Clerk | Honan, W. H. | '21 | I-A | S | - | | ✓ | | | | | | | |
| | | TOTALS | | | | | | 167 | 100 | 100 | 100 | 150 | 150 | 1250 | 1484 |

*Two of the forms employers will be asked to fill in by the War Manpower Commission. The Replacement Summary analyzes the employment force as to liability to the draft and as to jobs. The Replacement List inventories men to be replaced*

Transportation services.
Production of materials for packing and shipping products.
Production of communication equipment.
Communication services.
Heating power and illuminating services.
Repair services.
Health and welfare services.
Educational services.
Governmental services (other than federal).
Technical, scientific and management services.

2. Preparation of a list of the essential jobs—approximately one out of each nine—within each of these industries. This list should be completed by Dec. 31, and will include 3000 classifications.

3. Preparation of withdrawal and replacement schedules to be based on information compiled in the manning tables. Where plants are facing a critical situation requiring immediate attention, these schedules may be prepared and put into effect before the manning tables.

The four parts fit together neatly. The lists of essential industries and jobs aid local Selective Service boards in determining which jobs shall be reason for

deferment. The lists are elastic and can be lengthened or shortened as circumstances dictate.

The first step taken was to determine which industries were essential to the nation's war effort. This done, the War Manpower Commission studied the jobs within each industry and separated the essential ones from the others by applying the following three questions as a test:

1. Is a training period of at least six months necessary before an untrained worker can attain reasonable efficiency in the job?
2. Is the job essential to the industry?
3. Is the worker irreplaceable?

The job was rated essential if a "yes" answer was given to all three questions.

The local Selective Service boards can use these lists to check against any request by an employer for deferment of a worker whom the employer declares to be essential, pending completion of the withdrawal and replacement schedules.

Such deferments, usually granted for a six months period, do not mean exemption from the draft. Such workers, if fit for military service, are granted deferment only long enough to enable their employers to train someone to replace them.

In the past, however, replacements have been more the exception than the rule. Employers have not trained replacements in an adequate fashion and have had no way of knowing how rapidly men would be taken. Some have even made the mistake of training replacements who were themselves subject to induction.

Local boards are accustomed to dealing with each case as an individual. There have been cases when local boards, each unaware of what the other was doing, took so many men from a single department of a plant at the same period that production was disrupted. It has been obvious that some more co-ordinated method was needed for planning both withdrawals and replacements. To meet this need, the manning tables and the replacement schedules were worked out.

### Other Information Asked

In addition to the usual routine information, these manning tables ask each employer to provide the following information:

1. The different kinds of jobs in the plant or activity.
2. The number of workers necessary to do each kind of job.
3. The type of worker suited to do each job and the possibility of substituting other workers of less skill.
4. The amount and kind of training needed to train an unskilled worker to do each job.
5. Training methods being used or available.
6. The jobs in which women are employed and those in which women could replace men.
7. Indications of labor requirements that will accompany anticipated production program.
8. Job relationships, and possibilities for promotions and upgrading.
9. Balance or unbalance between number of skilled workers and unskilled, or of workers and supervisors.
10. Jobs where physically handicapped persons can be used.

The company retains one copy of the complete table and sends four to the WMC regional office. The regional office keeps one and sends a copy each to the state director of Selective Service, the War Manpower Commission in Washington, and the local director of the United States Employment Service.

After drafting the manning table, the employer will draw up a replacement schedule to direct him in upgrading, promoting and recruiting replacements for workers which the compiled information shows him will soon be inducted. When the replacement schedule has been accepted by the state director of Selective Service, the employer will be authorized to use a state acceptance number on forms 42-A filed in accordance with the accepted replacement schedule. The employer will fill out an affidavit—Occupational Classification Form 42-A—for all employes within the ages liable to military service for whom occupational deferment is then necessary.

### WMC To Assist Employers

It will not be necessary at the present time for employers to file such affidavits for employes who have wives and children with whom they maintain a bona fide family relationship. The employer will, however, file a Form 42-B for such employes.

These forms 42-A and 42-B are then forwarded to the local Selective Service boards concerned. When the employe is classified or reclassified, the local board will notify the employer.

This system will enable each employer to know not only how many employes will be withdrawn from each department of his plant but will know approximately when the withdrawal of a worker will occur and will be able to plan his replacements accordingly. The War Manpower Commission will assist the employer in every way it can to make such replacement and will advise him and aid him in locating women, older workers and handicapped workers.

Once the manning tables and replacement schedules are in operation, deferment of workers will be subject to periodical review.

The policy behind the manning table is explained by Paul V. McNutt, chairman of the War Manpower Commission.

"In total war," Mr. McNutt said, "each

(*Please turn to Page* 144)

*Ten grimy women in overalls, slacks, or a pair of their husband's old pants march to their lockers at the yards of the Long Island railroad, Jamaica, N. Y., after a busy day cleaning locomotives. A crew of 28 can clean as many as 58 engines by dipping a wad of waste into locomotive oil and rubbing hard. Their work is praised by enginemen and inspectors. NEA photo*

# New Setup Expected To Facilitate Effective Administration of CMP

*Twelve main operating branches provided, with four assistant division directors. Labor and industry committees important part of organization*

REALIGNMENT of WPB's Steel Division into 12 main operating branches, supervised by four assistant division directors, was announced last week by H. G. Batcheller.

At the same time, Mr. Batcheller announced full composition of the Steel Products Industry Advisory Committee and various individual product groups which work with the overall Iron and Steel Industry Advisory Committee.

"This new organization will enable the Steel Division to handle increased responsibilities placed upon it as a result of the Controlled Materials Plan", Mr. Batcheller said.

"The industry and labor committees are an important part of this organization, and we are counting on them to give us the benefit of their wide experience in the many phases of the production and fabrication of steel."

Office of the division director includes Alexander C. Brown, vice president, Cleveland-Cliffs Iron Co., as deputy director, and the following special assistants to director, as announced:

Clark King, research engineer, Bethlehem Steel Co.; Julius Clauss, chief engineer, Great Lakes Steel Corp.; A. Oram Fulton, president, Wheelock-Lovejoy & Co.; C. S. Long, president, Sterry Block Co.; and Harold J. Ruttenberg, research director, United Steelworkers of America, CIO.

### Production Directive Unit

Production directive committee is as follows:

Joseph L. Block, vice president, Inland Steel Co., chairman; Charles A. Halcomb, Procter & Gamble Co.; J. V. Honeycutt, Bethlehem Steel Co.; C. H. Longfield, Youngstown Sheet & Tube Co.; E. L. Parker, Columbia Steel & Shafting Co.; and A. V. Wiebel, United States Steel Corp.; Harold J. Ruttenberg; and R. W. Shannon, secretary.

Assistant division directors, chiefs of operating branches, and functions are:

Assistant director for raw materials and facilities: Frank Vigor, general transportation manager, Ashland Division, American Rolling Mill Co.; Facilities Branch, headed by Edwin H. Brown, vice president, Allis-Chalmers Mfg. Corp., responsible for planning construction, operation, repair and maintenance; Metallurgical and Technical Branch, headed by H. J. French, president, American Society for Metals, responsible for conservation specifications and substitution; Raw Materials Branch, W. C. Kerber, responsible for ore, pig iron, scrap, refractories and fluxes and fuel.

Assistant director for production: David Austin, former acting chief of the Iron and Steel Branch, and vice president, Carnegie-Illinois Steel Corp.; Alloy Steel Branch, headed by W. J. Priestly, vice president, Electro Metallurgical Co., responsible for construction alloys, stainless steels, tool steels; Heavy Products Branch, headed by J. V. Honeycutt, responsible for plates and shapes, rails, forgings and castings, and wire products; Bar Sheet and Strip Branch, headed by G. S. Gries, vice president, Great Lakes Steel Corp., responsible for hot-rolled, semifinished, and cold-rolled bars, sheets and strip; Tubular and Tin Plate Branch, headed by C. H. Longfield, responsible for pipe, tubing, and tin plate.

Assistant director for program and distribution: N. W. Foy, general manager of sales, Republic Steel Corp.; Program Distribution Control Branch, chief unnamed, responsible for requirements, records, and statistics, priorities and allocations and supply; Export Branch, headed by P. F. Schucker, responsible for all steel exports; Steel Recovery Branch, headed by C. V. Bradley, president, W. J. Holliday Co., responsible for sales, distribution and allocations, (located in Pittsburgh); Warehouse Branch, headed by J. R. Stuart, formerly of C. F. Hutton & Co., responsible for warehouses and merchant products.

Assistant director for ferroalloys: Miles K. Smith, former chief of the Ferroalloys Branch, and chief metallurgist, Latrobe Electric Steel Co.; Ferroalloys Branch, headed by Andrew Leigh, formerly deputy chief of the Manganese Branch, responsible for tungsten, vanadium, molybdenum, cobalt, manganese, chromium, nickel, matte ore and other alloying metals and ores.

General steel products industry advisory committee, which works with overall advisory group, is as follows:

Avery Adams, vice president, United States Steel Corp., Pittsburgh, carbon steel bars and semifinished steel.

R. M. Allen, general manager of sales, Allegheny Ludlum Steel Corp., stainless steel.

N. J. Clarke, vice president, Republic Steel Corp., Cleveland, alloy steel.

J. A. Henry, vice president in charge of sales, Weirton Steel Co., Pittsburgh, tin plate.

Paul Mackall, vice president, Bethlehem Steel Co., Bethlehem, Pa., shapes and plates.

John Neudorfer, vice president in charge of sales, Wheeling Steel Corp., Wheeling, W. Va., wire products.

L. M. Parsons, vice president in charge of sales, Jones & Laughlin Steel Corp., Pittsburgh, cold-finished bars.

W. W. Sebald, vice president and assistant general manager, American Rolling Mill Co., Chicago, sheets and strip.

E. W. Watson, vice president in charge of sales, Youngstown Sheet & Tube Co., Youngstown, O., pipe.

J. H. Parker, vice president, Carpenter Steel Co., St. Louis, tool steel.

Isaac Harter, executive vice president, Babcock & Wilcox Tube Co., Barberton, O., tubing.

A. C. Roeth, vice president, Inland Steel Co., Chicago, rails and track accessories.

Individual products advisory committees have been reorganized.

## Single Nonferrous Metals Branch Set Up by OPA

Consolidation of two branches of OPA's Industrial Materials Price Division to form a single Nonferrous Metals Branch has been effected.

The new branch, headed by John D. Sumner as price executive, incorporates the previously existing Copper, Aluminum and Ferroalloys Branch and the Zinc, Lead and Tin Branch.

Associated with Mr. Sumner in a staff capacity are E. S. Glines and Karl Anderson.

N. H. McDiarmid, principal administrative officer of the Zinc, Lead and Tin Branch, will serve the new branch in the same capacity.

Carl Holmquist, price executive of the Copper, Aluminum and Ferroalloys Branch, has resumed his former connection with Sanderson and Porter, New York industrial engineers.

The Nonferrous Metals Branch has five active operating sections, as follows: Basic Metals and Mining, O. C. Lockhard, head; Ferroalloys, Donald Van Deusen, head; Minerals and Minor Metals, Philip Woolfson, head; Scrap and Secondary Metals, Thomas McManus, head; Fabricated and Manufactured Products, Orrin McCorison, head.

# November Ingot Total Best for 30-Day Period

*Month's output of 7,184,560 tons drops slightly under record made in October*

PRODUCTION of 7,184,560 net tons of steel ingots and castings in November was the largest ever achieved in a 30-day month, according to the American Iron and Steel Institute. The November total was less than the peak production of 7,584,864 tons in October, but was greater than the 6,960,885 tons made in November, 1941.

In November steel production averaged 97.9 per cent of capacity, against the peak rate of 100.1 per cent in October. In November, 1941, production was at 98.2 per cent of a capacity which was considerably less than at present.

An average of 1,674,723 tons per week was produced in November, compared with 1,712,159 tons in October and 1,622,584 tons per week in November, 1941.

## Coke, By-Products at Alltime Peak; Increases Planned for '43

Output of coke and its chemical by-products has been increased to a new all-time record and production still is being expanded.

Approximately 1.4 tons of coal is required to make enough coke to produce a ton of steel. In making coke, many vital chemicals are obtained as by-products, which are used in making such essential war and civilian goods as explosives, artificial rubber, artificial silk ("nylon") and medicines, including the "sulfa" drugs which saved so many lives at Pearl Harbor.

October coke production, estimated at 6,046,394 tons, exceeded the August output, the previous record high month, by 49,324 tons.

The total 1942 output up to Oct. 31 is estimated at 58,551,000 tons. The output rate indicated that the previously estimated production of 70,000,000 tons in 1942—a new high record—probably will be exceeded. The production of coke by-products showed similar increases.

The supply of the particular grades and kinds of coals used in coke manufacture is limited, and steps are being taken to assure the future adequacy of these coals, according to Solid Fuels Co-ordinator Harold L. Ickes. Although emergency action by the Solid Fuels Office has been necessary on several occasions in recent months to keep "by-product" coal rolling to by-product coke plants in adequate quantity, no plant has yet reported curtailed operations for lack of coal. These particular emergencies occurred when manpower losses at the mines made it impossible for the coal producers to supply tonnages required by contracts with the coke plants.

Next year's anticipated coke production requirements have been estimated at 75,500,000 tons, and coal requirements of the coke industry will be about 112,000,000 tons. This represents an increase of about 12,000,000 tons of by-product coals over 1942. Altogether, it is anticipated that the iron and steel industry will consume a grand total of 126,000,000 tons of bituminous coal for all purposes in 1943.

## Lukens Increases Output 40.8 Per Cent Above 1941

Lukens Steel Co., Coatesville, Pa., during its fiscal year ending Oct. 10, set an all-time production record 40.8 per cent higher than in its 1941 fiscal year, which also was an all-time mark. This figure does not include operations by the company's two subsidiaries, By-Products Steel Corp. and Lukenweld Inc., both of which also established new high records in fabrication of war mate-

## STEEL INGOT STATISTICS

| | Estimated Production—All Companies | | | | | | | | Calculated weekly production, all companies Net tons | 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 | | |
| **Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production** | | | | | | | | | | |
| 1942 | | | | | | | | | | |
| Jan. | 6,328,128 | 95.4 | 490,864 | 86.0 | 305,930 | 96.3 | 7,124,922 | 94.7 | 1,608,335 | 4.43 |
| Feb. | 5,791,813 | 96.7 | 453,543 | 88.0 | 275,700 | 96.2 | 6,521,056 | 96.0 | 1,630,264 | 4.00 |
| Mar. | 6,574,701 | 99.1 | 493,294 | 86.4 | 324,916 | 102.3 | 7,392,911 | 98.2 | 1,668,829 | 4.43 |
| 1st quar | 18,694,642 | 97.0 | 1,437,701 | 86.7 | 906,546 | 98.3 | 21,038,889 | 96.3 | 1,635,994 | 12.86 |
| April | 6,346,707 | 98.8 | 454,583 | 82.2 | 321,023 | 104.4 | 7,122,313 | 97.7 | 1,660,213 | 4.29 |
| May | 6,600,376 | 99.5 | 454,054 | 79.5 | 332,460 | 104.7 | 7,386,890 | 98.2 | 1,667,470 | 4.43 |
| June | 6,247,302 | 97.2 | 452,518 | 81.8 | 322,335 | 104.8 | 7,022,155 | 96.4 | 1,636,866 | 4.29 |
| 2nd qtr | 19,194,385 | 98.5 | 1,361,155 | 81.2 | 975,818 | 104.6 | 21,531,358 | 97.4 | 1,654,985 | 13.01 |
| 1st half | 37,889,027 | 97.8 | 2,798,856 | 83.9 | 1,882,364 | 101.5 | 42,570,247 | 96.9 | 1,645,545 | 25.87 |
| July | 6,350,047 | 95.7 | 453,684 | 79.6 | 345,093 | 96.3 | 7,148,824 | 94.5 | 1,617,381 | 4.42 |
| Aug. | 6,420,496 | 96.6 | 467,313 | 81.8 | 345,642 | 96.3 | 7,233,451 | 95.4 | 1,632,833 | 4.43 |
| Sept. | 6,297,201 | 98.0 | 437,950 | 79.4 | 331,933 | 95.7 | 7,067,084 | 96.5 | 1,651,188 | 4.28 |
| 3rd qtr. | 19,067,744 | 96.8 | 1,358,947 | 80.3 | 1,022,688 | 96.1 | 21,449,359 | 95.5 | 1,633,615 | 13.13 |
| 9 mos. | 56,956,771 | 97.4 | 4,157,803 | 82.7 | 2,905,032 | 99.5 | 64,019,606 | 96.4 | 1,641,528 | 39.00 |
| Oct. | 6,757,696 | 101.6 | 461,895 | 80.9 | 365,273 | 101.7 | 7,584,864 | 100.1 | 1,712,159 | 4.43 |
| Nov. | 6,378,661 | 99.1 | 458,426 | 82.9 | 347,473 | 99.9 | 7,184,560 | 97.9 | 1,674,723 | 4.29 |
| **Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production** | | | | | | | | | | |
| 1941 | | | | | | | | | | |
| Jan. | 6,274,780 | 99.0 | 451,806 | 76.0 | 195,766 | 89.1 | 6,922,352 | 96.8 | 1,562,608 | 4.43 |
| Feb. | 5,669,425 | 99.1 | 378,536 | 70.5 | 182,393 | 91.9 | 6,230,354 | 96.5 | 1,557,589 | 4.00 |
| Mar. | 6,457,641 | 101.9 | 460,225 | 77.4 | 206,137 | 93.8 | 7,124,003 | 99.6 | 1,608,127 | 4.43 |
| 1st quar | 18,401,846 | 100.1 | 1,290,567 | 74.8 | 584,296 | 91.6 | 20,276,709 | 97.7 | 1,576,727 | 12.86 |
| April | 6,137,613 | 100.0 | 395,056 | 68.6 | 221,510 | 104.1 | 6,754,179 | 97.6 | 1,574,401 | 4.29 |
| May | 6,362,245 | 100.4 | 444,079 | 74.7 | 238,241 | 108.4 | 7,044,565 | 98.5 | 1,590,195 | 4.43 |
| June | 6,098,171 | 99.4 | 458,848 | 79.7 | 235,732 | 110.8 | 6,792,751 | 98.1 | 1,583,392 | 4.29 |
| 2nd qtr | 18,598,029 | 100.0 | 1,297,983 | 74.3 | 695,483 | 107.8 | 20,591,495 | 98.1 | 1,582,744 | 13.01 |
| 1st half | 36,999,875 | 100.0 | 2,588,550 | 74.6 | 1,279,779 | 99.7 | 40,868,204 | 97.9 | 1,579,753 | 25.87 |
| July | 6,085,100 | 94.4 | 489,297 | 85.0 | 237,827 | 85.7 | 6,812,224 | 93.3 | 1,541,227 | 4.42 |
| Aug. | 6,244,353 | 96.6 | 495,761 | 85.9 | 257,382 | 92.6 | 6,997,496 | 95.6 | 1,579,570 | 4.43 |
| Sept. | 6,054,418 | 96.9 | 500,768 | 89.8 | 256,568 | 95.5 | 6,811,754 | 96.3 | 1,591,531 | 4.28 |
| 3rd qtr. | 18,383,871 | 96.0 | 1,485,826 | 86.9 | 751,777 | 91.2 | 20,621,474 | 95.1 | 1,570,562 | 13.13 |
| 9 mos. | 55,383,746 | 98.6 | 4,074,376 | 78.6 | 2,031,556 | 96.4 | 61,489,678 | 96.9 | 1,576,658 | 39.00 |
| Oct. | 6,423,329 | 99.4 | 533,060 | 92.4 | 279,679 | 100.6 | 7,236,068 | 98.9 | 1,633,424 | 4.43 |
| Nov. | 6,194,679 | 99.0 | 488,822 | 87.5 | 277,384 | 103.0 | 6,960,885 | 98.2 | 1,622,584 | 4.29 |
| Dec. | 6,387,865 | 99.0 | 481,813 | 83.7 | 280,637 | 101.2 | 7,150,315 | 97.9 | 1,617,718 | 4.42 |
| 4th qtr. | 19,005,873 | 99.1 | 1,503,695 | 87.8 | 837,700 | 101.6 | 21,347,268 | 98.3 | 1,624,602 | 13.14 |
| Total | 74,389,619 | 98.8 | 5,578,071 | 80.9 | 2,869,256 | 97.9 | 82,836,946 | 97.3 | 1,588,741 | 52.14 |

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.

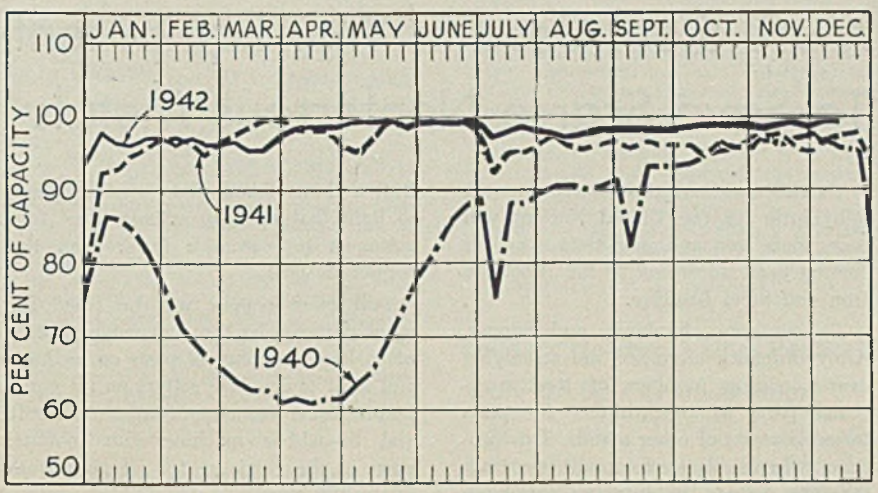
The percentages of capacity operated in the first six months of 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942 as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons. Beginning July 1, 1942, the percentages of capacity operated are calculated on weekly capacities of 1,500,714 net tons open hearth, 128,911 net tons bessemer and 81,049 net tons electric ingots and steel for castings, total 1,710,674 net tons; based on annual capacities as follows: Open hearth 78,247,230 net tons, bessemer 6,721,400 net tons, electric 4,225,890 net tons.

## DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

| | Week ended Dec. 12 | Change | Same week 1941 | Same week 1940 |
|---|---|---|---|---|
| Pittsburgh | 99 | None | 98 | 96 |
| Chicago | 101 | +0.5 | 101.5 | 98 |
| Eastern Pa. | 96 | None | 87 | 95 |
| Youngstown | 97 | None | 92 | 92 |
| Wheeling | 86.5 | +0.5 | 94 | 98.5 |
| Cleveland | 92.5 | —1.5 | 94 | 86.5 |
| Buffalo | 90.5 | None | 79 | 93 |
| Birmingham | 95 | None | 90 | 97 |
| New England | 92 | None | 84 | 90 |
| Cincinnati | 92 | None | 91 | 87 |
| St. Louis | 94 | None | 96 | 87.5 |
| Detroit | 95 | None | 90 | 90 |
| Average | 99.5 | None | °97.5 | °95.5 |

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




# STEEL . . . . . STEADY

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 99½ per cent. Two districts advanced, one declined and nine were unchanged. A year ago the rate was 97½ per cent; two years ago it was 95½, both computed on the basis of capacity as of those dates.

**Pittsburgh** — At 99 per cent for the second week, with few furnaces idle for repairs.

**Wheeling** — Gained ½-point to 86½ per cent.

**Chicago** — Rise of ½-point to 101 per cent, best in three weeks, resulted from return of open hearths to service.

**Central eastern seaboard**—Unchanged at 96 per cent, with scrap supply adequate for current needs.

**St. Louis** — Held at 94 per cent for the fifth week.

**Buffalo** — By quick repair of open hearths production has been maintained at 90½ per cent for six weeks, scrap being excellent.

**Cleveland** — Removal of an open hearth by one interest and slight curtailment by another caused the rate to drop 1½ points to 92½ per cent.

**Cincinnati** — With two open hearths idle for repair the rate held at 92 per cent.

**Youngstown, O.** — With 77 open hearths and three bessemers in production the operating rate remained at 97 per cent. Scrap is sufficient and labor supply is the principal restraining factor.

**Detroit** — Steady at 95 per cent, only repairs preventing capacity production.

**Birmingham, Ala.** — Steelmakers have managed to continue 23 open hearths in production, holding the rate at 95 per cent.

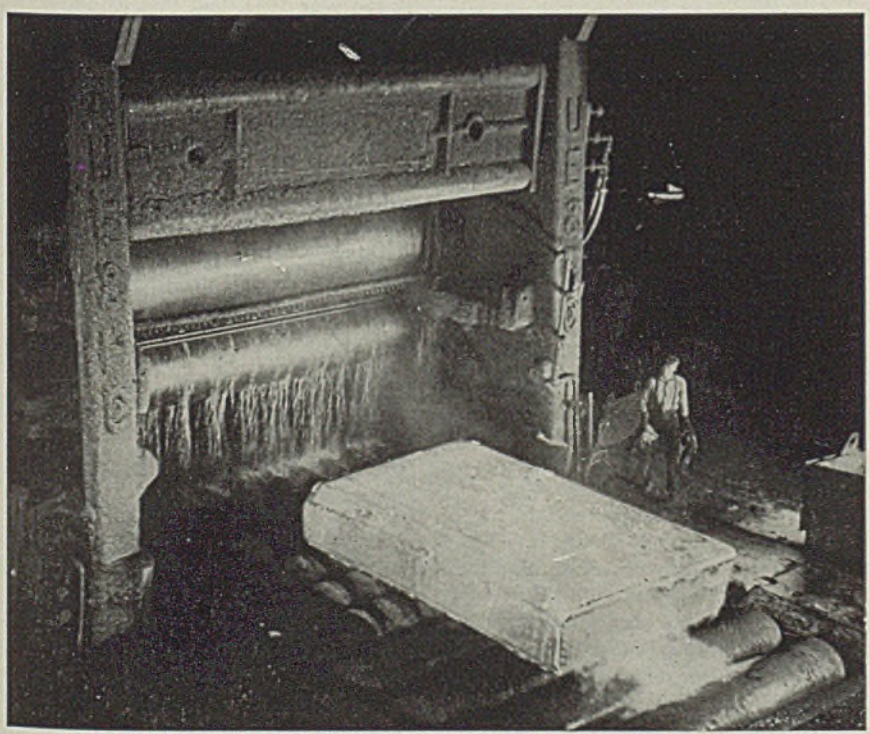
**New England** — Held steady at 92 per cent, with small repairs keeping rate down.

---

Collections of the various iron and steel salvage drives will be very close to its goal of 7,600,000 tons by Jan. 1, according to Lessing J. Rosenwald, director, Conservation Division, War Production Board. The various sections of the division sponsoring scrap drives report many sections are approaching their quota.

rials. Lukens specializes in steel plates—armor plate and in rolling heavy wide plates on its 206-inch plate mill.

Armor plate production increased more than 400 per cent over the prior all-time peak set in 1941. Rolling armor plate on its large plate mill, instead of using the slower forging process, eliminated a threatened bottleneck in providing armor for war vessels and accounts for the great increase in production. This material has been produced by rolling up to 9½ inches thick. Individual plates weighing over 100,000 pounds each have been rolled on the large plate mill, which produces material up to 195 inches wide.



*Rolling a 106,000-pound ingot on the 206-inch mill, world's largest plate mill at Lukens Steel Co., Coatesville, Pa.*

# More Steel Used in War Equipment To Save Scarce Nonferrous Metals

TANKS and field guns that go roaring into battle for the United Nations will carry more iron and steel than ever this coming year, according to the American Iron and Steel Institute.

To conserve aluminum and copper, Army ordnance engineers are specifying ever-increasing numbers of steel functional parts as pinch-hitters for parts formerly made of other metals. This program, when fully in effect, will free 180,000,000 pounds of primary aluminum and as yet untotaled amounts of copper and copper alloys for war production jobs where they have been found indispensable.

Heavy ordnance equipment has for years been made of steel. But now many smaller component parts from cartridge cases — which liberated 591,000,000 pounds of copper—to sights, range-finders and fuses, are being converted to steel wherever possible without any sacrifice of military effectiveness or safety. Many are out-performing their predecessors.

A large plate for the firing platform of the 90-mm. antiaircraft gun when converted was expected to have slower firing action because of the relative heaviness of steel compared to aluminum. But, a thin, ribbed plate was designed, so light that the gun actually goes into action a few seconds faster than the former design.

Still more copper will be freed for other purposes by the conversion to steel of: A larger number of parts on medium and light tanks; fuse setters on all guns; bomb fuses; components of antiaircraft and 50-caliber machine gun mounts; parts of the carriages for all guns from 20 to 155-mm.

Many machine gun crews will find virtually their entire equipment made of steel—tripods, sights, swivels and components of the cooling system.

Key points at which steel is pinch-hitting for aluminum are: 140 individual parts on medium and light tanks; fins to guide mortar shells; "windshields" for long range, high velocity shells; mortar components; carriages for guns from 20 mm. to 155-mm.; components of anti-tank mines, fire control instruments, telescopes and range finders.

Although Army authorities are relying more than ever upon steel, they do not specify steel for any new use until it has passed a rigid test and satisfied every requirement. No sacrifice of performance is permitted.

# U. S. Steel Chiefs Not Worried By Dwindling Iron Ore Supplies

*PITTSBURGH*

CHANGES in war production strategy ordered by the War Production Board are affecting the plant expansion program of United States Steel Corp., Irving S. Olds, chairman, and Benjamin F. Fairless, president, revealed at press conference when the corporation's directors met here last Thursday.

Some of the new facilities for making finished steel, chiefly armor plate for use in tanks, are being held up, they stated.

Despite rearrangement of the board's strategy—which is aimed at production of more of the things that are needed to wage offensive war—the corporation's backlogs of unfilled steel orders have not suffered noticeably, and the corporation's unfilled orders have changed little.

Neither Mr. Olds nor Mr. Fairless were perturbed about reports of dwindling reserves of high-grade iron ore.

Pressed for comment about the long-range effects of dwindling supplies of ore, Mr. Fairless said the supplies of "good-grade ore" would outlive all the reporters present at the press conference. He said he had been hearing dire predictions about iron ore reserves for practically every one of the 27 years he had been in the steel business.

There is also an abundant supply of steel scrap on hand at present, Mr. Fairless said, although he and Mr. Olds, stressed the necessity for continuing the drive for metal.

Efforts are still in progress to develop a satisfactory sponge iron process, Mr. Olds stated, but he pointed out that there were "287 such processes and none as yet is commercially feasible."

Mr. Olds declined to discuss the meeting of directors; "it merely took the place of the one that normally would be held in New York."

United States Steel Corp. subsidiaries are engaged in the greatest program of plant expansion in history in the Pittsburgh district, Mr. Olds revealed.

The Pittsburgh program, when completed, will cost $289,000,000, 66 per cent of which is for the account of the United States government. The corporation is also engaged in very substantial plant expansion programs in other districts.

It is expected that all of these Pittsburgh projects, which include vast expansions at Homestead, Duquesne and Edgar Thomson works of Carnegie-Illinois Steel Corp., will go into operation during the first half of 1943. The first unit of this program was brought in recently when a new electric furnace at Duquesne works began adding its tonnage of high-grade alloy steels to the war effort.

Carnegie-Illinois Steel Corp. since Pearl Harbor has established 187 all-time monthly production records, 60 in its blast furnaces, 34 in the steel producing departments and 93 on rolling mill units.

On five occasions since Dec. 7, 1941, this U. S. Steel subsidiary has broken its overall monthly blast furnace record for iron production and in each of four months its previous record for steel production was bettered.

Officials of Carnegie-Illinois anticipate that its total production of blast furnace products in the year 1942 will be three-quarters of a million tons higher than in the year 1941, and that its output of steel ingots this year will be more than 750 tons higher than last year.

In November, eight new all-time monthly production records were established; three new blast furnace marks being set, and one steel producing shop and four rolling mill units also sharing the honors.

Other wartime accomplishments by United States Steel subsidiaries in general were outlined in a press release issued by the corporation earlier in the week (see page 60).

## Steel Corp. Shipments Set New High for 11 Months

Finished steel shipments by United States Steel Corp. subsidiaries in November totaled 1,665,545 net tons, a decrease of 121,956 tons from the October figure but an increase of 41,359 tons over November, 1941. For 11 months shipments aggregated 19,214,522 tons, compared with 18,612,901 tons in the comparable period last year. Both the November and 11-month shipments were new records for those periods.

# PRIORITIES–ALLOCATIONS–PRICES

**Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, July 6, 1942**

## M ORDERS

**M-61 (Amendment): Graphite,** effective Dec. 4. Extends complete control over distribution and use of all graphite which will stand on a number 50 mesh screen. Requires specific WPB authorization to put into process any strategic graphite; to deliver (except by a jobber) any crucible or other product containing; graphite.

**M-253: Lithium Ores,** effective Dec. 5. Requires specific WPB authorization to deliver or use lithium ores. By Dec. 20 and 10th of each succeeding month suppliers must file with form PD-728 and consumers must file PD-729.

**M-257: Sulphuric Acid,** effective Dec. 5. Provides allocation control for sulphuric acid, including oleum and spent acid. WPB will issue directions when and as needed, covering deliveries to be made and uses to be permitted or prohibited. Producers of sulphuric acid and all others who deliver spent sulphuric acid must file form PD-601 by the 10th of each month with WPB.

## L ORDERS

**L-5-c (Amendment): Mechanical Refrigerators,** effective Dec. 8. Restricts sales of refrigerators frozen in manufacturers' stocks without specific authorization to Defense Supplies Corp.

**L-216: Portable Tools,** effective Jan. 1. Enables Director General, WPB, to issue schedules for standardization and simplification of portable tools. Schedule I lists the universal portable electric tools that are affected by the order, the sizes and models in these sizes which may be manufactured, and limits the length of the cable or electric cord to be used to carry power to such tools.

**L-221: Electric Motors,** effective Dec. 2. Prohibits delivery of motors unless they comply with certain standard specifications and are of the simplest practicable, mechanical and electrical design. Requires purchaser to certify why he must have a motor of a certain type. Restricts use of such special types to the conditions and the purposes for which they are required. Purchaser must certify also that he has made every reasonable effort (1) to adapt idle motors or generators in his possession, (2) to obtain used ones for his purpose, and (3) to repair or recondition his existing equipment.

**L-223: Hard-Surfacing Material,** effective Dec. 2. Restricts delivery to orders rated AA-5 or higher, except for research work or field tests. Restricts use for maintenance and repair purposes to a specific list of essential types of equipment. Limits use for new products to those specifically permitted by the order and inventories to a 60-days' supply. Producers must file monthly reports with WPB on forms PD-733, 734, and 735.

**L-227: Fountain Pens and Pencils,** effective Dec. 7. Limits production. Prohibits use of iron, steel, copper, copper-base alloys, crude rubber or reclaimed rubber in manufacture of fountain pens, except: low carbon steel for functional parts other than pen nibs; copper contained in 14 kt. gold pen nibs; stainless steel pen nibs which were held in inventory in completely fabricated form prior to Dec. 7 may be assembled through Dec. 31. Use of the same materials in manufacture of mechanical pencils also prohibited, except: low carbon steel for functional parts, provided that no more than 8 lb. shall be contained in each group of 1000 pencils produced after Feb. 1, 1943. Use of same materials completely banned in manufacture of wood-cased pencils.

### OPA Supplementary Order

**No. 31: Tax on Transportation of Property,** effective Dec. 1. Tax, imposed by section 620 of the Revenue Act of 1942 shall be treated as though it were an increase of 3% in the amount charged for transportation and not as a tax for which a charge may be made in addition to the maximum price. This order does not apply to price regulations: No. 4, Iron and Steel Scrap; No. 112, Pennsylvania Anthracite; No. 120, Bituminous Coal Delivered from Mine or Preparation Plant; No. 121, Miscellaneous Solid Fuels Delivered from Producing Facilities; No. 122, Solid Fuels Delivered from Dealers; No. 189, Bituminous Coal Sold for Direct Use as Bunker Fuel; No. 236, Heating Boiler Conversion Parts.

## PRICE REGULATIONS

**General Maximum Price Regulation (Amendments).** Effective Dec. 8, provides that maximum price for ferrosilicon of a West coast seller shall include an allowance for actual freight which need not exceed freight from Niagara Falls to St. Louis plus the federal tax on this freight, which became effective Dec. 1.

**No. 4 (Amendment): Iron and Steel Scrap,** effective Dec. 1. Authorizes sellers to pass on to consumers the 3 per cent property transportation tax imposed under the 1942 revenue act. Makes several changes to facilitate the movement of steel scrap from water shipping points.

**No. 113 (Amendment): Iron Ore Produced in Minnesota, Wisconsin and Michigan,** effective Dec. 1. Authorizes ore owners to pass along to ore buyers the exact increase in the established lake freight rate for ore shipped during December.

**No. 124 (Amendment): Rolled Zinc Products,** effective Dec. 9. Directs that cash and trade discounts which prevailed Oct. 1, 1941, shall not be lowered. Requires producers to file report imparting certain information to WPB by Jan. 8. Includes maximum prices for zinc plates and zinc engravers' plates in an enumerated list of products to whose prices permissible extra charges may be added.

**No. 136 (Amendments): Machines and Parts.** Effective Dec. 11, gear and speed reduction items of all types will be priced under this order, revoking price schedule No. 105. Maximum prices for gears, pinions, sprockets and speed reducers will continue to be those charged on Oct. 15, 1941, except for use in military equipment; automotive or tractor transmissions, transfer cases, power take-offs, differentials, and axle assemblies; for use in private or commercial vehicles which may use as maximums their prices on March 31, 1942.

Retroactively effective to Nov. 7, increase in maximum price authorized for automotive replacement batteries is extended to all other types of lead-acid storage batteries regardless of use. The new ceiling is the maximum price determined under other provisions of the order plus 1 cent per pound of lead content in the battery.

## SECOND SECTION

**A separately bound Section Two of this issue of STEEL is devoted to "Priorities — Allocations — Prices". This includes a description of the new Controlled Materials Plan, announced recently by WPB, with detailed instructions for preparing bills of materials required under the plan. The section also includes digests of the important orders and regulations issued by WPB and OPA, an index of PD forms and a tabulation of WPB and OPA personnel. Extra copies in lots of 10 or less are available free of charge to STEEL'S subscribers; otherwise, the price is 10 cents per copy.**

## Builders' Hardware Lines Reduced From 37,000 to 3500 Items

In one of the most extensive simplification programs yet announced by the War Production Board in the realm of manufacture, builders' hardware lines are reduced to approximately 3500 items from a present total of 27,000, under the provisions of Schedule I of Limitation Order L-236, issued last week by the director general for operations.

The effective date of the order is Jan. 15, 1943. Producers are prohibited from putting into process after that date any builders' finishing hardware which does not conform to the permitted sizes, types, grades, finishes, weights and standards.

An interval will be allowed following the effective date during which manufacturers may assemble, from completed parts in inventory, designs and types not included in Schedule I. After March 1, 1943, however, producers' inventories of finished parts for non-standard types, sizes, and styles will be frozen.

Merchandise lines covered by the order include lock sets, door trim, hinges of various kinds, door knobs, key plates, door pulls, door bolts, hydraulic door closers, window and transom hardware, screen door accessories, casement window fittings, cabinet hardware and locks, sash balances, padlocks, track and accessories.

Customers of retail stores will still be able to satisfy their essential needs for common types of builders' hardware. Approved styles and types will be of uniformly simple design and finish, however.

## Steel's 1941 Repair Bill Up 35 Per Cent

Nearly $420,000,000 was spent by the steel industry in 1941 for repairs and maintenance, American Iron and Steel Institute reported last week. This exceeded by more than 35 per cent the $305,000,000 in 1940, and is almost two and one-half times the amount spent in 1938, the last year of world peace.

Plant maintenance costs in 1941 averaged about $6.80 for each ton of finished steel produced, an increase of 50 cents a ton over 1940.

# MEN of INDUSTRY

**A. R. Abelt,** secretary, Chain Belt Co., Milwaukee, has been elected a vice president and a director, to succeed the late F. J. Weschler. In 1922 he was made sales manager of the Chain Belt and Transmission Division, retaining that post until early this year when he became manager of that division. He has been secretary since 1930. **G. D. Gilbert,** sales manager, Baldwin-Duckworth Division, Springfield, Mass., has been made general manager there, and also elected secretary to succeed Mr. Abelt.

—o—

**John H. Sipchen** has been named first assistant to the president, Anker-Holth Mfg. Co., Chicago. He will have charge of production and the development of air and hydraulic operated chucks, fixtures and devices. Mr. Sipchen was formerly vice president in charge of sales, engineering and production for Manufacturers' Equipment Co., Chicago, and previously had similar duties as vice president and general manager for Hannifin Mfg. Co., Chicago.

—o—

**C. H. Ellingboe,** heretofore purchasing agent, Toro Mfg. Co., Minneapolis, has joined Pioneer Engineering Co., Minneapolis, as purchasing agent.

—o—

**C. R. Dobson** has been appointed chief industrial engineer, Jones & Laughlin Steel Corp., Pittsburgh, under the vice president in charge of operations, **S. S. Marshall Jr.** Mr. Dobson succeeds **Lauson Stone,** resigned. He joined Jones & Laughlin in 1920 as an industrial engineer, and since 1930 has been assistant to Mr. Stone.

—o—

**Walter E. Gibson,** formerly advertising manager, Swartzbaugh Mfg. Co., Toledo, O., has joined the advertising staff of Detroit Rex Products Co., Detroit.

—o—

**Rudolph B. Flershem,** formerly general manager, Buffalo Bolt Co., North Tonawanda, N. Y., has been elected president, succeeding **Raymond K. Albright,** who has become chairman of the board.

—o—

**John E. Neumann** has been elected president, Anderson Stove Co. Inc., Anderson, Ind. **Wilbur J. Birkenmeier** and **Marion Collins** have been elected vice president and secretary-treasurer, respectively.

—o—

**T. L. Haines,** sales representative, Vascoloy-Ramet Corp., Chicago, has been elected secretary, Chicago chapter, American Society for Metals, succeeding **A. A. Engelhardt,** sales representative, Eclipse Fuel Engineering Co., Chicago, who has resigned to enter military service.

A. R. ABELT

JOHN H. SIPCHEN

C. R. DOBSON

—o—

**Alfred Marchev,** vice president and assistant general manager, Republic Aviation Corp., Farmingdale, Long Island, N. Y., has become general manager of the company's Farmingdale plant. Mr. Marchev joined the organization last February as assistant to the president, later becoming vice president and assistant general manager. Before that he was chief engineer, works manager and director, Signode Steel Strapping Co., Chicago.

—o—

**James M. Hait,** for many years chief engineer of the Peerless Pump Division of Food Machinery Corp., Los Angeles, has been appointed general manager, Food Machinery Corp., Division of Procurement and Engineering, a newly created division.

—o—

**Harry S. Zane Jr.,** vice president, Guiberson Corp. and Guiberson Diesel Engine Co., Dallas, Tex., and manager of the companies' offices in Chicago since 1940, has been appointed chairman of a new management committee to direct the expanding operations of the two companies.

—o—

**Martin A. Hotham** has been appointed production engineer, Follansbee Steel Corp., Follansbee, W. Va. Mr. Hotham has spent his entire career in the steel industry, and formerly supervised steel production and open-hearth operations for American Tube & Stamping Co., Bridgeport, Conn.

—o—

**Alvin A. Borgading,** since 1939 assistant to the purchasing agent, American Car & Foundry Co., New York, has been promoted to purchasing agent. Mr. Borgading has been associated with the company 35 years. **Herbert Streader** has been named assistant purchasing agent and placed in charge of the Material Control Division set up under WPB's Controlled Materials Plan. **George W. Brown** continues as assistant purchasing agent.

—o—

**L. B. Neumiller,** president, Caterpillar Tractor Co., Peoria, Ill., has assumed the added responsibilities of president of Caterpillar Military Engine Co., Decatur, Ill., a subsidiary. He succeeds **B. C. Heacock,** who has become deputy director for the distribution bureau, War Production Board, Washington. **T. R. Farley,** vice president in charge of operations for the Peoria factory, will continue in that capacity with the title of executive vice president.

Added to the executive staff at Decatur is **W. O. Bates Jr.,** newly elected vice president of Caterpillar Military Engine Co. He formerly was a vice president of Caterpillar Tractor.

—o—

**A. H. B. Jeffords,** management engineer, Trundle Engineering Co., Cleveland, has been appointed a vice president, and will specialize on war production rules, regulations and requirements. A

graduate in mechanical engineering from Massachusetts Institute of Technology, Mr. Jeffords joined Trundle Engineering in 1924.

—o—

**N. M. Forsyth,** general sales manager, Pump Engineering Service Co., division of Borg-Warner Corp., Cleveland, has been made vice president in charge of sales.

—o—

**William H. Knight,** formerly vice president, Electric Household Utilities Corp., Chicago, has been named director of sales and market research, Elastic Stop Nut Corp., Union, N. J.

—o—

**Charles G. Pyle,** general sales manager, Sylvania Electric Products Inc., has been named managing director, National Electrical Wholesalers Association, New York.

—o—

**George J. Taylor,** industrial lighting engineer at the Nela Park plant of General Electric Co., Cleveland, has been promoted to the post of wartime lighting engineer at the company's Atlantic Division, New York.

—o—

**Joseph L. Overlock,** since last April regional director, War Production Board, Chicago, has resigned to return to his former position as vice president, Continental Illinois National Bank & Trust Co., Chicago. **A. T. Kearney,** chief deputy WPB director, Chicago, will succeed Mr. Overlock as regional director.

—o—

**L. R. Howes,** associated with the rubber industry 28 years, has been named sales engineer for the automotive and aeronautic departments of the national sales and service division of B. F. Goodrich Co., with headquarters at 5400 East Olympic boulevard, Los Angeles.

**M. G. Huntington,** identified with B. F. Goodrich since 1923, has been made manager of the Washington office of the national sales and service division. He succeeds **K. D. Smith,** who assumes new duties at Detroit.

—o—

**Sherman K. Burke,** assistant vice president, Southern Pacific railroad, has been named general traffic manager, with headquarters in Chicago, succeeding **W. W. Hale,** recently transferred to San Francisco as vice president in charge of freight traffic. **D. J. McGanney,** freight traffic manager of the central district, succeeds Mr. Burke as assistant vice president. **F. C. Nelson** succeeds Mr. McGanney as freight traffic manager, central district, and **L. A. Brockwell,** replaces Mr. Nelson as assistant to the freight traffic manager in charge of rates and divisions.

—o—

**Walter Dorwin Teague,** 444 Madison avenue, New York, industrial designer, announces appointment of **Leo H. Rich** to his staff for the development of a post-war planning program, to assist industry in preparing for the post-war readjustment period, to plan for reconversion of war-time machinery to peace-time production, and to assist in designing peace-time products. Mr. Rich formerly was president of Rich Co. Inc., director of design for Revere Copper & Brass Inc., and general manager of Oscar B. Bach, crafts-man-in-metal.

—o—

**D. P. Brannin,** heretofore in charge of metal sales in the Chicago area for New Jersey Zinc Sales Co., has been appointed district sales manager of the Pigment and Metal Sales Divisions, with headquarters in Chicago. **J. P. Dunphy,** of the New York sales department, has been named district sales manager, Pigment Division, with headquarters in New York.

—o—

**Charles L. Huston Jr.,** director of personnel relations, Lukens Steel Co., Coatesville, Pa., and a member of the company's board of directors, has been appointed assistant to the president. He joined Lukens as director of personnel relations in September, 1939, after serving ten years with American Rolling Mill Co., Middletown, O.

—o—

**William C. Carter,** for 14 years vice president and the past year executive vice president, Link-Belt Co., Chicago, has been elected president, effective Dec. 31. He succeeds **Alfred Kauffmann,** who has resigned because of ill health. Mr. Kauffmann remains a member of the board of directors. Mr. Carter has been associated with the company since 1902.

## OBITUARIES . . .

**Albert Kahn,** 73, founder of Albert Kahn Associated Architects and Engineers, Detroit, and one of the best known industrial architects in the world, died in that city, Dec. 8. Recent Kahn designs include the Martin Aircraft plant at Baltimore, the Ford Willow Run bomber plant, Chrysler Tank Arsenal, Hudson Naval Ordnance plant, and innumerable buildings, military bases and related structures throughout the United States, England, Scotland, Japan, China, Egypt, Mexico and South America. Russia has more than 500 Kahn-designed factories. He was a brother of Julius Kahn, founder and former president of Truscon Steel Co., who died recently.

—o—

**Adolph L. de Leeuw,** 81, vice president, Goss & de Leeuw Co., New Britain, Conn., consulting engineer, inventor and author of numerous engineering articles, died Dec. 5 in Plainfield, N. J. He joined Goss & de Leeuw in 1923, and among his outstanding inventions was a milling cutter of the wide spaced type. For many years he maintained an office in New York as consulting engineer, specializing in plant management and production.

—o—

**H. E. Richardson,** 57, Philadelphia sales manager, Youngstown Sheet & Tube Co., and president, Steel Club of Philadelphia, died in that city recently. Born and educated in Philadelphia, he had been associated with Youngstown Sheet & Tube 29 years, all of which time was spent in the Philadelphia office.

—o—

**Claude Rorabeck,** 63, president, Link-Track Engineering Co., Chicago, died Dec. 4 when the automobile he was driving crashed into a parked truck near Chicago Heights, Ill.

—o—

**William R. Kales,** 72, president of Whitehead & Kales Co., Detroit, and a well known structural steel engineer, died in that city Dec. 3. He was a member, American Society of Civil Engineers, American Society of Mechanical Engineers and the Engineering Society of Detroit, being a past president of the latter organization.

—o—

**George T. Burrell,** 69, former president, Burrell Engineering & Construction Co., died Nov. 25, in Kenosha, Wis.

—o—

**C. C. Dornbush,** 67, for 40 years sales engineer for Jones & Laughlin Steel Corp., Pittsburgh, died Dec. 2 in that city.

—o—

**John A. Crowley,** 49, regional supervisor and Chicago district manager, J. B. Ford Sales Co., Wyandotte, Mich., died in Chicago Dec. 2.

—o—

**Vincent M. Yates,** 56, an executive in the lamp division of General Electric Co., New York, died in that city Dec. 7. He had been associated with General Electric 33 years.

# WINDOWS of WASHINGTON

*Committee for the Review of Data Requests from Industry eliminates, simplifies 40 per cent of voluminous WPB forms. Bureau of the Budget studies all forms. Foreign-owned patents available*

WHEN the War Production Board's Committee for the Review of Data Requests from Industry started to function July 1 it went directly to industry itself for complaints and suggestions. It first approached some 1200 trade associations, following with direct contacts with individual companies.

Surprisingly enough, it was found that there were relatively few complaints about the number of forms to be filled out. Less than 5 per cent were complaints of the number of forms, excepting where duplication existed. The other 95 per cent were criticisms of conflicting instructions, ambiguous phrases, meaningless data, unavailable information, oversized forms, receipt of forms not applicable to the particular business.

Since the Committee for the Review of Data Requests was appointed, approximately 40 per cent of the War Production Board's requests have been eliminated or simplified. With the hearty co-operation of the industry branches of the War Production Board, 120 forms were abolished and 132 simplified.

### Conplaints Get Results

A large automobile company complained that the preparation of forms in its hands at the moment would cost $125,000, with an estimated consumption of more than 100,000 man hours. A tool company in the Middle West declared that it was "furnishing the War Production Board in four or five different forms practically the same information, but each time dated a little differently, put on a different form, and arranged differently." Complaints such as these brought elimination of duplications by combining the legitimate requests for the same information from different branches into one form.

Certain impossible questions were eliminated or reworded, such as the one that originally asked the respondent to answer "yes" or "no" to the question "Is additional skilled labor available, or must it be trained?" There are many questions about the meaning of portions of forms due to variations in wording. The trouble has been cured by using the same language for repetitive clauses such as certifications and recitals of the criminal code. There was a good deal of complaint about odd-size forms which had to be filled out on wide-carriage typewriters. All WPB forms now are designed so as to conform to both the width and the spacing of a standard-carriage typewriter, and are printed on paper thin enough for use with carbons but sufficiently opaque so that both sides can be used.

Elimination of one column alone in WPB-732 relieved approximately 12,000 companies from endeavoring to furnish data in connection with the breakdown in man hours applicable to the priority ratings on their products; the task had proved a nuisance to many companies because the information was not readily available and in some cases could not be computed.

A simplification of substantial benefit to the chemical industry was the creation of standard forms PD-600 and PD-601. Before final adoption, these proposed forms were studied by a special subcommittee in which representatives from the chemical industry participated. As a result of a joint agreement between industry and the chemical branch, approximately 40 per cent of the content of the forms was eliminated and arrangements made for the new forms to replace scores of individual ones already in existence, as well as to serve as the standard reporting medium for various other chemicals if it should be required to put them under allocation. This enabled the manufacturers to set up standard accounting and reporting procedures for all of the chemicals reported on PD-600 and PD-601.

Similarly, the rubber industry was relieved of the need for supplying monthly inventory reports showing a detailed breakdown by sizes, types and classified by types of consumers. Instead, this industry merely reports monthly the total units of production, shipments and inventories by type only, and makes its detailed reports only four times a year when the necessary information is already available from normal accounting records.

### Relief for Steel Plants

As a result of meetings with representatives of the United States Steel Corp., Bethlehem Steel Co., Republic Steel Corp., and Inland Steel Co., agreements were reached which have relieved the steel industry from the necessity of making hundreds of thousands of entries monthly.

Several companies advised that they were requested to fill out forms which, while not issued by the War Production Board, stated that the information was being secured at the Board's request. In each instance the committee studied these "bootleg" forms and eliminated them.

It is estimated in a report recently released by the Office of War Information that the overall accomplishment of the Committee for the Review of Data Requests from Industry is saving American industry a minimum of 30,000,000 man hours annually, the equivalent of at least 15,000 office workers, working every week in the year. Thus the pressure on office help, which was so materially increased in the initial stage of our defense period, has been ameliorated to some degree. At least, this program of elimination and simplification of forms is giving them more time to attend to other duties.

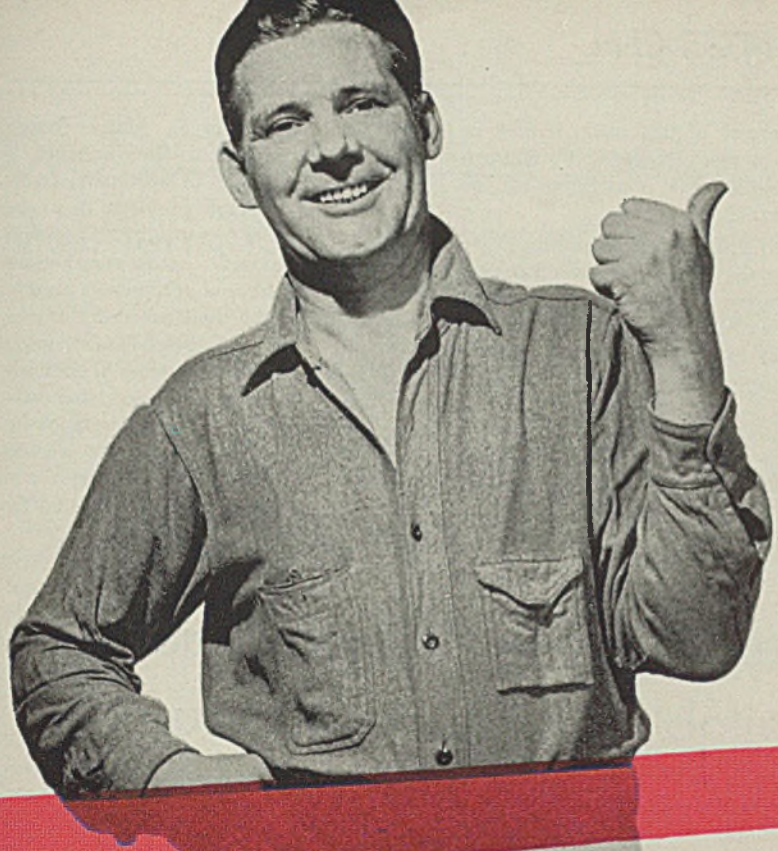
The committee points out that more new forms can be expected as more wartime controls come into being. They will be formulated and published under a centralized control. Effective Sept. 1, no division or branch of the War Production Board may issue a form requesting information from industry without approval by the Committee and the Bureau of the Budget, and the Administrative Division is on guard against having any forms printed that do not have such approval. In addition, all errant mimeographing machines have been taken into custody by the Administrative Officer.

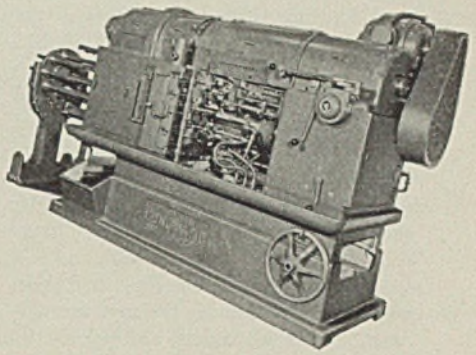
### Budget Bureau "Polices" Forms

A somewhat similar control over all government data requests has been put into effect by the Bureau of the Budget, as outlined in their Circular No. 360, Supplement 1, which provides that all "report forms" or other "written or oral requests" which call for answers for identical information upon identical items "from any group of ten or more respondents in the United States" shall be passed upon by the Bureau of the Budget. After Dec. 31 every copy of approved printed forms will bear the Bureau of the Budget serial number and expiration date.

Forms which have been officially approved by the War Production Board and the Bureau of the Budget are listed monthly in a publication entitled "Priorities", copies of which are available for inspection in all regional and district offices of the War Production Board.

Although a few forms, because of their confidential nature or for other special reasons, will not be included in any published list, their legitimacy will be indicated by the Bureau of the Budget serial number after Dec. 31, 1942. In the meantime, business men having any doubts about a form which does not bear the Bureau of the Budget serial number





# No pause need refresh them

When time, space and manpower are precious, the tireless performance of fast, dependable multiple spindle automatics is appreciated.

Although machines may not tire, their operators often do. Simplicity and convenience of operation are important factors of a good machine.

The Departmental Design of a Conomatic contributes much to its efficiency and ease of operation. The tooling area, work-head, overhead camshaft, and controls, are in orderly arranged units, conveniently accessible from either side of the machine.

These conveniences contribute to the effective results that good operators are getting from 4, 6 and 8 Spindle Conomatics.

Prime your production pulse by specifying CONES.

**Cone Automatic Machine Co., Inc., Windsor, Vermont**

and which is not listed in "Priorities" should seek advice at district offices.

Another step in simplification has been put into effect by a co-operative arrangement worked out between the Government Printing Office, the editors of the *Federal Register* and James G. Robinson, WPB's Administrative Officer, which enables copies of orders to be printed and distributed within 24 hours after they have been finally approved. Under the law it is required that official orders be printed in the *Federal Register*. Up until July 5 of this year frequently forms and orders were not available until a considerable time after they had been published. Now, under the new arrangement, copies of orders are printed on plates borrowed from the *Federal Register*, which not only enables them to be immediately available but eliminates any possibility of typographical errors resulting from variations between the individual copies of the orders and the official text at it appears in the *Federal Register*.

The business of printing and distributing WPB forms is well organized and functions with extreme speed and efficiency. Galley proofs turned over to the Government Printing Office up to 5 o'clock each day are handled with such speed that printed copies can be rushed into the mails, thus permitting distribution the next day to addresses as far west as Chicago and St. Louis. To appreciate the magnitude of this work, it may be said that as many as 9,000,000 impressions of WPB orders and forms can be printed within 24 hours.

Joseph I. Lubin, chairman of the Committee for the Review of Data Requests from Industry, a certified public accountant with wide background of experience, holds that the influence of government reporting procedures on accounting practices will carry over into the peacetime period ahead.

"Out of the adapted and the new record keeping systems will come information which can be used by private management now and in the p ace to come," he said recently in an address before the American Institute of Accountants.

"If the necessities of wartime accounting present a tough problem, they also present a good opportunity. They will provide the tools for better management control. A number of accountants already have grasped the significance of this possibility. They are expanding and unifying their records, examining their inadequacies and their blind spots, and making plans to use the new information for smoother operation under the existing priorities and allocations systems and for better management control in the postwar period."

# Foreign-Owned Patents Made Available to American Industry

ENEMY-OWNED patents will be made "readily and freely available forever to American industry," Leo T. Crowley, alien property custodian, announced last week. He added that plans are being made to "encourage the research necessary to develop them."

Unless American companies hold exclusive rights to their use, granted before the war, licenses will be issued on application "to any legitimate business concern on a royalty-free basis for the life of the patent."

Patents held by citizens of the occupied countries are to be treated similarly, except that if they are used after the war emergency has ended, reasonable royalties will be collected.

In case where exclusive-use licenses already are in existence, the royalties involved will be collected by Crowley's office. But the licensee will have the option of cancelling his exclusive contract, and taking instead a standard non-exclusive royalty-free license.

Mr. Crowley, in a letter to the President, said that by Dec. 31, his office will have taken control of 50,000 foreign-owned patents. These represent some of the finest research achievements of modern science, particularly in the production of dyestuffs, plastics, pharmaceuticals and electric goods.

Manufacturers will be apprised of the nature of these patents through classified lists some of which now are ready for distribution.

"Every effort will be made," Mr. Crowley says, "to bring these patents to the attention of small business as well as large, thus building up our national productive capacity and stimulating the fullest use of modern technique."

---

Brass ingot makers and brass foundries are to report their inventories of ingot to the WPB on two new forms now mailed. Ingot makers will report on PD-751 and foundries on PD-59-b. From these reports the Copper Branch will be able to learn how long ingot is being held which cannot be used for war orders on hand.

## DENY ARMY OVEREXPANDED PLANT CONSTRUCTION

DENIAL that the Army has overexpanded its plant construction was made before the Senate Small Business committee last week by Lieut. Gen. Brehon Somervell, left, commanding services of supply, and Maj. Gen. Levin H. Campbell, Chief of Ordnance. NEA photo

# Over 1000 To Produce Special Maintenance Tools for War Vehicles

TO UTILIZE facilities of more than 1000 small plants throughout the country not now producing war materials, the Ordnance Department Tank-Automotive Center in Detroit is engaged in a program to convert them to the manufacture of special maintenance tools for combat vehicles.

Over 200 plants of the small machine shop type throughout New England, New York, New Jersey, Pennsylvania and Ohio are now participating in this operation. It is anticipated that 300 more will be converted to this work within the next 90 days.

C. B. Smith, director of the tool and equipment section of the Center, reports that most of these plants had only minor adjustments to make to adapt their operation to the manufacture of special maintenance tools. A careful study of the facilities available made it possible to assign to each manufacturer the tools he was best fitted to make with equipment that was available, and which would require the least change to get in immediate operation.

Special maintenance tools are not standard products of the tool industry, which is now working to capacity on war orders for standard tools. Even though it was not possible in some cases for the small plants to produce the entire tool, or set of tools, arrangements have been made to subcontract a portion of the prime contract so that all may participate.

System of industrial integration committees used by the Ordnance Department will be expanded in future months as a result of recent conference at the Tank-Automotive Center, it was announced by Brig.-Gen. A. R. Glancy, deputy chief of ordnance in charge of the Center. Integration committees comprise manufacturers doing work for the Tank-Automotive Center. The committee system enables various plants making one product to work together much as though they were a single unit.

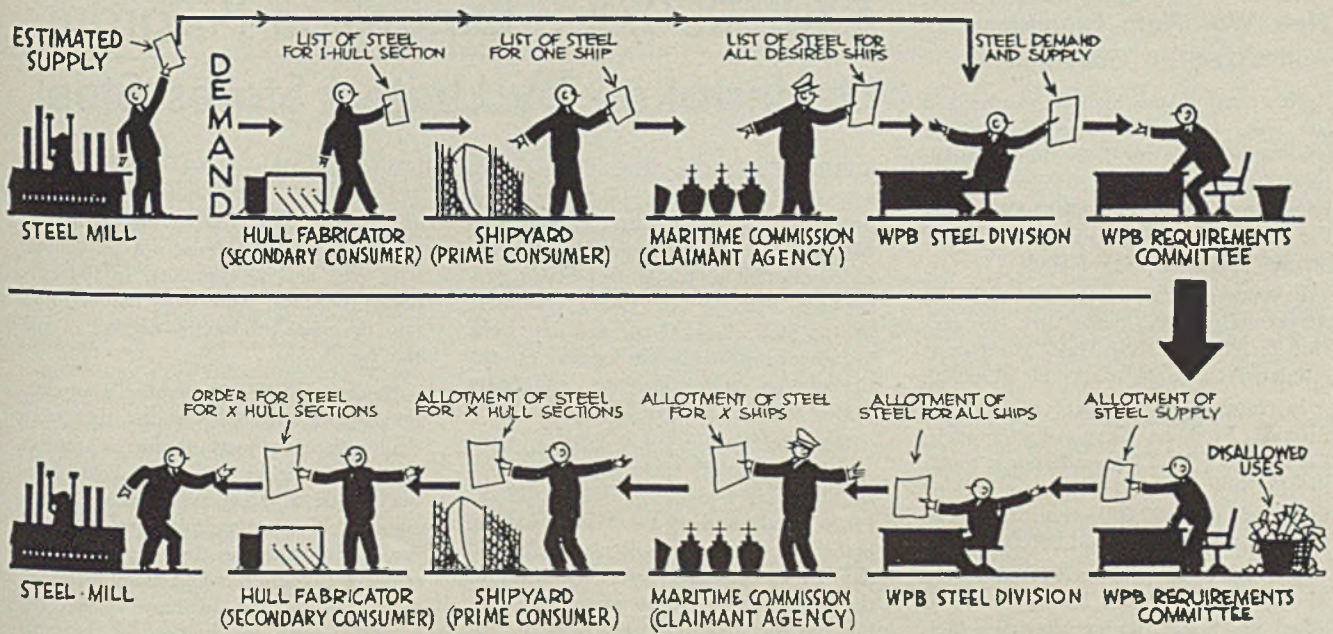
As an example, the medium tank committee composed of all private plants manufacturing the medium tank, enables the members to deal directly with one another in exchanging parts, raw materials, machine tools or improved methods of production.

Gen. Glancy also announced the formation of a new committee—the Self-Starter committee. There are seven others: Medium Tank, Light Tank, Half Track, Armor Plate, Armor Castings, Power Train, and Track.

---

Charles E. Wilson, WPB production vice chairman, has appointed Ralph J. Cordiner as WPB director general for war production scheduling. Mr. Cordiner for the last three years has been president, Schick Inc., Stamford, Conn.

## HOW CONTROLLED MATERIALS PLAN BALANCES SUPPLY AND DEMAND




HOW the supply of steel, aluminum and copper are forced into balance with the demand is illustrated by the above sketch showing operations of the Controlled Materials Plan.

1. The producers of these metals will report the available supply and rate of output for the coming quarter to the Controlled Materials Divisions.

2. The secondary consumer will send Bills of Materials covering his requirements to his prime consumer.

3. The prime consumer will gather all of these bills of materials together with his own and will send a total summary to the claimant agency.

4. The claimant agency will then multiply these requirements by the contemplated program and will send the grand total to the Requirements Committee.

5. The Requirements Committee will adjust the demand with the available supply and issue the allotments.

6. The claimant agency will receive the adjusted allotments and pass them on to the prime consumer in the form of adjusted approval schedules.

7. The prime consumer will divide his allotments with his various secondary consumers.

Orders are then placed with the mills bearing allotment numbers, which will assure delivery of that material in the approved period.

# Building of Chicago Detinning Plant Gets Underway This Week

CONSTRUCTION of the government-financed detinning plant to be located in Chicago and operated by the Metal & Thermit Corp. will get underway about Dec. 15. H. K. Ferguson Co., Cleveland, has the contract, and purchase of the site has been completed.

The plant, which will be similar to others planned for Buffalo, Birmingham, Los Angeles and Dallas, will occupy a 18-acre site on the southwest side of the city along the drainage canal. It will have a floor area of 50,000 square feet.

Tentative construction plans call for seven buildings, to be put up with non-critical materials such as concrete masonry and timber. Operations are expected to start next spring or summer.

The plant will have capacity to handle 60,000 tons of tin cans a year. A ton will yield 23 pounds of grade A tin and 1970 pounds of steel scrap. Seven pounds of metal are lost in the chemical process.

## New War Plant Expansions Authorized by Government

New war plant facilities authorized last week by the Defense Plant Corp. were announced by Jesse Jones, secretary of commerce. In each case title will be retained by Defense Plant Corp. and the facilities will be operated by the private operator. They include:

Execution of a contract with Simmonds Aerocessories Inc., New York, to provide facilities in New York. The cost is estimated to be in excess of $150,000.

Increase in its contract with Liberty Aircraft Products Corp., Farmingdale, Long Island, N. Y., for additional facilities in New York. This increase will be in excess of $300,000, resulting in an overall commitment of $1,900,000.

Increase in its contract with the Ford Motor Co., Dearborn, Mich., for additional plant facilities in Michigan. This increase will be in excess of $75,000, making a total commitment of more than $250,000.

Increase in its contract with Fairchild Engine & Airplane Corp., Hagerstown, Md., for additional plant facilities in North Carolina. The increase will be in excess of $300,000, making a total commitment of more than $3,000,000.

Increase in its contract with Owens-Corning Fiberglas Corp., Toledo, O., for additional plant facilities in Ohio. This increase will be in excess of $500,000, making an over-all commitment of more than $1,800,000.

Increase in contract with Ex-Cell-O Corp., Detroit, for additional facilities in Michigan. This increase will be in excess of $450,000, resulting in an overall commitment of more than $8,000,000.

Increase in contract with Hudson Motor Car Co., Detroit, for additional facilities in Michigan. This increase will be in excess of $600,000, resulting in an overall commitment of more than $1,000,000.

Execution of a contract with Commodity Credit Corp., Washington, to provide for construction and equipment of a plant in Illinois at a cost in excess of $350,000.

Execution of a contract with Commodity Credit Corp., Washington, to provide for construction and equipment of a plant in Kentucky at a cost in excess of $350,000.

Execution of a contract with Addressograph-Multigraph Corp., Cleveland, to provide machinery and equipment in a plant in Ohio at a cost in excess of $350,000.

Execution of a contract with General Cable Corp., New York, to provide machinery and equipment in a plant in New York at a cost in excess of $800,000.

Execution of a contract with Sangamo Electric Co., Springfield, Ill., to provide machinery and equipment to be placed in a plant in Illinois.

Execution of contract with Eastern States Petroleum Co. Inc., New York, to provide machinery and equipment in a plant in Texas at a cost in excess of $1,500,000.

Execution of contract with International Business Machines Corp., New York, to provide machinery and equipment in a plant in New York, at a cost approximating $1,000,000.

Execution of a contract with Cornell-Dubilier Electric Corp., South Plainfield, N. J., to provide additional facilities in a plant in Massachusetts at a cost in excess of $250,000.

# $700,000,000 Expansion Program Undertaken by United States Steel

"UNITED States Steel Corp. is engaged in the greatest plant expansion project in its history, costing more than $700,000,000—about two-thirds of which is for account of the United States government," Irving S. Olds, chairman, United States Steel Corp., said last week in reviewing accomplishments of the Corporation and subsidiary companies during the first year of the war.

New steel producing or finishing units near Pittsburgh, Chicago, Cleveland, Birmingham, Duluth, Worcester, Mass., Provo, Utah, and on the West coast are being pushed to completion night and day by thousands of workers. Most of these units will go into production during the first half of 1943. A large part of the new facilities is being erected by United States Steel for the account and at the expense of the government. For the remainder, the Corporation is using its own funds.

"The vast steel expansion now being carried on by U. S. Steel and other steel companies in accordance with the wishes of the federal government," Mr. Olds said, "should insure, upon its completion, the supply of steel required for war.

"There must be no relaxation of American industry's all-out war production effort," Mr. Olds added. "The record of U. S. Steel's contribution to the war effort since Pearl Harbor has been most creditable, but we must not be content with past accomplishments. In the days ahead, we must work even harder to attain the steel production needed to win the war."

Reviewing the Corporation's production figures, Mr. Olds stated that more than a thousand new production records have been established since Pearl Harbor by U. S. Steel subsidiaries. As instances of outstanding performances, Mr. Olds cited the delivery of 24 destroyers, two cruisers and many merchant ships, tankers and auxiliary vessels; the invention and production of portable steel runways for airplanes; an accelerated method of spinning bomb casings; completion in four months of 550 miles of pipe for the war emergency oil pipe line; and the production in one week by a single subsidiary of a quantity of steel plates in excess of the amount required for the building of 7000 Gen. Grant tanks. Mr. Olds pointed out that U. S. Steel plants had a larger steel output than all of the units of Germany and Japan combined, on the basis of the latest information available.

# New Peak at 30,000 Units

*Builders' backlogs still heavy. Continued high operations necessary for duration*

MACHINE tool production in the United States during October was approximately 30,000 units, an all-time high. The American armed forces received approximately 22,500 units.

Although dollar value of machine tool production in 1942 will show a 1300 per cent increase over the 1929-1938 yearly average, the backlog of unfilled orders placed by producers of war material now is $1,012,000,000. This represents approximately 7.5 months production by the entire industry.

Although cancellation of machine tool orders occurs as requirements change, a recent survey of existing orders placed by the Army, Navy and Maritime Commission indicated that the percentage of cancellations has been running less than 2 per cent of unfilled orders monthly, a loss which will be exceeded by new orders.

Continuing efforts are being made to assure the most efficient utilization of existing equipment, but the demands of war production cause tools to wear out three times as fast as normally. Depreciation is accelerated by the increased use of untrained operators.

Changes in design of weapons frequently necessitate changes in tools. Similarly, any increase in the strength of armor or the power of projectiles dictates still greater improvement in each. To meet the threat imposed by the German use of flat-trajectory 88 millimeter gun as an antitank weapon, it was necessary to convert a 3-inch high velocity antiaircraft gun into an even better tank destroyer.

Armor and armament on aircraft have been increased far beyond the standards common at the start of the war. The four-bladed propeller, recently announced by the British for use in the Spitfire, soon became standard for fighter planes.

Such changes as these all require new machine tools.

Allowance must also be made for a reserve of critical types of machine tools to replace losses. Total unit requirements for 1943 may be less than for 1942 but more than half of the 1943 production capacity has already been pre-empted by the backlog of unfilled machine tool orders. Machine tool manufacturers are now being urged to make quickest possible deliveries in order that present assembly lines may soon be completed.

## Tool Builders' Schedules Will Be Rearranged

Rearrangement of schedules of machine tool manufacturers to spread the work and reduce excessive backlogs of orders, is being undertaken as the No. 1 job of George H. Johnson, new director of the WPB Tools Division.

Mr. Johnson, who assumed the position only recently, was faced with the problem of accelerating the production of machine tools needed for the aircraft program. One expedient move, it was decided, would be to relieve certain companies of orders that could not be filled for many months and to reassign these orders to companies with backlogs of shorter periods.

Examination of the order boards of companies engaged in machine tool production showed that some had backlogs of two years or more, while others had orders for as little as a few weeks. The purpose of the rearrangement of schedules will be to keep the backlogs as nearly even as possible.

## SUBCONTRACT PLAN CONCENTRATES RESPONSIBILITY IN ONE ORGANIZATION

Mohawk Valley Plan of subcontracting, giving substantially the same control over subcontracted items that it does over items being made within the contractor's plant, has been developed by Lamson Corp., Syracuse, N. Y.

Under the plan, each group of subcontractors in a zone is covered by inspectors and expediters whose only responsibility is that particular group. The size of the group under one inspector or expediter depends on the geographical location of the subcontractors and the amount of work subcontracted.

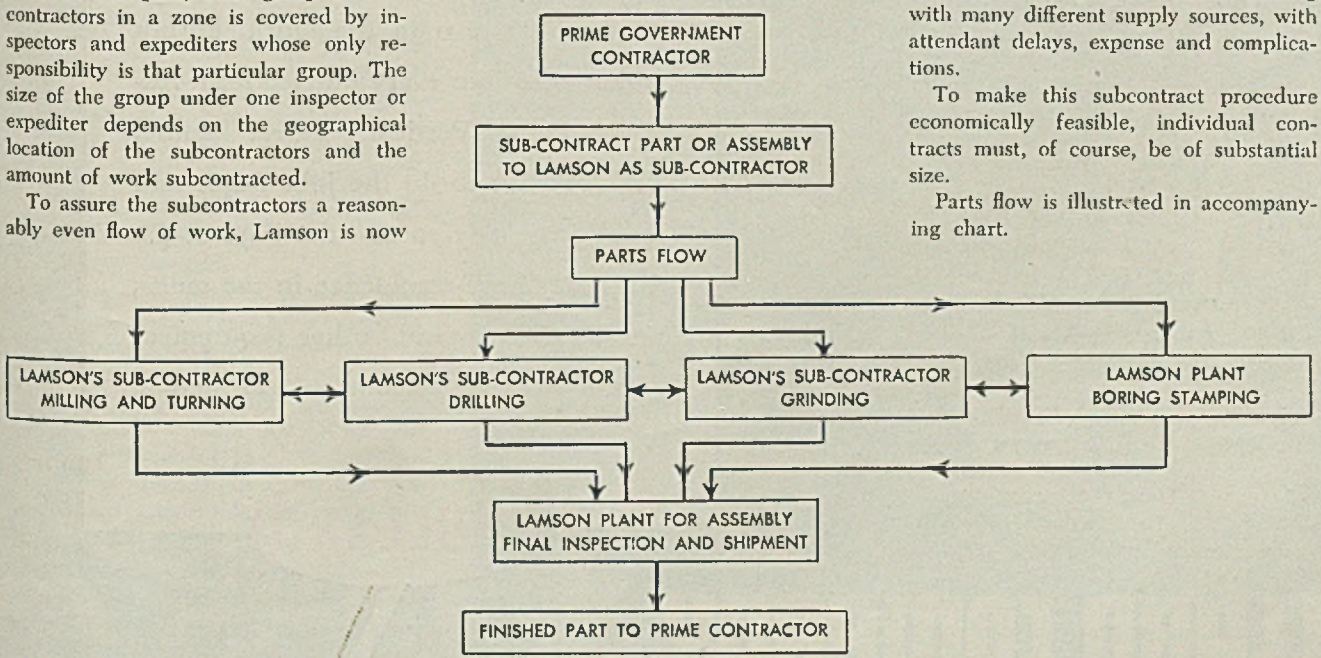
To assure the subcontractors a reasonably even flow of work, Lamson is now taking subcontract orders from other manufacturers holding prime government contracts and giving portions of the work to its subcontracting groups.

Lamson does all expediting and engineering, thus giving its principal the advantage of a multiplicity of tool facilities, but, at the same time, keeping the overall responsibility concentrated in the hands of one organization.

Not only does this give undivided responsibility, but it also eliminates the necessity for the prime contractor dealing with many different supply sources, with attendant delays, expense and complications.

To make this subcontract procedure economically feasible, individual contracts must, of course, be of substantial size.

Parts flow is illustrated in accompanying chart.




The Army-Navy "E" for excellence means to the Bullard workers that they are Industrial Soldiers backing up the Armed Forces—those Soldiers at the front.

Such a spirit of true Americanism reflects itself not only in speeded-up Production but also in the workmanship which goes into every Bullard Mult-Au-Matic and Vertical Turret Lathe. They're built to do the jobs faster and more accurately so that the boys at the front may have confidence in the tanks, guns, planes, and other equipment which Bullard machines have helped to build.

BULLARD

# BULLARD COMPANY

RIDGEPORT, CONNECTICUT

By A. H. ALLEN Detroit Editor, STEEL

# MIRRORS of MOTORDOM

*Studebaker Corp. receives share of plaudits for turning out $215,000,000 worth of war products in 1942. Triples original aircraft engine schedule*

SOUTH BEND, IND.

WHILE Detroit is frequently referred to as the arsenal of democracy, "Detroit" actually is more a state of mind than a geographical restriction of democracy's arsenal to a single city. Other ex-automotive centers, such as South Bend, often show excusable irritation over the apparent exclusion of their efforts in war production which, after all, are not inconsiderable.

Studebaker Corp. of South Bend, for example, will turn out $215,000,000 worth of war products this year, and is heading for a total of $350,000,000 next year. The company now is at work on ten separate war contracts, all restricted items except military trucks and airplane engines—and until last week the latter was also a "hush" item despite the fact it will soon be two years since the company received its first contract for engines.

Though these figures may seem small compared to some of the multi-million dollar war contracts scattered around the country these days, it must be remembered Studebaker in an automotive sense is a relatively small company, peak peacetime employment not being much over 10,000. Today 16,000 are at work in Studebaker plants at South Bend, Chicago and Fort Wayne, plants in the latter cities being new feeder units for the new engine operation at South Bend.

Studebaker is an old company and is an old hand at war goods manufacturing, having supplied materiel of one sort or another in every war this country has engaged in since 1852. But in the 67 years of the old Studebaker Bros. company, from 1852 to 1919, the entire volume of war production totaled only about 100 millions.

### Engine Program on Heroic Scale

The most sensational and heroic undertaking of the moment is the airplane engine program, in which the unceasing co-operative efforts of Studebaker and Wright Aeronautical Corp. resulted in beating earlier production schedules by four months. Breaking ground for new plants in March of 1941, the first engines were shipped just a year later and output has expanded rapidly every month since then.

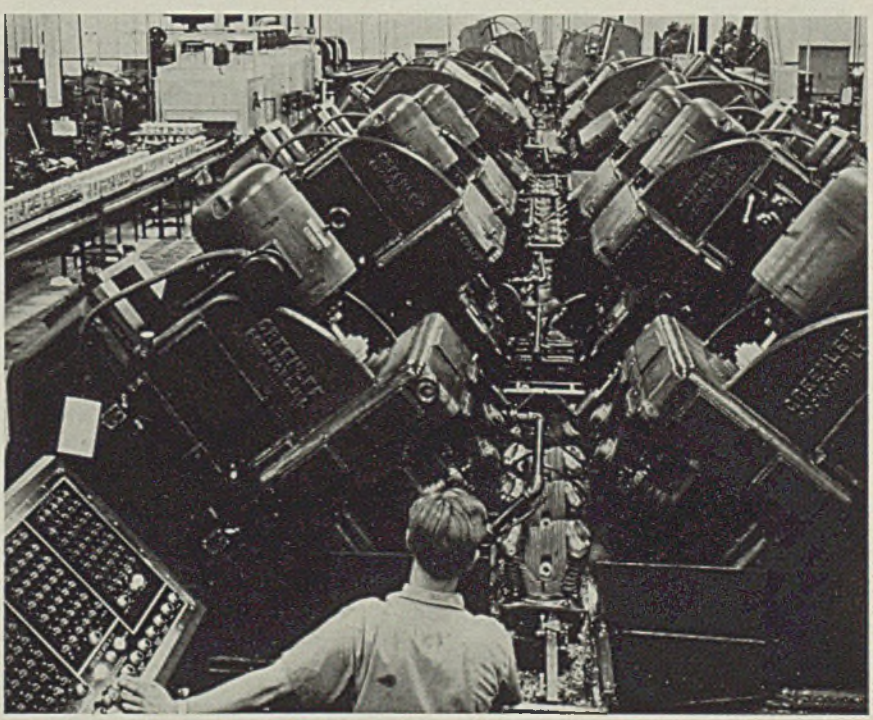
Engine being built by Studebaker is the Wright R1820 nine-cylinder radial, rated at 1200 horsepower at 2500 r.p.m., the latest version of a long series of Cyclone models which were first used in commercial air liners over ten years ago. This power plant is not the one which Studebaker once planned to build; in fact five months of preliminary planning and tooling for a 14-cylinder engine were thrown out the window in June, 1941, when the Army Air Forces decided to concentrate on production of the Boeing B-17 Flying Fortress at a greatly accelerated pace and thus was confronted with the danger of an engine shortage. Thanks to the sales ability of Lieut.-Gen. W. S. Knudsen and his faith in Studebaker, it was finally agreed that Studebaker and Wright should cooperate in bulwarking supplies of the Fortress engines. They have made good in a superior way, though there has been little fanfare over the achievement, and each participant is convinced it would have been impossible without major assistance from the other.

### Project Enlarged 3½ Times

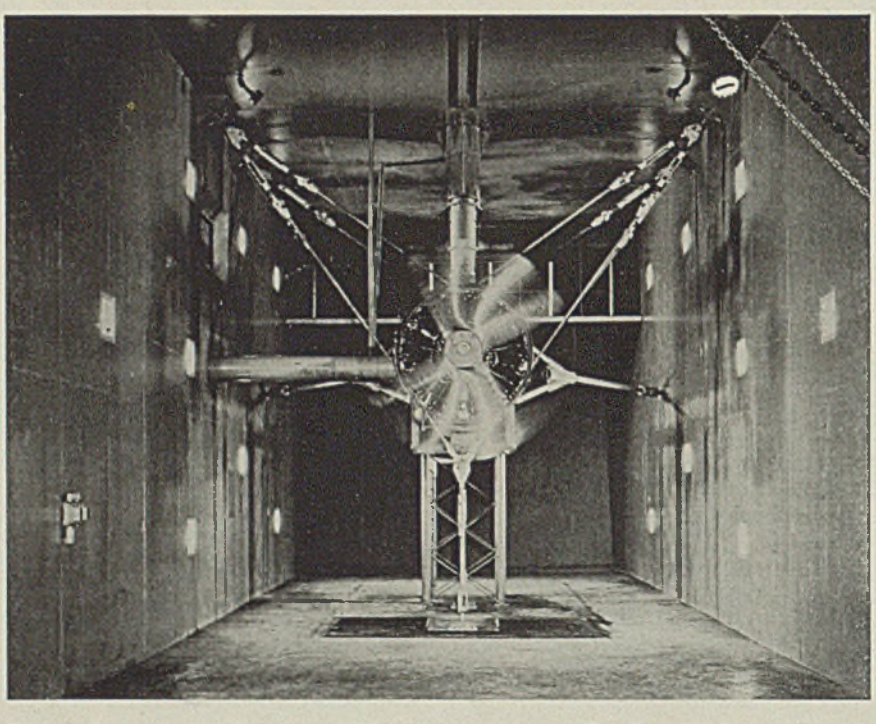
Original production program, doubled after Pearl Harbor, now is virtually 3½ times the size of the project when it was first launched two years ago, and while peak output has not yet been reached, it is at least half-way toward the proposed goal. Plant facilities have been underwritten by the DPC to an extent of over $70,000,000, latest increase being for $6,500,000, announced Oct. 15.

Spotting of three plants in separate localities to produce a single type of engine may sound incongruous in these days of vast plant areas under a single roof, but when related to the availability of labor supply, Studebaker's wisdom seems perfectly sound. To locate the three plants at a common point would cause disruptions in the community which are now evident in nearly every large industrial section. Placing the principal plant on the home lot permitted Studebaker gradually to move its automotive workmen over to aircraft engine operations and to step up the latter steadily without hardship on local labor. The South Bend plant comprises about 50 per cent of the floor space of the three units, requires 40 per cent of total employment. Only now is the bottom of the barrel of available labor being scraped, and employment of women can still go much further. At present women comprise only 12 per cent of the total at South Bend, 20 per cent at Chicago and 14 per cent at Fort Wayne. By the end of November, Studebaker had lost 1000 men to the armed services.

In laying out production equipment, the company naturally has been guided by the experience of Wright. For one thing, Studebaker had only a small staff



*One of a battery of three Greenlee automatics for machining cast aluminum cylinder heads at Studebaker plant. Heads are bolted to plates and move down central ways, being locked in position as cutting heads follow through cycle*



*Mounted on test stand in one of 96 concrete U-type cells, the 1200-horsepower engine whirls its "club" propeller as observers watch through window in left wall. Fire protection is maintained by carbon dioxide spray, released through nozzles, two of which are shown in roof*

of technicians to handle the job; that is, compared with some of the larger motor companies. Furthermore, the machining, finishing, assembling and testing of an aircraft engine are as different as night from day compared with automotive practice.

The project was under the general direction of H. S. Vance, who returned to his company after spending some time with the former OPM where he worked closely with Knudsen. Heading up work on shop detail and equipment was Ralph Vail, whose working knowledge of machining practice and intimate association with "the machine tool people" are surpassed by few in the automotive industry. Mr. Vail has been in the automobile "game", as he says, since 1904, and during the height of the career of the late Dodge brothers, he became one of their right-hand men as far as manufacturing practice was concerned. Since that time he has been a pioneer in guiding Studebaker production and is now vice president in charge of that department—but his manner is that of anybody save a vice president.

*Two of these wheeled tables hold the 8000 parts making up one Wright engine as it is torn down for inspection after the "green" test run. Note forged steel crankcase sections on lower shelf of table at left*

### Learned to Spend Money

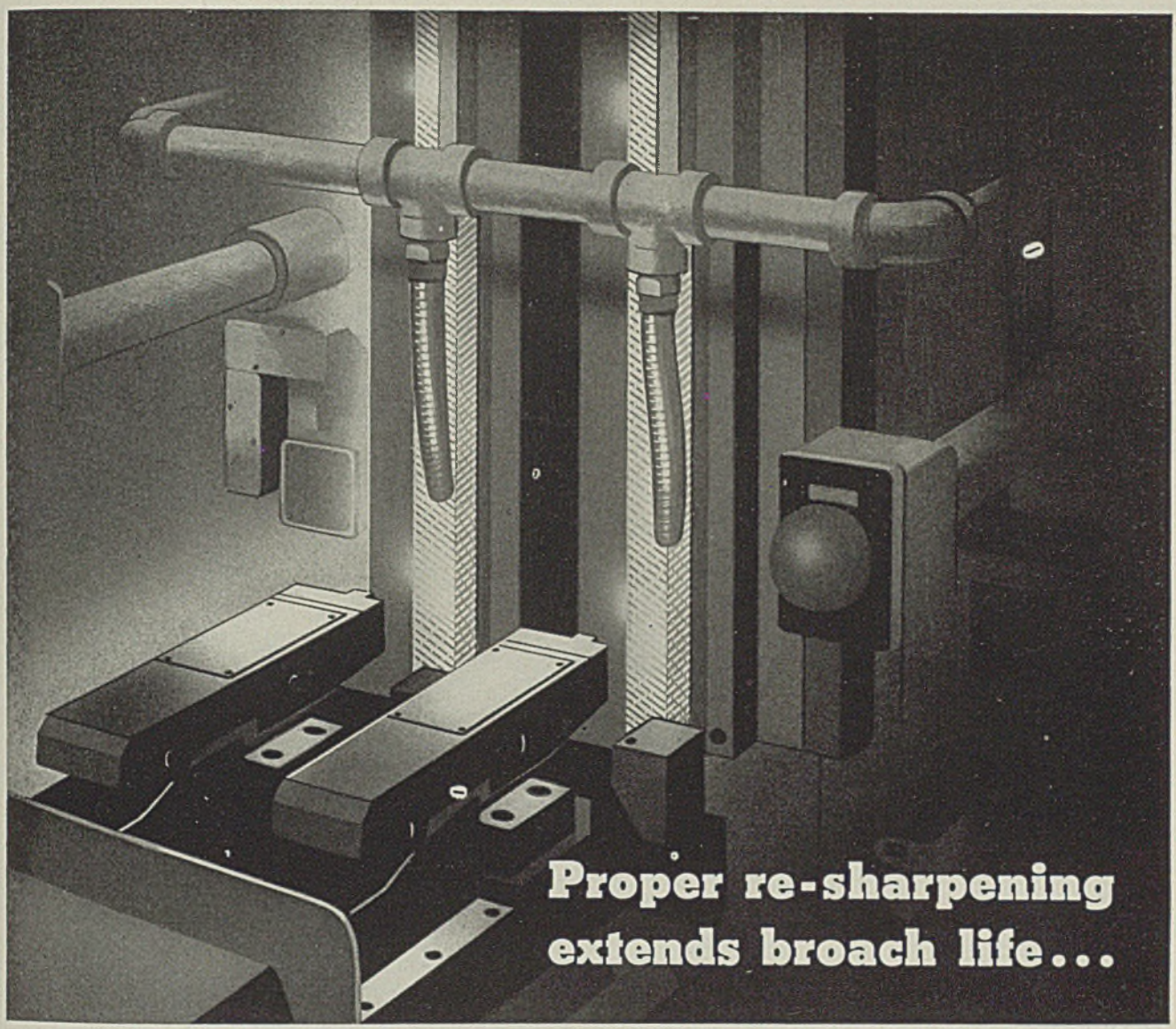
When asked what he has learned from his two-year association with aircraft engine manufacturing, Mr. Vail replies bluntly, "I've learned how to spend a hell of a lot of money!"

However, money alone will not build an engine that will stand the gaff and build them in thousand-lots. Dependable suppliers and subcontractors (Studebaker subcontracts about 58 per cent of the Wright engine job), precision equipment and tooling, trained personnel and inspectors (Vail says women make better machine operators than men when "trained from scratch", that is, without previous skill) are requisites.

Consider the forged alloy steel crankcase on which the Wright engine is built. Starting with two forgings weighing 178 pounds apiece, they are hogged out, faced, bored, drilled, tapped and ground down to a two-piece unit weighing but 78 pounds, with vertical wall thickness of but 0.010-inch. That represents removal of 278 pounds of steel or nearly 80 per cent of the original forgings. There is no real reason for having to cut away so much of the original steel, except that it has proved impossible to forge the section in anything but its hefty form. However, it takes a lot of intricate machining to finish these basic pieces.

One of the most elaborate and complete setups for facing, drilling, boring, reaming, tapping and counterboring aluminum cylinder heads ever achieved is that which Studebaker-Wright engineers have installed at South Bend, working in co-operation with Greenlee Bros. & Co., Rockford, Ill. Greenlee automatics now are in use in other Wright airplane engine plants and their spectacular appearance never fails to stop an inspection party. Actually what they are is a series of massive tool heads angularly

(*Please turn to Page* 148)




*Information supplied by an Industrial publication*

Proper re-sharpening of broaches is a very important factor in their continued performance. Tooth form, cutting hook and finish should conform as closely as possible to the original after re-sharpening.

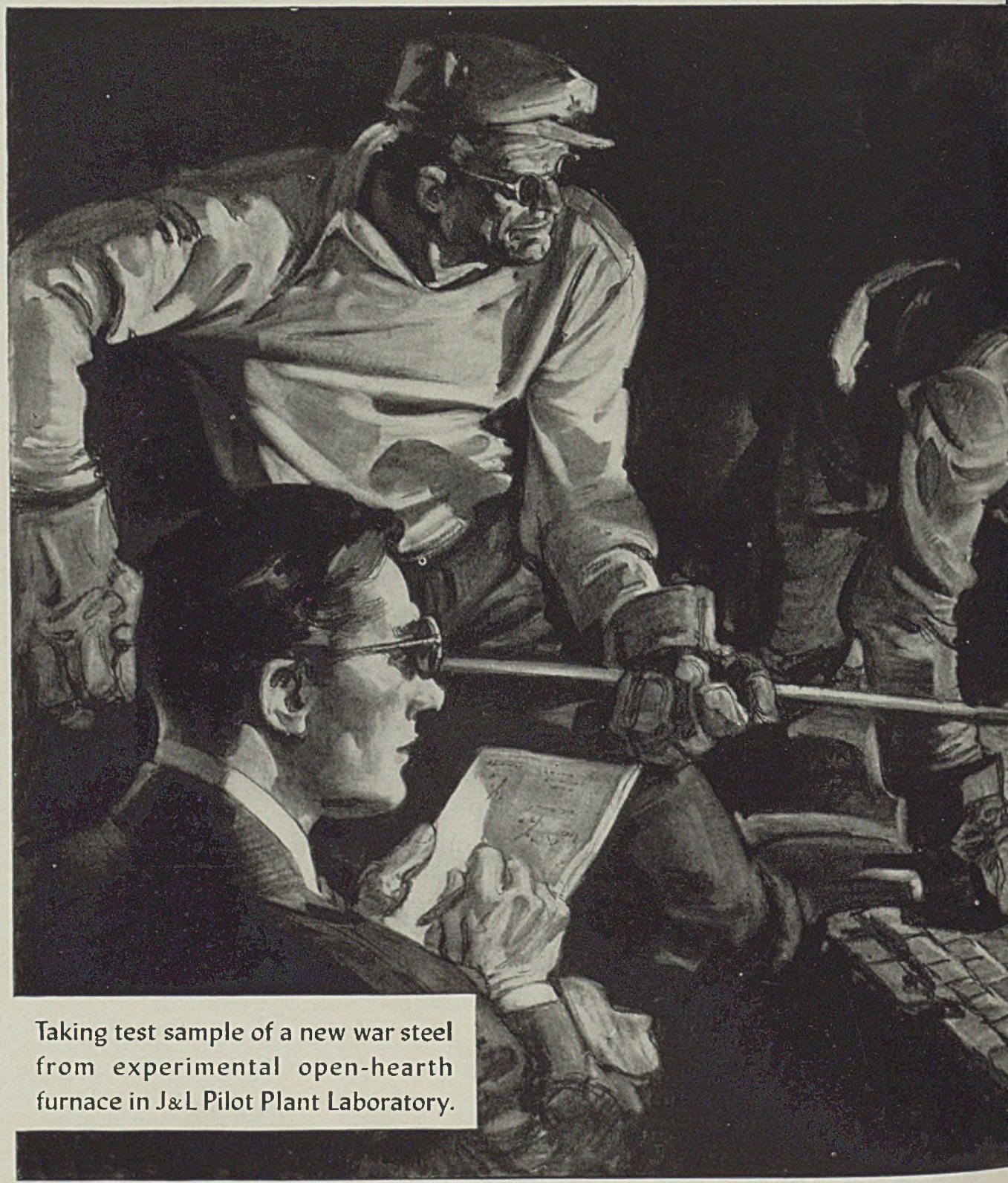
There are two particular ways of determining when a broach should be re-sharpened. One consists of periodic examination of the finished work. The other, and more accurate, is examination of the broach itself.

If the work starts to show rough surfaces, or tears, it is a good indication that the broach is in need of re-sharpening. But this method of checking is not recommended.

The best way is to examine the cutting edge of the broach teeth at regular intervals. When there is a shiny land on the tooth, or the edge is ragged, the broach should be sharpened.

The land should not be allowed to become too wide, because if it does, too much stock must be removed in re-sharpening. It is much better to re-sharpen oftener and thus extend the life of the broach.

# TO CRUSH ENEMY FORCES, SAFEGUARD OUR OWN, IS AIM OF STEEL RESEARCH



Taking test sample of a new war steel from experimental open-hearth furnace in J&L Pilot Plant Laboratory.



## JONES & LAUGHLIN STEEL CORPORATION

FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

PITTSBURGH, PENNSYLVANIA

CONTROLLED QUALITY STEEL FOR WAR

J&L STEEL

## HUSH-HUSH IN WAR LABS

**Censorship and secrecy** are rigidly imposed in American industrial laboratories because of startling results in research on new materials and weapons to crush enemy forces, and protect our own, achieved during our first year at war. "Sections of many industrial laboratories are so hush-hush," says Scripps-Howard's *Washington Calling* "even important officials can't get near them. Top war men are cheered by some new offensive weapons you won't hear about for some time."

**Steel research had momentum** when war came, was able to swing immediately into war-steel development work. Research facilities were available in hundreds of plants. Thousands of trained metallurgists, chemists and skilled research workers had an accumulation of data on the innermost secrets of steel; were eager to put their knowledge to work to help fight the war.

**Pilot for peace is now pilot for war** thanks to foresight of J&L metallurgists and management who in 1937 took steel research out of the test tube stage, put it on a practical basis in first Pilot Plant laboratory in the industry. Here with small experimental furnaces and rolling mills, research engineers conduct their experiments under conditions that simulate actual mill practice without interfering with mill operations — make it possible for their findings to be quickly applied to the big steel producing furnaces and mills.

**Small four-ton open-hearth furnace** (capacity each regular steel works furnace averages 150 tons) is keystone of this unique laboratory where practical steel men, technically-trained metallurgists and physicists work 24 hours a day. Since December 7, 1941 this little furnace and its crew have been developing new steels with which to destroy the Axis and protect the lives of our sons, our husbands, our fathers, our brothers in the armed forces.

**Skilled steel workers** in the J&L plants eagerly take over new developments of the Pilot Plant and apply them to producing new war steels—millions of tons a year. Working shoulder to shoulder with mill metallurgists are men whose fathers and their fathers before them for a century have been the backbone of steelmaking in America. Month after month these men establish new production highs, make world records, then break them again and again.

**Axis feeling effects of U. S. research.** Today enemy forces on land, at sea and in the air are feeling the destructive effects of our armed forces equipped with the products of American ingenuity in making materials of war, with more to come. At the same time our fighting men are getting a tremendous lift from the security of bombers that return safely, of tanks that aren't pierced, of ships that won't go down.

# New List of Areas with Manpower Shortages Issued by WMC Chairman

A NEW list of 270 industrial areas, showing that current labor shortages exist in 102 areas, are anticipated in 77 others, and that labor surpluses are current in 91, has been prepared by the War Manpower Commission.

The lists are furnished to the War Production Board and government procurement agencies for guidance in placing war contracts with consideration for manpower factors, and are revised periodically.

The list of 270 areas is the first revision announced since the original list of 227 areas was issued Oct. 20. With the addition of 43 new areas, the list now includes all cities of 50,000 or more population, and any smaller cities where 5000 or more workers must be added to the local labor force to meet peak production demands.

"Manpower is only one of several considerations that guide procurement officials in negotiating war procurement contracts," WMC Commissioner McNutt explained. "The ability of a concern to deliver or perform a contract on time, and the ability of a concern to fill a contract with a minimum amount of new machinery or equipment, and other factors are likewise considered.

"The lists represent a positive approach to the need for placing war contracts in areas in which workers would otherwise be idle, underemployed, or employed in producing materials that are less essential to the war effort. Experience since the original list of cities was issued indicates that war contracts will tend to flow to manufacturers in labor surplus areas.

### Exhaust Local Supply First

"Any community that has a labor shortage at present, or is facing an anticipated labor shortage, should lose no time in drawing upon its own labor reserves to relieve the shortage. Only by utilizing every possible source of untapped local labor—for example, women, handicapped workers, and minority groups—can a community classified as a labor shortage area be confident of discharging the war production commitments."

The chairman pointed out that the grouping of localities may be changed from time to time. "We are ready to change our recommendations as to the placing of contracts," he said, "if an area solves its labor shortage problem. These solutions depend, of course, on the extent of local initiative and co-operation with the program of the War Manpower Commission. We have asked industry, labor and civic organizations to do their part in a program of voluntary co-operation to correct labor piracy, hoarding, discriminatory hiring, and other hindrances to the full use of manpower."

Mr. McNutt explained that continuous surveys of labor conditions throughout the country provide the basis for forecasts of labor shortage conditions in the future. "Employers have told us," he said, "how many workers they will need in the future, as well as right now. We know how many more will leave their jobs for military service, and how many will have to be replaced. Some communities have had an adequate labor supply so far, and may have enough workers now. However, it may be advisable not to ask these communities to undertake more work if that work can be done somewhere else, due to inevitable manpower shortages in the future."

In many communities, workers have had no opportunity to participate or contribute their skill to the war production effort, he said. "In most of these areas where labor is abundant," he added, "housing, transportation, and other facilities are also plentiful."

*War Manpower Chief Paul V. McNutt considers the entire population "a national pool from which the needs of the armed forces, industry, agriculture and essential civilian activities will be supplied." Above, the manpower czar is shown at a recent press conference at which he announced plans to ration scarce labor. NEA photo*

## Report Lost Time Due to Strikes at Five-Year Low

Office of War Information last week released a chart based on National War Labor Board figures showing that man-days of idleness due to strikes in all industry have dropped, during a year of war, to the lowest level of the past five years.

While the number of men employed in industry has risen from a monthly average of 30,545,000 in 1937 to 36,621,000 for the first ten months of 1942, the average number of man-days of idleness due to strikes has fallen in that period from 2,369,000 to 397,000. Man-days of idleness for the first ten months of this year are only 28 per cent of the average for the last five years of peace, though monthly employment in 1942 was up 119 per cent of the five-year average.

The percentage of time lost in war industry strikes since Pearl Harbor has never risen above one-tenth of one per cent of the number of man-days worked.

**Man-Days Idle—Strikes In All Industry**

| | Total | Average per month |
|---|---|---|
| 1937 | 28,424,857 | 2,368,738 |
| 1938 | 9,148,273 | 762,356 |
| 1939 | 17,812,219 | 1,484,352 |
| 1940 | 6,700,872 | 558,406 |
| 1941 | 23,047,556 | 1,753,963 |
| 1942 | (ten months) | 396,888 |

| | | | |
|---|---|---|---|
| Jan. | 327,206 | Feb. | 351,947 |
| Mar. | 397,477 | Apr. | 360,382 |
| May | 306,964 | June | 550,000 |
| July | 450,000 | Aug. | 450,000 |
| Sept. | 450,000 | Oct. | 325,000 |

# Steelworkers Earn 13% More Per Ton

*Wage increase and additional overtime responsible for advance over a year ago*

STEEL companies are paying employes 13 per cent more in direct wages per ton of products turned out by the employes than they did a year ago, according to the American Iron and Steel Institute.

In September this year, the wage earners were paid an average of $16.71 for every ton of pig iron and steel products shipped to consumers, compared with $14.72 in September, 1941. Prices at which iron and steel products are sold remained unchanged over the period.

The wage increase effective last summer, and more overtime pay, "are responsible for most of the rise in labor cost per ton," the institute states.

Rise in average hourly earnings was somewhat less than increase in wage per ton, indicating a slight decrease in output per man-hour.

Payrolls totaling a record-breaking $126,627,000 were distributed by companies in the steel industry in October. The total exceeded by nearly $2,000,000 the previous peak of $124,777,000 disbursed in September. In October, 1941, steel payrolls set a new peak up to that time of $118,890,000.

Continuing the trend of the past several months, the number employed in the industry declined during the month, with 635,000 employes on the rolls during October, against 640,000 in September, and 646,000 in October, a year ago.

Wage-earning employes earned an average of 107.7 cents per hour in October, compared with 108.6 cents per hour in September and 98.3 cents per hour in October, 1941. An average of 39.9 hours per week was worked by wage earners in the month, against 39.8 hours per week in September, and 40.0 hours per week in like month last year.

Monthly payrolls and employment since the first of the year are shown in the following table:

| | Payrolls | Number of Employes |
|---|---|---|
| January | $118,785,000 | 651,000 |
| February | 108,563,000 | 651,000 |
| March | 116,998,000 | 653,000 |
| April | 118,568,000 | 654,000 |
| May | 117,403,000 | 656,000 |
| June | 118,067,000 | 659,000 |
| July | 120,671,000 | 665,000 |
| August | 118,718,000 | 647,000 |
| September | 124,777,000 | 641,000 |
| October | 126,627,000 | 635,000 |



## Manpower Shortage Causes Finishing Operations To Fall

Shortage of manpower has curtailed operations in steel mill rolling departments in the Buffalo district. Bethlehem Steel Co., last week placed a quarter-page display advertisement for help in Buffalo newspapers. Many foundries are placing similar ads. However, response has been negligible.

The heavy industries have difficulty competing with aviation plants and other war industries for the limited supply of labor available. Mills report a considerable number of workers have found ways of evading antipirating labor agreement among Buffalo industries, by taking jobs elsewhere.

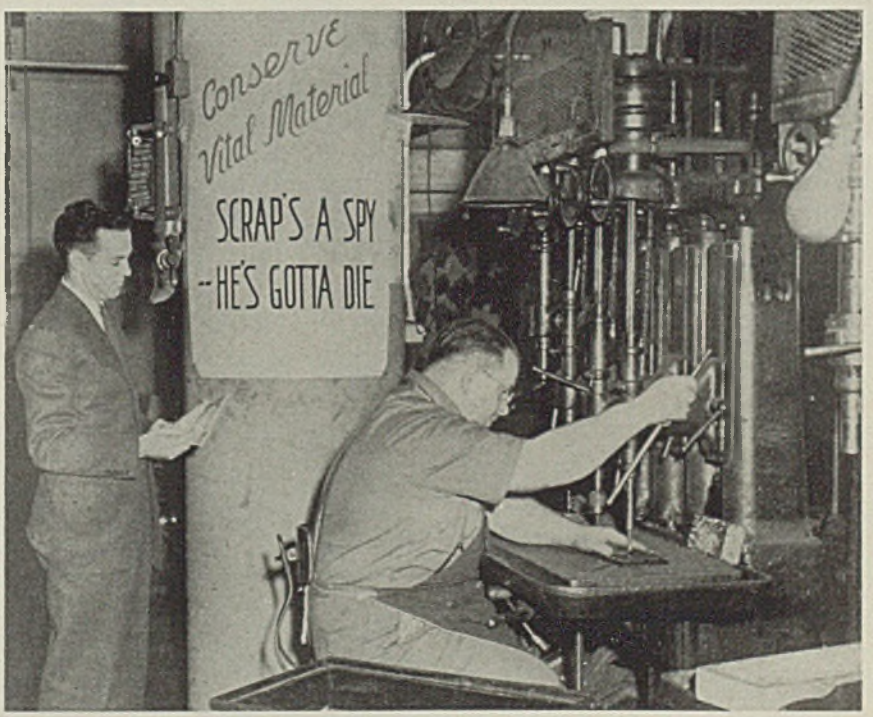
Steel mills have jobs available "for thousands of workers." While the labor shortage has not been reflected in ingot production, finishing departments have been curtailed. Ingots have been stored in one plant, awaiting a satisfactory arrangement of schedules in rolling mills.

## President Asks Seniority Rights for War Workers

Request that employers in civilian industries grant the same seniority guarantees and re-employment advantages to workers who leave to accept jobs in war plants as are offered to employes who leave for the armed services was issued last week by the President.

Selective Service act provides both retention of seniority and replacement in their old or comparable jobs.

## WRITES SLOGAN, WINS BOND




SLOGAN contest winner W. C. Knake received a $25 War Bond from an Indiana plant of General Electric Co., for his "Scrap's a Spy, He's Gotta Die" entry. Contest was conducted as part of G-E's program to reduce waste and spoilage. The slogan is being prominently displayed on posters during the bond campaign and in the plant's employe magazine

# Accumulated Shortages To Make Possible Post-War Prosperity Era

*NEW YORK*

THE stage is set for an economy of prosperity after the war, provided a number of vitally important things are done. The primary necessity is to reform those national policies that now depress business and discourage investment of private funds in business ventures. That was the main conclusion reached in a panel discussion before the War Congress of American Industry, held recently in New York under auspices of the National Association of Manufacturers.

Dr. Ralph Robey, associate editor, *Newsweek*, prophesied that by the end of 1943 the American public will have the greatest accumulation of buying power in its history. The principal element will be $24,000,000,000 of war bonds held by individuals, all immediately convertible into cash on demand. He estimated that at the same time there will have accumulated a reservoir of installment credit amounting to at least $8,000,000,000. In addition, there will be some $18,000,000,000 of cash in circulation and some $116,000,000,000 of deposits in our commercial banks. Obviously, he argued, there will be no need for governmental pump priming.

There will be accumulated shortages of almost all types of consumers' durable goods, Dr. Robey said, shortages that will come to almost $12,000,000,000. For business construction and equipment, he predicted a shortage of another $3,000,000,000; for deferred maintenance, another $2,800,000,000; for public works and maintenance, $2,600,000,000; and for consumers' nondurable goods, $2,500,000,000—a total exceeding $22,500,000,000.

### Government Holds the Key

By December of 1943, he believed, there will be a deferred demand for 10,000,000 automobiles, 1,000,000 houses, 20,000,000 radios. On the other hand, we will have an expanded supply of all raw materials, of machine tools, electric energy and trained workers. The world will look to us for manufactured goods of all kinds. There is not the slightest doubt but what we can have prosperity, he declared, but added that whether we have it depends on what the government does with reference to taxes, the banking system, labor, agriculture, and so on.

Dr. Harley L. Lutz, professor of public finance, Princeton University, Princeton, N. J., expressed the opinion that there can be no vigorous recovery of the free enterprise system in the postwar period without a remarkable relaxation of progressive taxes. It is equally clear, he believed, that the enemies of a free society are fully aware of the advantage they now hold, with these taxes, and that they will resort to every kind of trick, stratagem and artifice to prevent such relaxation. He thinks the postwar period also is far from attractive to the investor in another respect—the security of the monetary unit. When it is necessary to make adjustment for an unknown but possibly violent change in the dollar, the investment process is demoralized or even paralyzed.

Other pertinent comments about the postwar period were as follows:

Prof. Ray Westerfield, Yale University: The banks may hold close to $100,000,000,000 of government bonds before the war is over, a bad condition because it will place the banks largely under the control of the Treasury Department. Some demagogue is likely to come along and say "Why pay all this interest to the banks?" and then propose socializing the banking system. . . . Existing obstacles to private investment will have to be overcome to finance the postwar period.

### Need Lower Taxes

Murray Shields, economist, Irving Trust Co., New York: Postwar business must be expanded by lowering taxes, by encouraging the profit motive, by the elimination of many existing governmental controls. The government must confine its expenditures to public works only, public works for use and not for work relief or other ulterior purposes.

H. B. Arthur, economist, Swift & Co.: The fact that business men now are thinking in terms of improving the lot of our underprivileged citizens should make the public feel in the course of time that this is decreasing in stature as a government problem. . . . Every employe should be informed about the lengths to which employers have to go every day in complying with government regulations; they already are resentful of controls which affect their lives and which many of them believe to be unjust and unnecessary. It should be easy to develop a resentment that will bring eventual elimination or sharp modification of burdensome government controls.

Proposal of the War Production Board to further zone and concentrate industries was questioned by the congress, and a formal resolution protesting against needless action of this kind was adopted.

The situation was analyzed by NAM's chairman, Walter D. Fuller, president, Curtis Publishing Co., in a radio broadcast.

"New York fur makers are told blandly by a deputy chairman of the War Manpower Commission whom I quote, 'You are going to bleed to death . . . Your men will be taken out bit by bit'. New York City now has several hundred thousand unemployed. Many of those unemployed do similar work, have similar skills to those of fur workers. Yet there is talk of bleeding such business to death. What for?" asked Mr. Fuller.

### "Sacrifice End in Itself?"

"There seems to be a conviction among some of our administrators that sacrifice is an end in itself, that mortification of the flesh will win the war," he continued. "If concentration of industry is necessary for victory, you and I certainly will not oppose it. But we want to be certain that it is necessary. For concentration with all that it entails for industry, for labor, for our whole economy, can be achieved only at a heavy price."

In reporting on the activities of his Office of Price Administration—referring to it as "Other People Associated"—Leon Henderson said that we are in for more red tape instead of less as long as the war lasts. Rationing will have to be applied to additional commodities.

Henry J. Kaiser, Pacific coast shipbuilder and potential iron and steel producer, submitted an outstanding address on "Management's Responsibility in the Postwar World". He called upon industry to plan now on how to provide work for all after the present emergency is over. Housing, road construction, all sorts of consumer and industrial goods will afford opportunity on a vast scale and if industrial managements will plan realistically and unselfishly they will lead the way to a high postwar level of prosperity.

Resolutions that were passed requested remedial action to resolve inequities in the 1942 tax law and the contract renegotiation act, decried recent attacks on the American patent system, called for a plan for postwar close relationship between industry in the United States and industry in the United Nations, urged centralization and stabilization of food control under one head, lauded the National Educational Association for its educational activities.

The congress adopted a 1943 platform calling for all-out victory and op-

position to anybody who gets in the way. Read by NAM's new president, Frederick Coolidge Crawford, it declared industry stands for the basic American freedoms and will do everything it can to preserve these freedoms while at the same time pledging all its skill and resourcefulness in producing for victory. It also pledged industry to turn its skill and resourcefulness to the works of peace, to provide employment for returning soldiers and sailors and all others, "to enable the American people to resume their historic upward march, spiritually and materially as free men."

## Officers, Directors Elected by Manufacturers

Frederick C. Crawford, Cleveland, was elected president of the association. Mr. Crawford, who is president of Thompson Products Inc. and Thompson Aircraft Products Co., will take office Jan. 1.

Directors-at-large for the years 1943-44 were named as follows:

C. S. Davis, president, Borg-Warner Corp., Chicago; J. Howard Pew, president, Sun Oil Co., Philadelphia; James H. Rand Jr., president, Remington Rand Inc., New York; Ernest T. Weir, chairman of the board, National Steel Corp., Pittsburgh; Robert E. Wood, chairman of the board, Sears, Roebuck & Co., Chicago; R. J. Wysor, president, Republic Steel Corp., Cleveland.

State directors include:

ALABAMA: Herbert C. Stockham, president, Stockham Pipe Fittings Co., Birmingham.

CALIFORNIA: Alfred W. Eames, president, California Packing Corp., San Francisco; J. A. Hartley, president, Braun Corp., Los Angeles; K. T. Norris, president, Norris Stamping & Mfg. Co., Los Angeles.

COLORADO, UTAH, NEW MEXICO and ARIZONA: Harold F. Silver, president, Silver engineering Works Inc., Denver.

CONNECTICUT: Graham H. Anthony, president, Veeder-Root Inc., Hartford; N. W. Pickering, president, Farrel-Birmingham Co. Inc., Ansonia; Maurice Stanley, president, Fafnir Bearing Co., New Britain.

DELAWARE: Lammot du Pont, chairman of the board, E. I. du Pont de Nemours & Co. Inc., Wilmington.

GEORGIA: Wm. D. Anderson, chairman of the board, Bibb Mfg. Co., Macon.

ILLINOIS: James D. Cunningham, president, Republic Flow Meters Co., Chicago; Robert M. Gaylord, president, Ingersoll milling Machine Co., Rockford; Wilfred Sykes, president, Inland Steel Co., Chicago.

INDIANA: Wm. A. Atkins, vice president, E. C. Atkins & Co., Indianapolis; Louis Ruthenberg, president, Servel, Inc., Evansville; Lothair Teetor, president, Perfect Circle Co., Hagerstown.

IOWA: George M. Foster, vice president, John Morrell & Co., Ottumwa.

KANSAS: H. W. Cardwell, president, Cardwell Mfg. Co. Inc., Wichita

KENTUCKY: A. H. Dick, president, Louisville Textiles Inc., Louisville.

LOUISIANA: John U. Barr, proprietor, Federal Fibre Mills, New Orleans.

MAINE and VERMONT: Redfield Proctor, president, Vermont Marble Co., Proctor.

MARYLAND: S. Duncan Black, president, Black & Decker Mfg. Co., Towson.

MASSACHUSETTS: G. N. Jeppson, president, Norton Co., Worcester; William M. Rand, vice-president, Monsanto Chemical Co., Merrimac Division, Everett; George B. Wells, president, American Optical Co., Southbridge.

MICHIGAN: G. W. Mason, president, Nash-Kelvinator Corp., Detroit; Clarence J. Reese, president, Continental Motors Corp., Muskegon; S. Wells Utley, president, Detroit Steel Castings Co., Detroit.

MINNESOTA: M. W. Griggs, president, Griggs, Cooper & Co., St. Paul; S. V. Wood, president, Minneapolis Electric Steel Castings Co., Minneapolis.

MISSOURI: M. G. Ensinger, president, Union Wire Rope Corp., Kansas City; Byron A. Gray, president, International Shoe Co., St. Louis; Howard I. Young, president, American Zinc, Lead & Smelting Co., St. Louis.

NEBRASKA: L. E. Hurtz, president, Fairmont Creamery Co., Omaha.

NEW HAMPSHIRE: Winthrop L. Carter, president, Nashua Gummed & Coated Paper Co., Nashua.

NEW JERSEY: Thomas Roy Jones, president, American Type Founders, Inc., Elizabeth; Robert Shannon, president, RCA Mfg. Co. Inc., Camden; E. F. Weston, president, Weston Electrical Instrument Co., Newark.

NEW YORK: W. M. Angle, president, Stromberg-Carlson Telephone Mfg. Co., Rochester; C. Donald Dallas, president, Revere Copper & Brass Inc., New York City; Theodore G. Montague, president, Borden Co., New York City.

NORTH CAROLINA: Stuart W. Cramer Jr., president, Cramerton Mills Inc., Cramerton; Reuben B. Robertson, executive vice-president, Champion Paper & Fibre Co., Canton.

OHIO: Harold Boeschenstein, president, Owens-Corning Fibreglass Corp., Toledo; Roger A. Selby, president, Selby Shoe Co., Portsmouth; C. J. Stilwell, president, Warner & Swasey Co., Cleveland.

OKLAHOMA: Howard Stover, secretary and treasurer, Gaso Pump & Burner Mfg. Co., Tulsa.

OREGON: T. H. Banfield, president, Iron Fireman Mfg. Co., Portland.

PENNSYLVANIA: Charles E. Brinley, president, Baldwin Locomotive Works, Philadelphia; A. W. Robertson, chairman of board, Westinghouse Electric & Mfg. Co., East Pittsburgh; Wilbert Wear, president, Harrisburg Steel Co., Harrisburg.

RHODE ISLAND: Norman D. Mac Leod, president, Abrasive Machine Tool Co., East Providence.

SOUTH CAROLINA: J. L. Coker, president, Sonoco Products Co., Hartsville.

TENNESSEE: A. J. Dyer, president, Nashville Bridge Co., Nashville.

TEXAS: J. B. O'Hara, president, Dr. Pepper Co., Dallas; John R. Suman, vice president, Humble Oil & Refining Co., Houston.

VIRGINIA: E. H. Lane, president, Lane Co. Inc., Altavista.

WASHINGTON: E. I. Garrett, president, Wire Rope Mfg. & Equipment Co., Seattle; E. G. Griggs II, president, St. Paul & Tacoma Lumber Co., Tacoma.

WEST VIRGINIA: J. A. Bloch, president, Bloch Brothers Tobacco Co., Wheeling.

WISCONSIN: Walter Geist, president, Allis-Chalmers Mfg. Co., Milwaukee; Herbert V. Kohler, president, Kohler Co., Kohler; C. O. Wanvig, president, Globe-Union Inc., Milwaukee.

Continuing as members of the 1943 board of directors are:

William P. Witherow, president, Blaw-Knox Co., Pittsburgh; Howard Coonley, chairman of board, Walworth Co. Inc., New York; Walter D. Fuller, president, Curtis Publishing Co., Philadelphia; Charles R. Hook, president, American Rolling Mill Co., Middletown, O.; H. W. Prentis Jr., president, Armstrong Cork Co., Lancaster, Pa.; William B. Warner, president, McCall Corp., New York; Henry Abbott, president, Calculagraph Co., New York; C. M. Chester, chairman of board, General Foods Corp., New York; H. L. Derby, president, American Cyanamid & Chemical Corp., New York; Robert L. Lund, executive vice president, Lambert Pharmacal Co., St. Louis; S. Bayard Colgate, chairman of board, Colgate-Palmolive-Peet Co., Jersey City; Thomas J. Hargrave, president, Eastman Kodak Co., Rochester; John Holmes, president, Swift & Co., Chicago; Sydney G. McAllister, chairman executive committee, International Harvester Co., Chicago; Malcolm Muir, president, Newsweek, New York; W. S. S. Rodgers, president, Texas Co., New York.


*Shown at the War Congress of American Industry, New York, are, left to right: Henry J. Kaiser, Pacific Coast shipbuilder; William P. Witherow, retiring president of the National Association of Manufacturers; and Frederick C. Crawford, new president of the association. NEA photo*

# Management Society Discusses Wartime Production, Cost Problems

PROBLEMS confronting industrial management growing out of war production, distribution and government controls, involving costs, operating schedules, training and labor relations were discussed at the annual conference of the Society for the Advancement of Management, New York, Dec. 3-5.

That management must accept increasing responsibilities was the keynote of numerous statements by leaders in industry, economics and organized labor. Labor leaders took a more prominent part in the meeting than they did in previous years, without exception urging closer co-operation between management and labor.

Percy S. Brown, president, Consumer Distribution Corp., New York, was elected president of the section. R. R. Zimmerman, executive assistant to the chairman, Council for Personnel Administration, Washington, is new vice president; Herbert E. Stats, division of administrative engineering, State of Minnesota, secretary; and Frank G. Atkinson, works manager, Joseph Dixon Crucible Co., Jersey City, treasurer.

New approach to cost controls is required by new and frequently changing production problems, George Ebert, comptroller, propeller division, Curtiss-Wright Corp., Caldwell, N. J., declared. He pointed out that methods of obtaining costs and presenting of cost facts to management are frequently overlooked as an aid in obtaining increased output. Statistics on costs properly presented soon enough are valuable aids to management, often centering attention to items which are potential bottlenecks and users of excess manpower. But because of the speed at which industry is operating, unless this information is available at once, much of its value is lost.

### Scrap Losses Reduced

Quick decisions on production schedules and detailed information as to costs, inventory, production and profit, allow prompt revisions.

Citing as an example, heavy scrap losses, up to 40 per cent in the fabrication of a certain propeller blade, Mr. Ebert described a cost and time study of the task. Method of fabrication was improved by new equipment, changes in material and process of fabrication. Personnel was trained for the new methods and scrap losses were cut 10 per cent, but improvement did not continue.

Cost study determined the fact scrap losses were less on the first shift of employes than on the second and third. Supervising personnel on the last two included mostly workers who had been trained in the methods of the original technique; production had increased but scrap losses had not declined to the point expected. The second and third shifts were not following closely the new technique. When this was corrected, scrap losses were cut 60 per cent which, coupled with higher production, reduced the cost of the unit and allowed the producer to make a lower price to the government.

How cost information can assist production management was also reviewed by Mr. Ebert, based on experience with manufacture of an engine cowling. This cowling, while new in design from an aero-dynamic standpoint, was built in accordance with regular construction practice followed at the time in production of engine cowlings. The design was good aero-dynamically, but in service the replacement cost was especially high. Through cost analysis it was established that cost of fabricating this unit was all out of proportion to other portions of the airplane built in a different manner.

Attention of the engineering, tooling and fabricating departments was brought to this particular part. A new design, aero-dynamically the same as the first, resulted in a reduction in cost to one-third of the original. The service problem was all but eliminated, the new unit being stronger in construction while savings involved made it possible to produce more units in a shorter period and made available additional manpower.

Job cost systems are often too complicated for wartime high production programs, the speaker said. He urged product cost analysis. Total cost accumulations against a product will permit prompt adjustment of variable costs. Loose cost controls may also lead to inventory accumulations, tying up capital in materials made idle by revised plans.

In the use of the product cost analysis the accountant is handling daily the actual cost of the product as compared to the standards established, and obtaining variances daily, making it possible to bring to the attention of production management the causes of these variances; if serious, production management can immediately correct the causes of these variances at their inception.

E. J. Tribble, assistant manager, Harrison Works, Worthington Pump & Machinery Corp., said the WPB Controlled Materials Plan must be taken into consideration for production planning and cost controls. He indicated supplies of materials would be more closely related to production needs and that a 45-day inventory must be expected. Fluctuating labor supply will be another important factor in planning and costs.

Upward revision of war production schedules in precision manufacture was discussed by George W. Allison, assistant works manager, Mergenthaler Linotype Co., Brooklyn.

He described his company's production schedule which enables the shop to increase operating time approximately 30 per cent.

Mergenthaler was operating on a two-turn basis at the start of the war production expansion, 113 machine operating hours out of a possible 168. Due to the skill required and precision nature of the products, the usual three-shift eight-hour day was discarded as impractical; unless further complicated by a swing shift arrangement, it still meant a six-day work week.

### Machine Operation Up 92 Per Cent

Under the plan each employe works 11 hours for six consecutive days, then has two days off. On three machines as a unit, the three regular operators per shift, plus one additional operator per shift, operate the machines 22 hours each day, seven days a week. This gives a machine operation of 154 hours of a possible 168 hours, approximately 92 per cent maximum against 67½ per cent previously.

Saturdays and Sundays are considered the same as any work day in this plan; the sixth consecutive day is a time and one-half day, while the seventh is a double time day.

## Foundry Apprentice Contest Scheduled for April 28-30

The annual Apprentice Molding and Patternmaking competition sponsored by the American Foundrymen's Association will be continued in 1943. The group's apprentice training committee has announced a contest to be held in connection with its St. Louis convention, April 28, 29 and 30. Contest is open to all indentured apprentices in gray-iron, steel and nonferrous molding and patternmaking with cash prizes offered in each classification for entries submitted from local competitions.

Copies of regulations and blueprints are available at the offices of the AFA, 222 West Adams street, Chicago.

# Curtailment of Armament Schedules Attributed to "Fluidity of War"

RESPONSIBILITY for the cutting down or terminating of manufacture of certain types of war material, which curtailment has caused concern in many industrial areas, is placed upon the "fluidity of war", by Maj. Gen. Levin H. Campbell Jr., chief of ordnance, services of supply, War Department, Washington. "Warfare is not static and the Army's requirements are determined solely by combat situations once the enemy is engaged on a large scale," he declared.

General Campbell, one of the two principal speakers at the forty-ninth annual dinner meeting of the Illinois Manufacturers' Association in the Palmer House, Chicago, last Tuesday, discussed "Ordnance on World Battle Fronts". Joseph C. Grew, former ambassador to Japan, spoke on "Our War Efforts in Fighting Japan". More than 2000 guests, including distinguished Army officers and industrial leaders from the middlewestern and eastern states, attended the dinner. Military character of the event was in observance of the first anniversary of the Japanese attack on Pearl Harbor.

"Today the United States has the longest lines of communication in the history of warfare," said General Campbell. "No other nation could maintain them. By these extended lines of communication, each numbering thousands of miles, while our enemies' lines are numbered by hundreds of miles, the United States is nevertheless carrying the war to the enemy.

"Over these lines also are going vast quantities of war materiel for our allies Militarily, 'exterior lines' of communication are a tremendous disadvantage. However, the fact that our Navy and Air Forces are keeping these lines open also enables us to keep the enemy from the continental United States. And don't let anyone think for a moment Japan and Germany do not have plans for invading this country."

The general made it clear that "the American high command has determined production emphasis must be placed upon ships and aircraft. Certain other types of war materiel are being 'de-emphasized' simply because we have them in sufficient quantity at this time. It does not mean we aren't going to need more of the de-emphasized items. We may, or we may not. The 'fluidity of war' will determine that.

"A specific example of the fluidity of war with its resultant effect upon production is the anti-aircraft ammunition situation in the British Isles. There was a recent period of nearly 27 days wherein not a single antiaircraft gun was fired.

"In war, daily ammunition requirements are computed on a basis known as the unit of fire of each type of weapon. The unit of fire means that so many rounds of ammunition are supplied daily. The number of rounds in each unit of fire for each weapon is established by combat experience, past or present.

"Purpose of units of fire is two-fold. One is to provide an adequate quantity of all types for each weapon in the Army. The second is to determine the Army's overall ammunition program in all phases."

According to the general, "the unit of fire for the British anti-aircraft guns had to be high enough for each gun to do its share in repelling a blitz. When more than two weeks pass without a single gun being fired, it is obvious that an ample supply of reserve is on hand. The fluidity of war therefore results in de-emphasizing anti-aircraft ammunition."

Thus, in explaining the recent orders curtailing or cancelling manufacture of certain ordnance items, General Campbell said "It would be a mistake in any nation to carry on capacity production under similar circumstances. The material for anti-aircraft shell can be better employed on war items more urgently needed.

"Manufacturers are familiar with the 'fluidity of merchandise' in peacetime. They manufacture what the customers want to buy. If one item moves faster than another, because of consumption or purchase, that item is emphasized and

(*Please turn to Page* 106)

## MADE IN THE UNITED STATES; LAID IN GUADALCANAL

AMERICAN-BUILT steel mats are being laid on Guadalcanal to form airfields for the fighters and bombers of the United States Marines. The steel mats, perforated to permit native foliage to grow through the holes, are a development of the war. They may be laid quickly, repaired easily. U. S. Marine Corps photo

# Labor Priority Ratings Set Up; Iron, Steel Output at New Peak

*TORONTO, ONT.*

NEW labor priority ratings have been established in Canada for the more important industrial operations and officials are preparing ratings for other firms in intermediate classifications. After consultation with the Department of Labor, Department of Munitions and Supply and the Wartime Prices and Trades Board the ratings were prepared by the National Selective Service. Industry has been placed in four classifications, "A" for top priority; "B" for high priority; "C" for low priority and "D" for no priority.

The highest division includes firms on the essential list of the Department of Munitions and Supply and industries most essential to war work and civilian efficiency. The "B" list includes those important to war work or essential to civilian life and efficiency and the "C" list those important to civilian life and efficiency. The fourth classification includes those regarded as not essential.

The "A" rating covers those engaged in mining operations; war production, such as shipbuilding, aircraft, ordnance; iron and steel manufacture; ferroalloys; scrap collection; automotive transport; electrical, metalworking, machinery and aluminum production; metal smelting and refining.

"B" rating includes other nonferrous metals not in the first group; nonmetallic minerals; abrasives; building glass; electrical goods for civilian use. The "C" classification embraces newspaper printing and publishing; manufacture of clothing; household furniture and others.

### Pump Production Controlled

The nonessential trades include manufacture of lace, mats, rugs, artificial flowers, jewelry and many paper products.

To conserve critical materials in Canada and avoid importation from the United States of parts now difficult to obtain, the Department of Munitions and Supply has issued an order freezing types of circulating, condensing and vacuum pumps which maye be made in Canada and limiting types of control equipment which may be used to regulate these pumps. The order also prohibits manufacture of vertical types of these pumps and use of ball bearings in them, except by written permission. Another order prohibits manufacture of humidifiers for all industrial uses, except by permit. A third order prescribes types and sizes of surface heating coils.

Pig iron production in Canada during October reached the highest monthly record in the country's history with a total of 175,424 tons, while output of steel ingots and castings at 271,127 tons was only slightly below the record of 272,247 tons, made in May, 1942. New all-time highs were made in pig iron, steel and ferroalloys in the first ten months this year.

Comparisons in pig iron, steel and ferroalloy production are as follows:

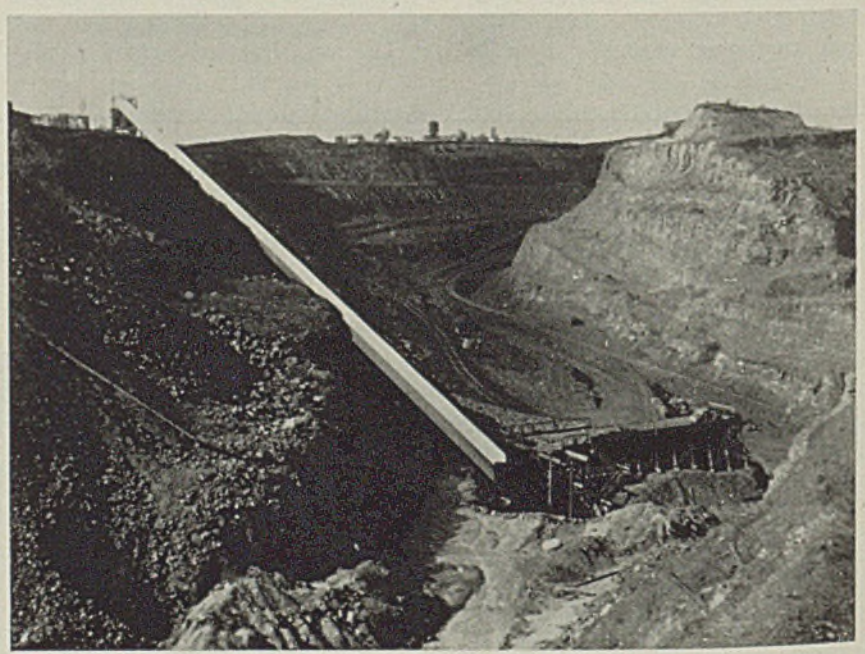
| | Steel ingots, castings | Pig iron | Ferro-alloys |
|---|---|---|---|
| Oct. 1942 | 271,127 | 175,424 | 18,266 |
| Sept. 1942 | 244,922 | 155,900 | 18,548 |
| Oct. 1941 | 249,595 | 153,568 | 18,826 |
| 10 Mos. 1942 | 2,579,715 | 1,640,075 | 177,336 |
| 10 Mos. 1941 | 2,208,535 | 1,212,088 | 174,105 |
| 10 Mos. 1940 | 1,847,293 | 1,057,702 | 118,004 |

C. G. Bateman, metals controller, has issued an order placing wrought copper and brass under direct allocation, consolidating previous directives. Sales of 300 pounds or more must have the controller's approval and sales under 300 pounds may be made without permit only if for a purpose necessary to war production, public health, communications, transportation or other essential use. More than 98 per cent of wrought brass or copper produced in Canada is being used in manufacture of war supplies, with less than 1 per cent for essential civilian uses.

A new board of directors has been appointed for Victory Aircraft Ltd., the government company recently formed to operate the Malton, Ont., aircraft plant formerly owned by National Steel Car Corp. Ltd. New officials are: President, J. P. Bickell, president of McIntyre Porcupine Mines Ltd. and director of International Nickel Co. of Canada Ltd.; directors, S. H. Logan, president of Canadian Bank of Commerce; Donald MacAskill, director of International Nickel Co. of Canada Ltd.; E. C. Fox, chairman, Canadian Cottons Ltd., and W. Kaspar Fraser, barrister, all of Toronto.

Gordon F. McDougall, general manager of Port Arthur Shipbuilding Co. Ltd., Port Arthur, stated that his company has received a contract from the Department of Munitions and Supply for construction of minesweepers representing expenditure of upwards of $5,000,000.

## STEEL-CARCASS BELT LIFTS ORE FROM OPEN PIT



IRON ORE travels up a 1100-foot slope, and is lifted a vertical distance of 240 feet from base of pit to loading tipple on the rim of an open pit mine, on this steel-carcass conveyor belt, developed by Goodyear Tire & Rubber Co. Reported by Goodyear to be "the first steel-carcass belt," it is in use by Oliver Iron Mining Co., U. S. Steel Corp. subsidiary, near Hibbing, Minn. Although no thicker than a conveyor belt with six plies of fabric, its wire-carcass strength is "actually the equivalent of 14 such plies"

# First Year of War Shows Marked Forward Strides

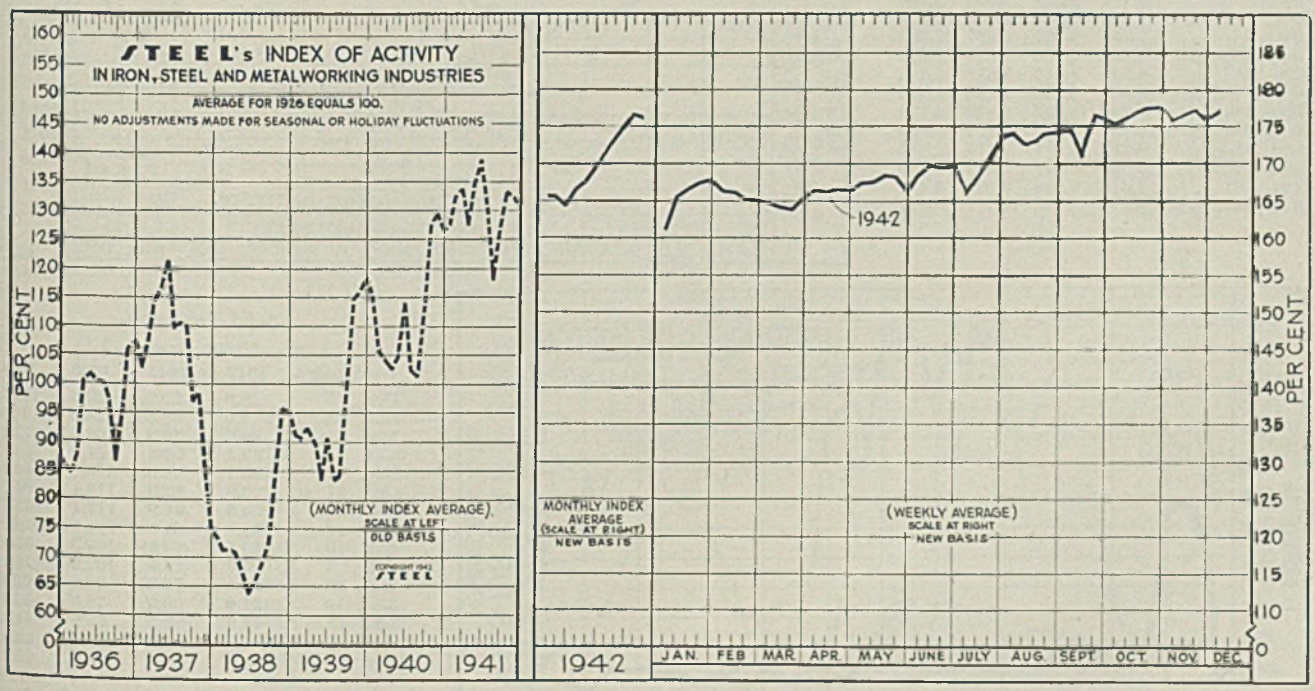
IN ONE year of war our potential productive capacity of military goods has been increased to the extent that it cannot be adequately serviced at present by either certain critical raw materials or by manpower.

Production of combat armaments is currently exceeding that of all the axis nations combined. WPB reports that naval ship construction in 1942 will be more than three times last year's total. Output of merchant ships will be five times greater than in 1941, while that of ordnance is six times the 1941 total. Production of planes is expected to be three and one-half times the previous year's showing.

During the week ended Dec. 5, STEEL's index of activity advanced to 177.1, reflecting upturn in steelmaking operations, freight carloadings and electric power consumption. The index currently is 3.1 points above the preceding week's figure, but is 0.7 point below the all-time peak recorded during the period ended Oct. 31 last.

The national steel rate rose one-half point during the week ended Dec. 5 to 99.5 per cent. This compares with 96.5 per cent in the corresponding week last year. Since the middle of October ingot production has fluctuated between the narrow limits of 99 and 99.5 per cent. The expected tapering off in collections of steel scrap has developed recently. However, mills are confident that sufficient material from usual sources will continue to be made available over the winter months to sustain practical capacity operations.

Electric power consumption climbed to a new all-time peak of 3,883,534,000 kilowatts during the week ended Dec. 5. This represents a gain of 13.7 per cent over the 3,414,844,000 kilowatts consumed in the comparable week last year. Early estimate of revenue freight carloadings for the latest period shows a slight gain to about 755,000 cars.



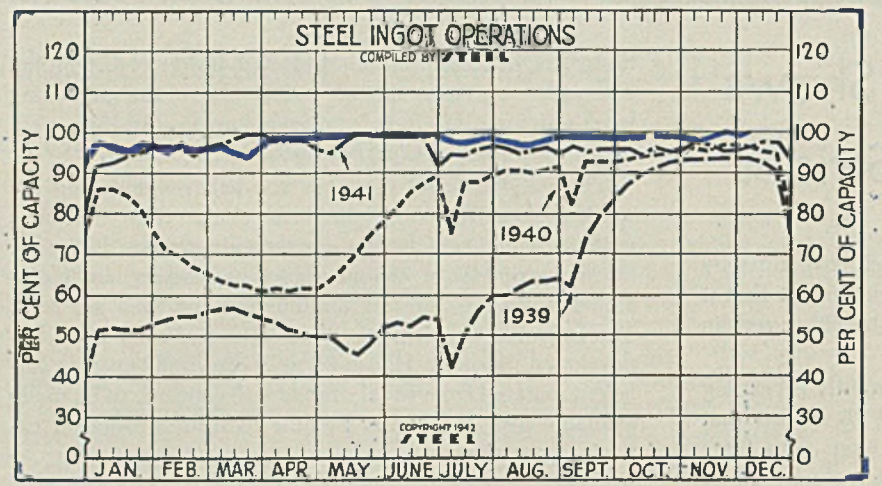

*STEEL's index of activity gained 3.1 points to 177.1 in the week ending Dec. 5:*

| Week Ended | 1942 | 1941 |
|---|---|---|
| Oct. 3 | 175.5 | 132.7 |
| Oct. 10 | 176.5 | 132.3 |
| Oct. 17 | 176.9 | 133.4 |
| Oct. 24 | 177.7 | 133.5 |
| Oct. 31 | 177.8 | 133.8 |
| Nov. 7 | 175.6 | 134.4 |
| Nov. 14 | 176.2 | 133.8 |
| Nov. 21 | 177.3 | 128.4 |
| Nov. 28 | 174.0 | 132.2 |
| Dec. 5 | 177.1† | 133.4 |

†Preliminary.

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

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

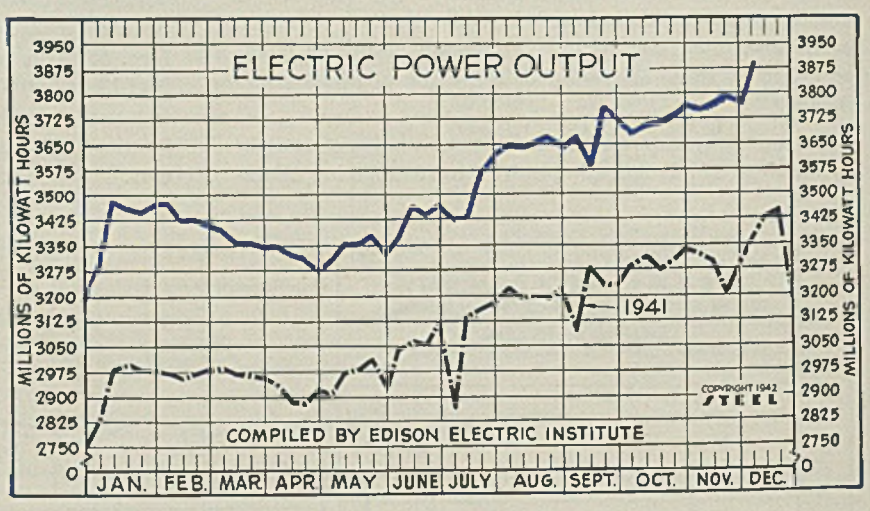


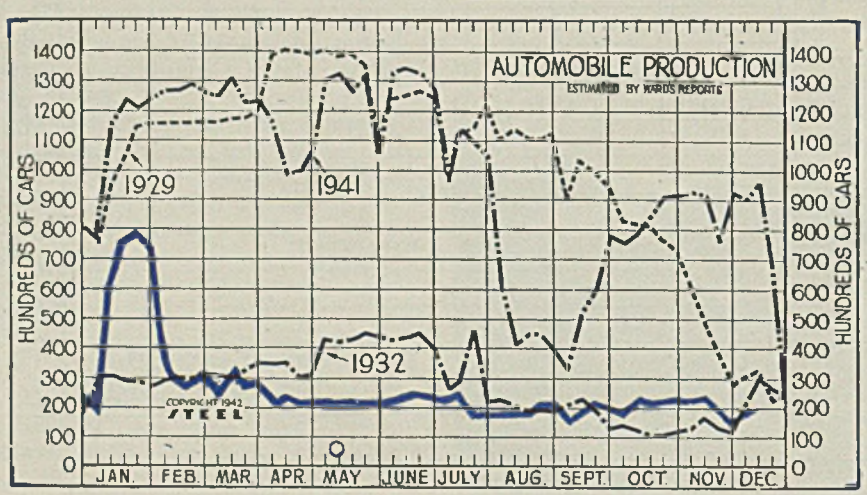

**Steel Ingot Operations**
(Per Cent)

| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Dec. 5 | 99.5 | 96.5 | 96.5 | 94.0 |
| Nov. 28 | 99.0 | 95.0 | 97.0 | 94.0 |
| Nov. 21 | 99.5 | 95.5 | 97.0 | 93.5 |
| Nov. 14 | 99.0 | 97.0 | 96.0 | 93.5 |
| Nov. 7 | 98.5 | 97.5 | 96.5 | 93.0 |
| Oct. 31 | 99.0 | 95.5 | 96.5 | 93.0 |
| Oct. 24 | 99.0 | 95.5 | 95.5 | 92.0 |
| Oct. 17 | 99.0 | 96.5 | 95.0 | 91.0 |
| Oct. 10 | 98.5 | 94.5 | 94.5 | 89.5 |
| Oct. 3 | 98.0 | 96.0 | 93.5 | 87.5 |
| Sept. 26 | 98.0 | 96.0 | 93.0 | 84.0 |
| Sept. 19 | 98.0 | 96.0 | 93.0 | 79.5 |
| Sept. 12 | 98.0 | 96.5 | 93.0 | 74.0 |
| Sept. 5 | 98.0 | 95.5 | 82.0 | 62.0 |
| Aug. 29 | 98.0 | 96.5 | 91.5 | 64.0 |
| Aug. 22 | 97.5 | 96.6 | 90.5 | 63.5 |
| Aug. 15 | 97.0 | 95.5 | 90.0 | 68.5 |

**Electric Power Output**
(Million KWH)

| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Dec. 5 | 3,884 | 3,368 | 2,976 | 2,654 |
| Nov. 28 | 3,766 | 3,295 | 2,932 | 2,605 |
| Nov. 21 | 3,795 | 3,205 | 2,839 | 2,561 |
| Nov. 14 | 3,776 | 3,305 | 2,890 | 2,587 |
| Nov. 7 | 3,762 | 3,326 | 2,858 | 2,589 |
| Oct. 31 | 3,775 | 3,339 | 2,882 | 2,609 |
| Oct. 24 | 3,753 | 3,299 | 2,867 | 2,622 |
| Oct. 17 | 3,717 | 3,273 | 2,838 | 2,576 |
| Oct. 10 | 3,702 | 3,315 | 2,817 | 2,583 |
| Oct. 3 | 3,683 | 3,290 | 2,792 | 2,554 |
| Sept. 26 | 3,720 | 3,233 | 2,816 | 2,559 |
| Sept. 19 | 3,757 | 3,232 | 2,769 | 2,538 |
| Sept. 12 | 3,571 | 3,281 | 2,773 | 2,532 |
| Sept. 5 | 3,673 | 3,096 | 2,592 | 2,376 |
| Aug. 29 | 3,640 | 3,224 | 2,736 | 2,442 |
| Aug. 22 | 3,674 | 3,193 | 2,714 | 2,434 |




**Auto Production**
(1000 Units)

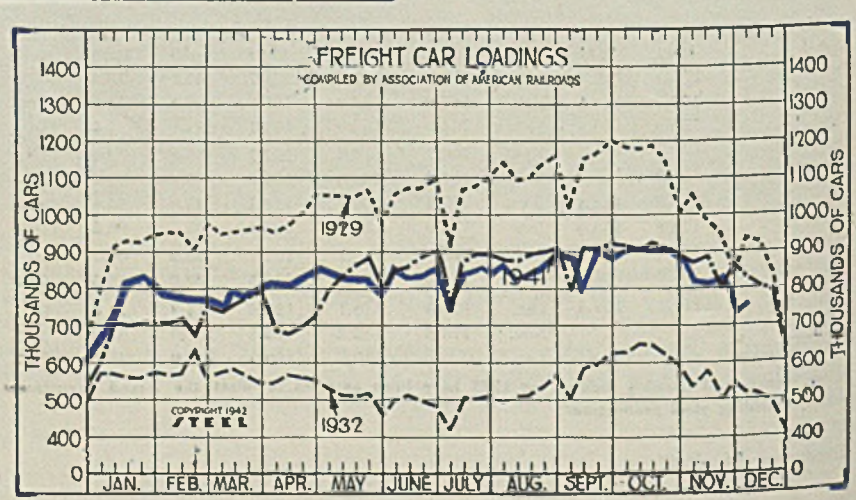
| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Dec. 5 | 19.9 | 90.2 | 124.8 | 115.5 |
| Nov. 28 | 14.6 | 93.5 | 128.8 | 93.6 |
| Nov. 21 | 18.3 | 76.8 | 102.3 | 72.5 |
| Nov. 14 | 20.2 | 93.0 | 121.9 | 86.7 |
| Nov. 7 | 20.2 | 93.6 | 120.9 | 86.2 |
| Oct. 31 | 20.9 | 92.9 | 118.1 | 82.7 |
| Oct. 24 | 20.8 | 91.9 | 117.1 | 78.2 |
| Oct. 17 | 20.2 | 85.6 | 114.7 | 70.1 |
| Oct. 10 | 20.3 | 79.1 | 108.0 | 75.9 |
| Oct. 3 | 19.9 | 76.8 | 105.2 | 76.1 |
| Sept. 26 | 20.9 | 78.5 | 96.0 | 62.8 |
| Sept. 19 | 21.0 | 60.6 | 78.8 | 54.0 |
| Sept. 12 | 19.6 | 53.2 | 66.6 | 41.2 |
| Sept. 5 | 16.9 | 32.9 | 39.7 | 26.9 |
| Aug. 29 | 21.1 | 40.0 | 27.6 | 25.2 |

Figures since Feb. 21 last include Canadian trucks and automobiles and United States trucks.

**Freight Car Loadings**
(1000 Cars)

| Week ended | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Dec. 5 | 755† | 833 | 739 | 687 |
| Nov. 28 | 844 | 866 | 729 | 689 |
| Nov. 21 | 836 | 799 | 733 | 677 |
| Nov. 14 | 827 | 884 | 745 | 771 |
| Nov. 7 | 829 | 874 | 778 | 786 |
| Oct. 31 | 891 | 895 | 795 | 806 |
| Oct. 24 | 903 | 914 | 838 | 834 |
| Oct. 17 | 901 | 923 | 814 | 861 |
| Oct. 10 | 910 | 904 | 812 | 845 |
| Oct. 3 | 908 | 918 | 806 | 835 |
| Sept. 26 | 898 | 920 | 822 | 835 |
| Sept. 19 | 903 | 908 | 813 | 815 |
| Sept. 12 | 815 | 914 | 804 | 806 |
| Sept. 5 | 888 | 798 | 695 | 667 |

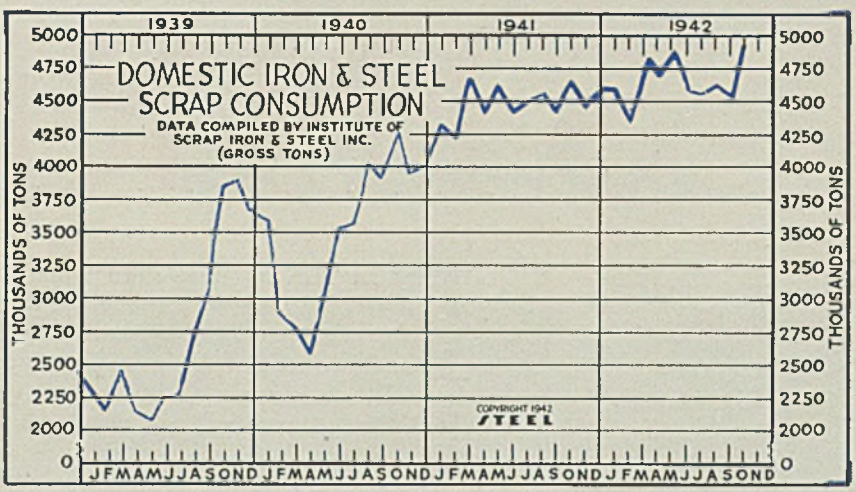
†Preliminary.

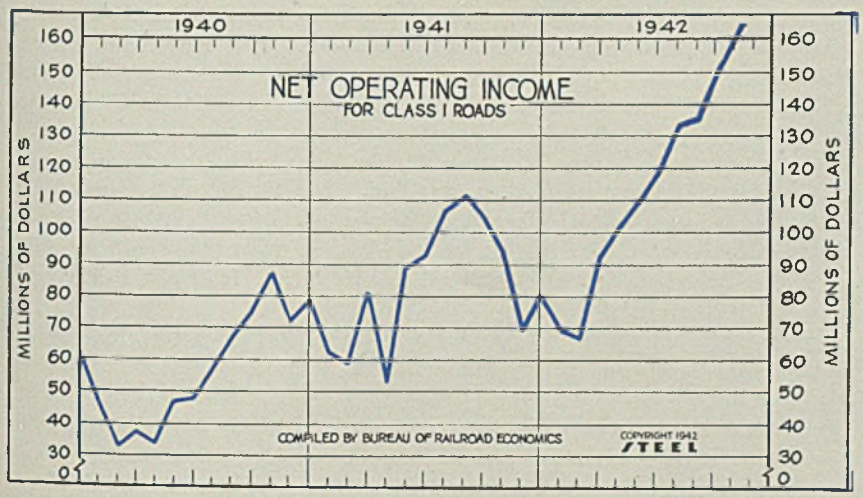


## Iron and Steel Scrap Consumption

(Gross Tons)

| | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| | (000 omitted) | | | |
| Jan. | 4,590 | 4,278 | 3,581 | 2,257 |
| Feb. | 4,276 | 4,172 | 2,812 | 2,124 |
| Mar. | 4,840 | 4,662 | 2,728 | 2,419 |
| Apr. | 4,672 | 4,406 | 2,548 | 2,114 |
| May | 4,857 | 4,609 | 3,061 | 2,079 |
| June | 4,608 | 4,406 | 3,482 | 2,221 |
| July | 4,600 | 4,415 | 3,526 | 2,247 |
| Aug. | 4,645 | 4,518 | 3,968 | 2,675 |
| Sept. | 4,883 | 4,392 | 3,876 | 3,018 |
| Oct. | .... | 4,649 | 4,233 | 3,809 |
| Nov. | .... | 4,482 | 3,922 | 3,858 |
| Dec. | .... | 4,634 | 3,950 | 3,613 |
| Total | .... | 53,623 | 41,687 | 32,434 |
| Mo. Av. | .... | .... | 3,474 | 2,703 |




## Class I Railroads
## Net Operating Income

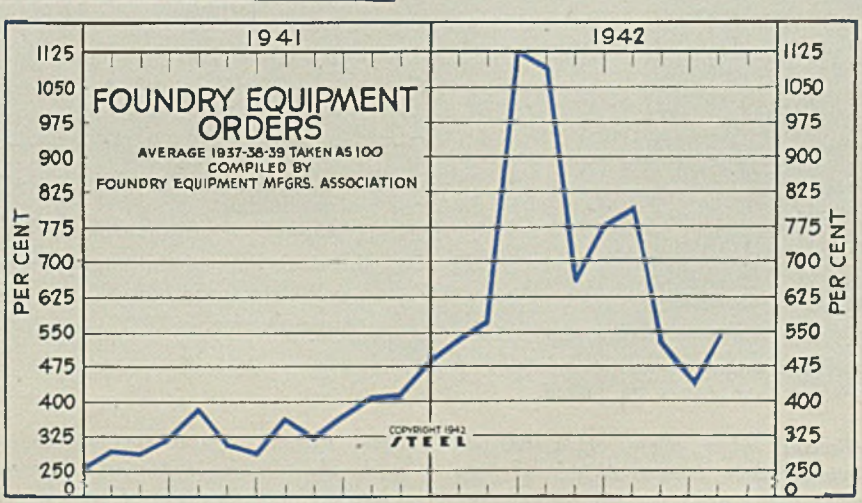
(Unit: $1,000,000)

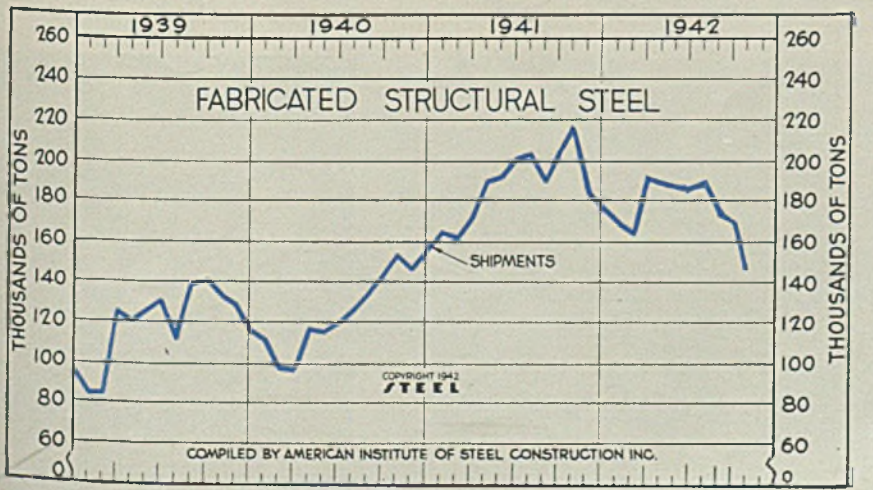
| | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Jan. | $68.97 | $62.02 | $46.01 | $32.95 |
| Feb. | 66.49 | 58.48 | 32.86 | 18.64 |
| Mar. | 92.39 | 80.63 | 37.03 | 34.38 |
| April | 102.03 | 52.57 | 34.12 | 15.32 |
| May | 109.63 | 88.63 | 47.41 | 25.17 |
| June | 118.73 | 93.26 | 48.09 | 39.17 |
| July | 133.00 | 106.31 | 57.73 | 49.00 |
| Aug. | 135.26 | 111.32 | 66.53 | 54.57 |
| Sept. | 154.63 | 104.07 | 74.72 | 86.53 |
| Oct. | 184.68 | 93.66 | 87.64 | 101.72 |
| Nov. | . | 68.76 | 72.00 | 70.41 |
| Dec. | . | 80.55 | 78.79 | 60.95 |
| Average | . | $83.29 | $56.84 | $49.02 |

## Foundry Equipment Orders

Monthly Average
(1937-38-39 equals 100)

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




## Fabricated Structural Steel

(1000 tons)

| | Shipments | | | Bookings | | |
|---|---|---|---|---|---|---|
| | 1942 | 1941 | 1940 | 1942 | 1941 | 1940 |
| Jan. | 167.8 | 164.6 | 110.9 | 183.4 | 281.2 | 81.7 |
| Feb. | 164.6 | 161.4 | 97.2 | 228.7 | 173.6 | 98.9 |
| Mar. | 191.3 | 170.2 | 95.9 | 248.3 | 206.1 | 128.3 |
| Apr. | 187.2 | 189.8 | 116.3 | 314.0 | 218.0 | 73.8 |
| May | 184.2 | 191.9 | 115.6 | 161.0 | 179.9 | 126.8 |
| June | 182.7 | 200.5 | 119.1 | 184.5 | 246.9 | 109.7 |
| July | 189.9 | 203.0 | 127.1 | 125.2 | 214.8 | 194.9 |
| Aug. | 173.9 | 189.3 | 134.9 | 80.6 | 158.7 | 122.5 |
| Sept. | 169.8 | 204.1 | 142.8 | 68.5 | 158.8 | 225.5 |
| Oct. | 146.6 | 217.7 | 153.2 | 46.8 | 128.7 | 233.1 |
| Nov. | .... | 182.6 | 147.0 | .... | 184.0 | 141.9 |
| Dec. | .... | 176.1 | 155.5 | .... | 146.4 | 203.1 |
| Tot. | .... | 2251.1 | 1515.5 | .... | 2297.0 | 1748.1 |

# SHIPBUIL

*Above, traveling gas-cutting machine automatically cuts off overhang on plates on fantail*

FOR THE first time since World War I days, Ashtabula, one of Ohio's ore and coal ports, is building ships again—the same kind of ships that built Ashtabula. Four big 621-foot Great Lakes bulk freighters, among the largest on the lakes, are being built at the Great Lakes Engineering Corp.'s shipyard on the Ashtabula river between the city of Ashtabula and Ashtabula Harbor. The United States Maritime Commission will sell or lease the vessels to lake fleet operators.

The four vessels will make an important addition to the Great Lakes cargo fleet, being exceeded in size by only the five vessels built for the Pittsburgh Steamship Co. and only two or three of the older vessels. The older vessels, just slightly larger, are the Bradley Line's CARL D. BRADLEY, previously rated the lakes' biggest ship; the Interlake Steamship Co.'s HARRY COULBY, and the Canada Steamship Lines' LEMOYNE, which once held some of the lakes' cargo-carrying records.

The new Ashtabula-built vessels will be 621 feet long with 60-foot beams, and will handle about 16,000 net tons of cargo per trip. The Pittsburgh Steamship Co. vessels are 67 feet in beam and 641 feet long, their size limiting them to only a few ports in the lakes.

However, the Ashtabula fleet is being built to operate into most of the lake ports so their size had to be restricted.

The vessels apparently will be popular with lake fleet operators for already many different lines have been bidding with the Maritime Commission for sale or lease of the vessels.

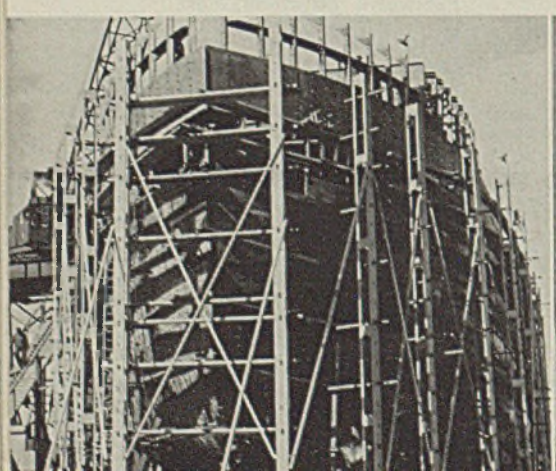
Construction of the vessels marks the re-entry of Ashtabula into the shipbuilding business after a lapse of about a quarter of a century. The yards built a number of lake freighters, many of them still in operation, prior to and during World War I. But after the war, the yard was used chiefly for outfitting the winter fleet, making repairs and drydocking damaged vessels or those in for inspections.

Much of the steel for the fleet is coming from Youngstown, Pittsburgh and Chicago steel mills, which the fleet, when completed, will serve.

Construction of the vessels is an interesting sight. Built on a long concrete pier supporting the keel, they are propped up on a forest of timbers, and are surrounded by a maze of scaffolding.

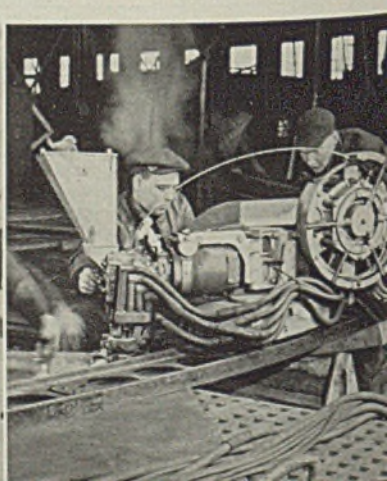
Squat, long and square-bottomed, the vessels are ugly in their scaffolding as they lack the sleek lines of the large salt-water vessels. But they are considered the world's most efficient cargo vessels, carrying more cargo at less cost than ocean-going ships of comparable size.





*Directly below, view of a 621-foot freighter being built at Ashtabula. Note giant derrick with big boom used to place sections in the structure*

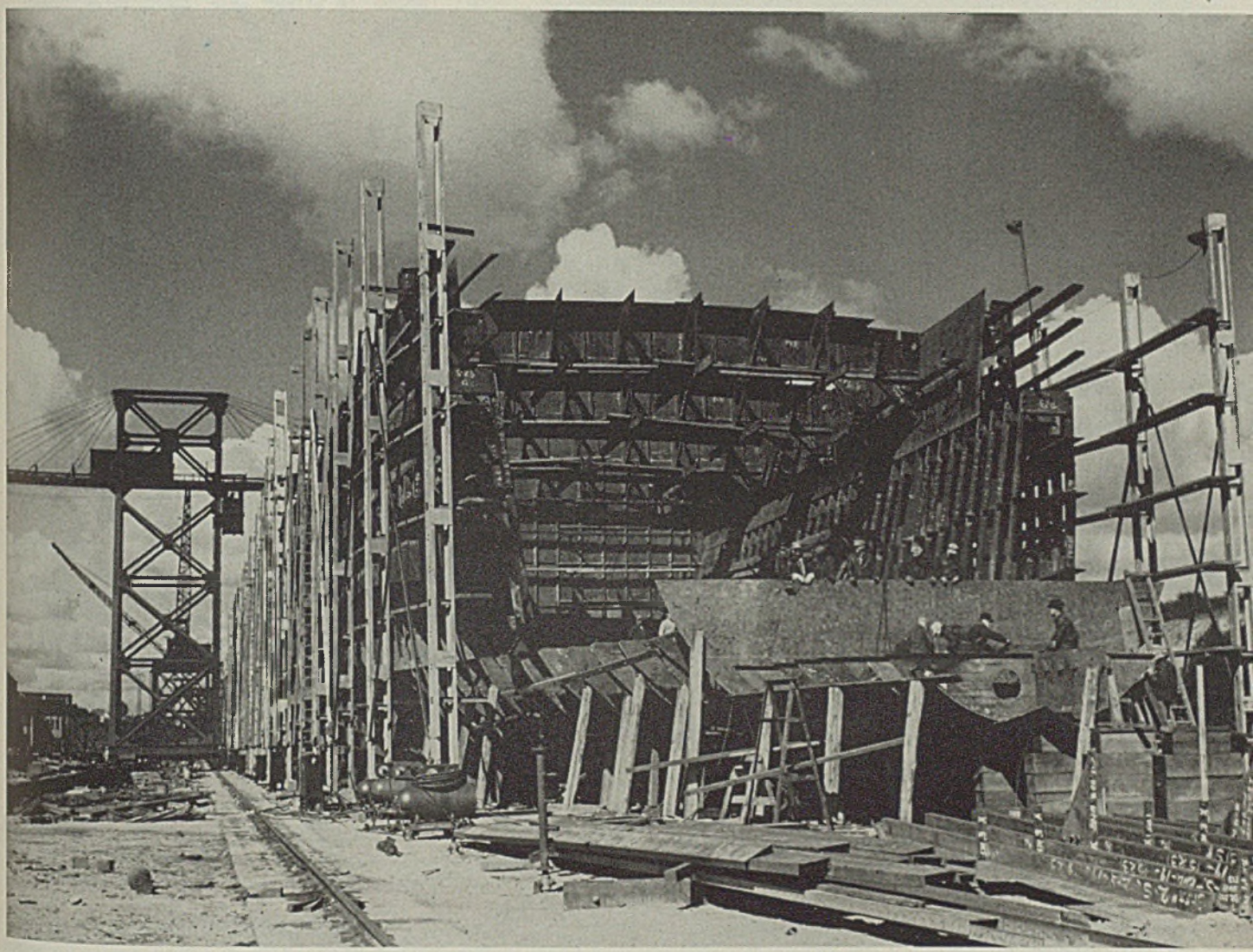
*Hand welding is employed for much work, also, Union Melt machine being limited to application of downhand welds*



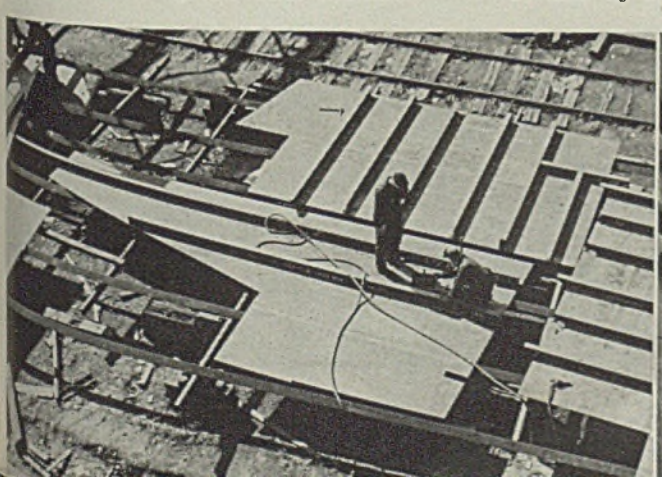
*Automatic Union Melt welding machine and runway on which it travels, joins bulkhead plates. Portable unit can be rigged up quickly where needed*

# DING at Ashtabula

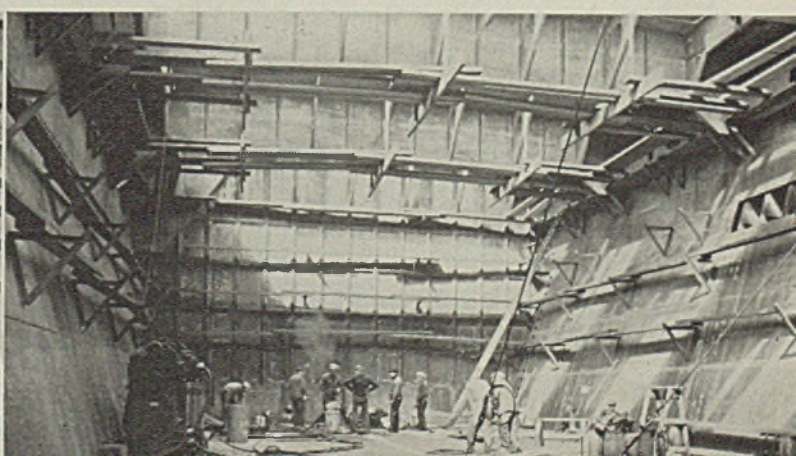
By GEORGE R. REISS



*Above, view of uncompleted stem of one of four 621-foot freighters. Special derrick at left works over two ways as can be seen by arms extending both ways*



*Subassemblies, below, are built up on these waist-high supports by cutting and welding, later positioned by cranes for welding into main structure*



*This view, below, taken in a cargo hold gives a rough idea of the immense size of these large ships that sail the lakes during the summer*

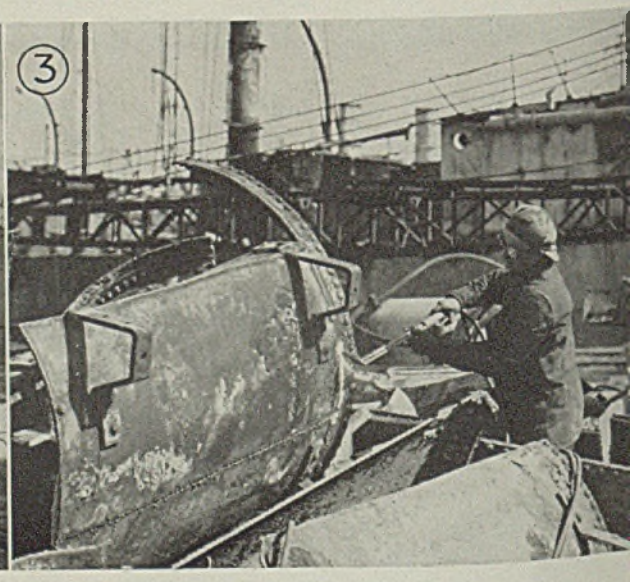
# WAR SPEEDS *Propane*

*Fig. 1—These parts scrapped from an old battleship no longer serviceable were long ago converted into steel for our armed forces*

*Fig. 2—An old battleship being scrapped. This view was taken long before Dec. 7, 1941*

*Fig. 3—Closeup of operator wielding a propane cutting torch in the process of scrapping an old battleship*

*Fig. 4—To facilitate the scrapping operations, whole sections are cut free and removed for further cutting away from the ship*



By GERALD E. STEDMAN

# Cutting Progress

IF HITLER knows of all the improvements being made in our productive abilities, it must make his rudder shudder. Much of this advancement has come, not from the origination of new processes and methods, but by refinement of the old. The more extensive industrial use of propane gas is a good example.

Results were far from satisfactory when propane was first employed as a cutting fuel. Original torch equipment was incorrectly designed so the resultant oxygen consumption was all out of proportion, and the use of oxypropane cutting just didn't make sense. That unfavorable impression became widespread although, back of it all, a few designers finally began to give oxypropane cutting the exclusive engineering attention it deserved and set about to develop original torch and tip designs that finally have eliminated its original disadvantages.

The comparatively low flame temperature of propane in oxygen of 5280 degrees Fahr. appears to be of material benefit in most types of cutting operations. Steel sections up to 34 inches in thickness have been cut successfully by oxypropane without the use of an oxygen lance.

Due to its excellent performance, industrial uses of propane have been gradually extended. For reasons that defy explanation, its popularity has seemed to center in the Pittsburgh steel district, where it has been so successfully and economically used that one equipment company alone is reported to have shipped 150,000 cutting torch tips into the area in 1937 for use with gases other than acetylene.

However, the war brought a great increase in the need for metal cutting in thicknesses not customarily experienced. The amount of metal cutting required in armor and ship plate has vaulted. This expansion has meant the search for better methods, quicker production, greater economy, fewer man-hours, elimination of handling difficulties. Oxypropane cutting appears to possess these advantages.

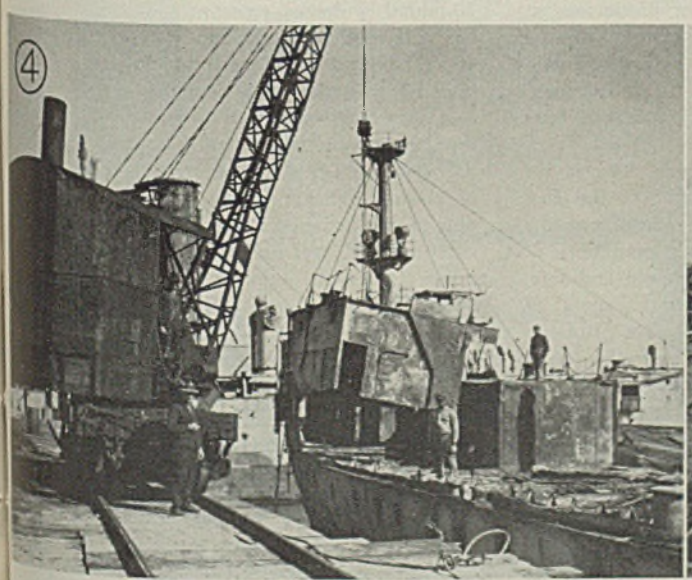
It is impossible because of censorship to report specifically on many important oxypropane operations or to provide data indicating its effectiveness and economy. Among locations where interesting use of the technique exists are: Newport News Shipbuilding & Drydock Co., Philadelphia Navy Yard, Brooklyn Navy Yard, Robins Dry Dock & Repair Co., Watertown arsenal, Norfolk Navy Yard, Portsmouth Navy Yard, Dodge Steel Co., General Steel Castings Corp., Harrisburg Steel Corp.

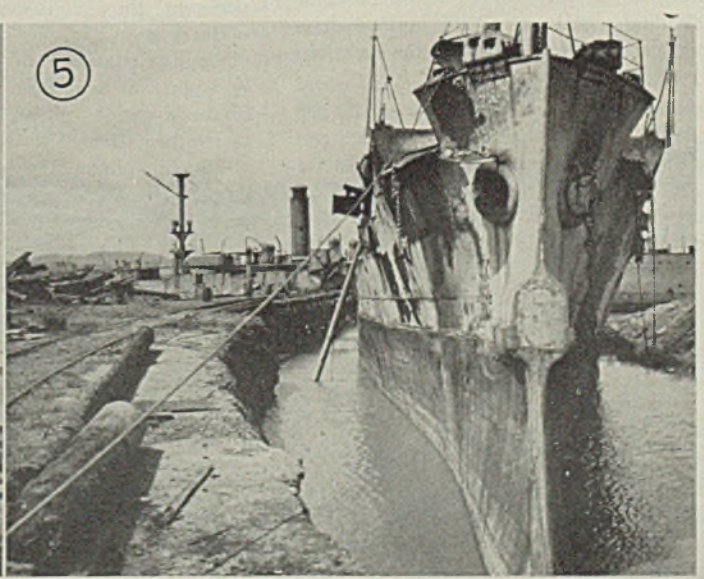
Any properly accredited firm probably can obtain details on performance data at these plants, once the decision has been made to investigate.

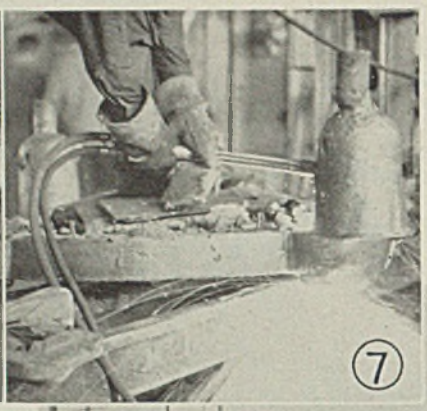
Propane is one of the paraffin series of lighter hydrocarbons recovered from natural gas in winning natural gasoline or from oil refinery gases by special fractionation equipment. Its potential supply is extremely large. Constancy of composition, flexible use and advantageous physical characteristics make it desirable for general processing work. It is particularly flexible for general foundry use. Its high heat content of 91,800 B.t.u. per gallon and a range of available pressures without booster requirements permit its effective transportation through pipe lines of small diameter yet in sufficient volume for any plant utilization. Specific gravity is constant. Balanced pressures are easily maintained.

Recent observations among a number of foundries have indicated that the use of industrial propane is increasing in marked manner, not alone for flame cut-

*Fig. 5—End view of old battleship in process of being cut up for scrap. Note railroad running alongside for fast transportation of scrap by means of locomotive cranes and cars. Figs. 1, 3, 4 and 5 furnished by Standard Oil Co. of California*





*Figs. 6 and 7—Burning risers off of cast steel parts at the Dodge foundry. Figs. 6, 7 and 8 furnished by Dodge Steel Co.*

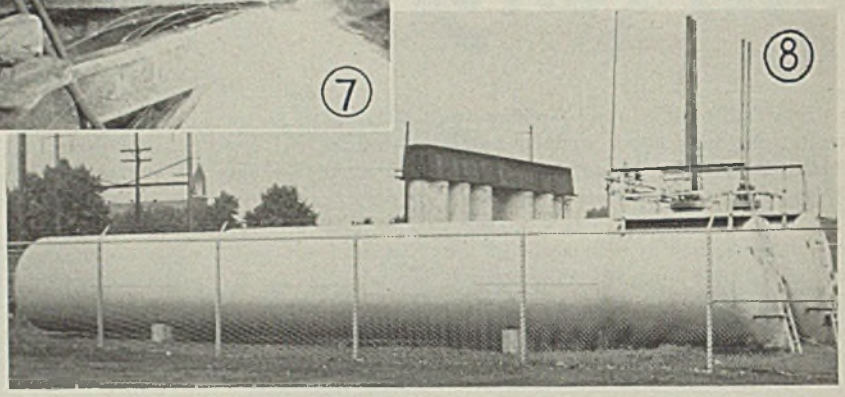


*Fig. 8—These two tanks store 30,000 gallons of propane at Dodge Steel Co., Tacony, near Philadelphia*

ting but also for such work as annealing castings, baking cores, melting nonferrous metals, preheating electric furnaces, drying molds, heating ladles, as well as for miscellaneous laboratory and heating uses.

The equipment required for a plant installation is relatively simple. A storage tank of sufficient capacity to receive tank car loads is installed, usually above ground and connected to a plant piping system. See the typical installation in Fig. 8. Since propane exerts a vapor pressure of approximately 120 pounds per square inch at 70 degrees Fahr., this pressure can be reduced to that desired for burner operation by conventional gas regulators. Where the rate of use is high, vaporization is accomplished by means of a heat exchanger. One of the best tanks is 57 feet 4 inches long with a 15,000-gallon capacity and an 87-inch inside diameter. It is constructed in accordance with the ASME unfired pressure vessel code for working pressures of 200 pounds per square inch.

In the majority of installations, propane vaporizes within the tank, passes out through proper pressure regulators into the service piping to the various gas burning stations. It is piped around the plant at 30 pounds pressure, and individual regulators at each outlet reduce the pressure to that desired for each job.

One of the most efficient industrial propane installations can be found at the plant of Dodge Steel Co., manufacturers of electric steel castings, whose works are at Tacony, Pa., near Philadelphia. This company produces carbon and alloy steel castings varying in weight from ½ to 2000 pounds. It ships more than 50,000 castings per month. Tank car shipments of approximately 9600 gallons or close to 880,000,000 B.t.u.'s are stored in two 15,000-gallon tanks, Fig. 8, for the use of industrial propane by this concern is unusually extensive.

"Our plant originally installed equipment for the use of propane," Mr. C. S. Roberts, Dodge vice president in charge of operations, told me, "for heating purposes in June, 1936. We were then gas cutting gates and risers from small and medium-weight carbon-steel castings. After some tests and procurement of proper tips and torches, it was decided that the use of propane had some advantages both in cost and operation. Since this original installation, all cutting has been with propane. In this 6-year period, uses of propane in this plant have been unusually extensive.

### Propane Safe to Handle

"While it is difficult to obtain accurate comparative costs due to the large number of variables in the size, shape, location and cleanliness of gates and risers on steel castings, we are convinced that there has been no over-all increase in oxygen consumption," Mr. Roberts says. A reduction of cuts on the sprue cutter, increasing the area of gates and risers formerly cut on the sprue cutter by 15 per cent, thus increasing production at no increase in cost, has shown a decrease of oxygen consumption of approximately 8 per cent in relation to the unit area of metal cut in other comparative tests of long duration.

"Buying propane in bulk, its cost for cutting is lower than that of the fuel previously used. The piping of propane to the location of cutting operations at any desired pressure is simple and safe. The handling of bottles and disposal of sludge are eliminated," Mr. Roberts states. Of course Dodge operations have been tremendously expanded, and the economy of just the matter of eliminating the handling of bottles is huge. There is data to prove that the amount of propane for cutting a cross sectional area of 76,000 square inches is only 850 cubic feet.

Mr. Roberts states that on both large and small work his organization is well satisfied with the type of cut as well as the speed, control and economy obtained.

In discussing the matter with E. C. Troy, Dodge Steel Co.'s chief metallurgist, Mr. Troy said, "Let me add that propane has proved extremely easy to handle. There is little possibility of its exploding. Because of its low burning temperature, it is not likely to fuse to adhering sand or slag at the surface to be burned. This allows great latitude in the cleanliness of the casting that can be cut—an important consideration. Operators say they would rather burn with propane because it is easier to handle when sand, scale, or other inert materials are encountered."

According to Mr. Troy, a No. 5 tip is used to burn sections up to 16 inches in diameter, using 65-pound oxygen and 20-pound propane pressure. Tip size No. 4 is used with 45 pounds of oxygen and 20 pounds of propane to burn sections up to 6 inches in diameter.

A very narrow kerf is obtained with the oxypropane flame, and slag adherence is practically nil. A small kerf is, of course, indication that a small volume of steel is being burned away. Every cubic inch of steel removed naturally requires a definite amount of oxygen to effect such oxidation. Thus, a clean, narrow kerf is proof of oxygen economy.

The Dodge experience in cutting risers is that successful results are obtained without resorting to the use of an oxygen lance. This is unusual in that some of the castings produced have risers up to 21 inches in diameter. The oxypropane cutting torch does not tend to carburize or case-harden the edges of

(*Please turn to Page* 118)

# How Tool Shapes can cause hardening hazards

*When a tool breaks* hours of skilled tool making time are wasted. Whether it is a tool that cracked in the quenching tank, or a die that let go on the press, valuable *production* time is lost. Premature tool failure can often be traced to some oversight in the relation of tool design to heat treatment. We are passing along the following suggestions to help you avoid tool shapes that cause hardening hazards and premature tool failure. They may be of help to the men in your tool room.

Heat treated steel has a certain strength depending upon the analysis of the steel, the quality of the metal, and its heat treatment. Sometimes just the internal strains set up in heat treating exceed the strength of the metal, and the tool cracks before it sees service. Or, if you get it through hardening safely, it may be so weakened that it fails under relatively light loads.

Internal strains arise from many causes, but the most serious are those developed during quenching, by reason of differential cooling of sections of the tool that are of markedly different size or mass. Thus, the differential cooling is largely controlled by the size and shape of the tool being quenched. It is wise to plan tool shapes so that the entire tool may be heated and cooled at approximately the same rate.

The angled shape here suggests a condition to avoid. It is impossible to get uniform cooling at such sharp re-entrant angles as "A" and internal strains are set up right where service stresses concentrate.

This shape illustrates a light section adjoining a very heavy section. It would be practically impossible to harden such a shape in water without cracking at the sharp corner. Even in oil, it would be difficult.

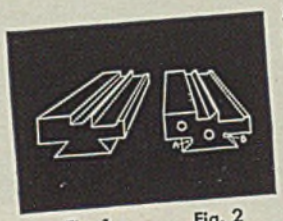


Fig. 1 Fig. 2

*Figure 1 shows an undercutting form-tool that would be hazardous to harden because of the heavy and light sections joined by sharp angles. In figure 2 holes have been drilled to balance these heavy sections and "A" and "B" suggest two ways to avoid the sharp angles.*

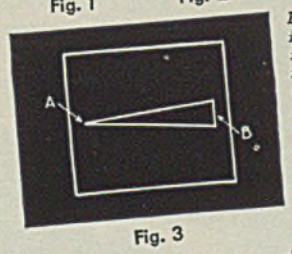



Fig. 3

*Figure 3 is an oil-hardening blanking die that failed in service. It was made from a section approximately 3" x 2¾" x ½". Heat treatment and service stresses concentrated at points "A" and "B". A larger section, 3½" x 2¾" x ¾" could have eliminated failure.*

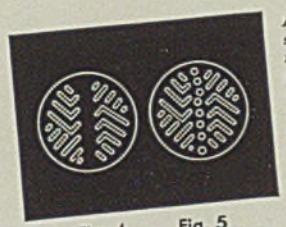


Fig. 4 Fig. 5

*Another cause of warping is shown in Figure 4. The heavy rib through the center tends to prevent shrinkage and would cause the die to become oval in quenching. Drilling holes, as in Figure 5, helps overcome the difficulty.*

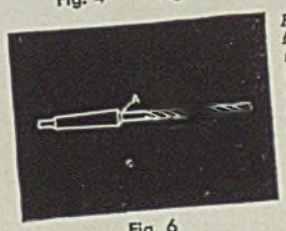



Fig. 6

*Figure 6 illustrates a design for twist drills that gave trouble by breaking at "A". When a more generous fillet was allowed at this point, the trouble was eliminated and satisfactory results were obtained.*

These tips on the relation of tool design to heat treatment were extracted from "Tool Steel Simplified". They represent only *a part* of the useful information in one chapter of the book. Other chapters provide helpful facts on tool making, heat treating, furnace atmospheres, quenching and many other subjects, including "trouble shooting". Get the benefit of *all* this practical information. Make copies of "Tool Steel Simplified" available to the tool-room men you want to train. Order as many as you need today.

**The Carpenter Steel Company, 139 Bern St., Reading, Pa.**


**315 pages—205 illustrations**

**Available at cost in the U. S. A. —$1.00 a copy. ($3.50 elsewhere)**

*More than 32,200 copies of "Tool Steel Simplified" are now in use in several thousand plants like yours to "upgrade" men — save time — "trouble shoot" — get better results.*

Carpenter MATCHED TOOL STEELS

# Industrial "TAXI" Service

By GEORGE E. STRINGFELLOW
Division Manager
Storage Battery Division
Thomas A. Edison Inc.
Orange, N. J.

*. . . . is one portion of complicated materials handling system that includes a narrow-gage yard and intraplant railroad, 11 highway trucks, two tractor-trailer units with ten 4-wheel trailers, and a complete lift-truck-skid system*

*Fig. 1—Small castings are brought from the shakeout operation on the conveyor shown in the background here. Castings next are sorted directly into skid boxes which then are taken by lift truck to processing lines. All photos from Storage Battery Division, Thomas A. Edison Inc., Orange, N. J.*

NORMALLY an almost incredible variety of industrial machinery and equipment is produced in the huge Allis-Chalmers plant, but today this variety is more amazing than ever for this company is not only turning out machines for wartime industry at an accelerated pace but also a variety of heavy armament and ordnance work for the Army and Navy. Methods of materials handling are correspondingly varied and are highly developed.

A yard railroad runs between and through the various buildings of the plant. It serves for large quantities of materials going to one destination as well as for single loads too heavy for any available means of transportation—as, for example, a casting for mine-hoist sheave or a hydraulic-turbine housing. Also connecting the various buildings is a network of paved roads on which a fleet of eleven highway trucks, two industrial-type tractors and ten 4-wheel trailers is kept busy transporting smaller lots of materials through the yards.

Within the foundries and shops, the lift-truck-skid system is the most common method of handling materials. Skid containers, designed in almost limitless variety to unitize many different kinds of materials into loads of approximately 2 tons, are the principal handling and storage units through process, through the yard transportation system, and to the point of use at assembly or erection.

In the foundries, the batches are made up in buckets hauled by electric trolley cars underneath storage bins, where the batch ingredients are dumped in, and from there to a hoist, which raises them to the tops of the cupolas. On the casting floor, sand for small, repetitive molding is fed through chutes from overhead, and the molds are carried by conveyors past the pouring operation to the shake-out. Sand for larger molds, made up in smaller lots, is supplied by industrial trucks in dump hoppers.

The molten metal is poured into ladles mounted on skid platforms which are picked up at the cupolas by lift trucks and taken to the pouring lines. Because more than one pouring line is supplied from one cupola, the lift truck has proved to be the simplest, most practical means of doing the work.

From the shake-out operation, small castings are sorted directly into waiting skid boxes, thus keeping the handling motions at an irreducible minimum. These boxes are replaced with empties as they are filled and the loaded boxes delivered by lift trucks to the cleaning operation and then to waiting flat cars, trucks or trailers for delivery to the various machine shops; at destination the skid boxes are unloaded by other lift trucks. Large heavy castings are handled by overhead cranes and rail cars.

In the machine shops, the general methods of handling materials are, to a considerable degree, influenced by the extent to which the operations are repetitive and continuous, or comprise a variety of different kinds of work in the course of a year.

Production of tractors is a good example of the former. Manufacture of tur-

# *Speed Up* GUN BARREL INSPECTION

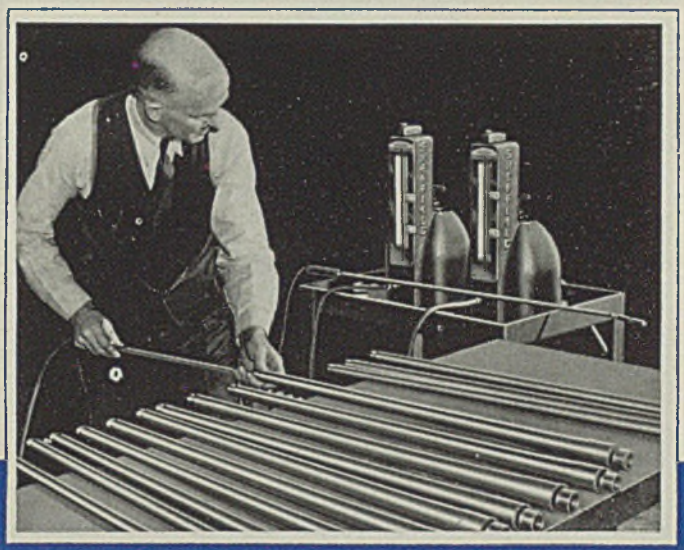
In just one pass through a gun barrel the Sheffield Precisionaire tells the inspector whether or not the bore is within prescribed tolerance or, if not, whether it is oversize, undersize, out-of-round, or bell mouth —also exactly at what point any dimensional discrepancy occurs.

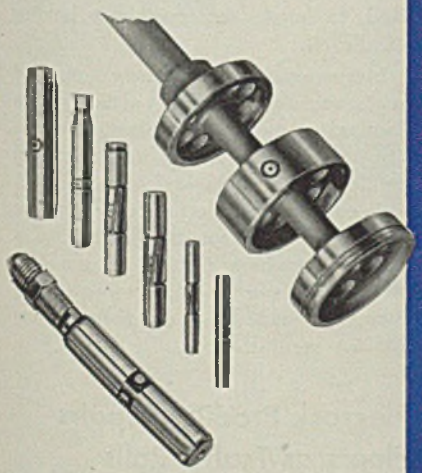
It takes no longer to inspect a gun barrel than it does to push a cleaning rod through it and no more skill, in spite of the fact that the Precisionaire is accurate to .0001". Any new operator having no previous experience can be taught to handle this gage in less than fifteen minutes.

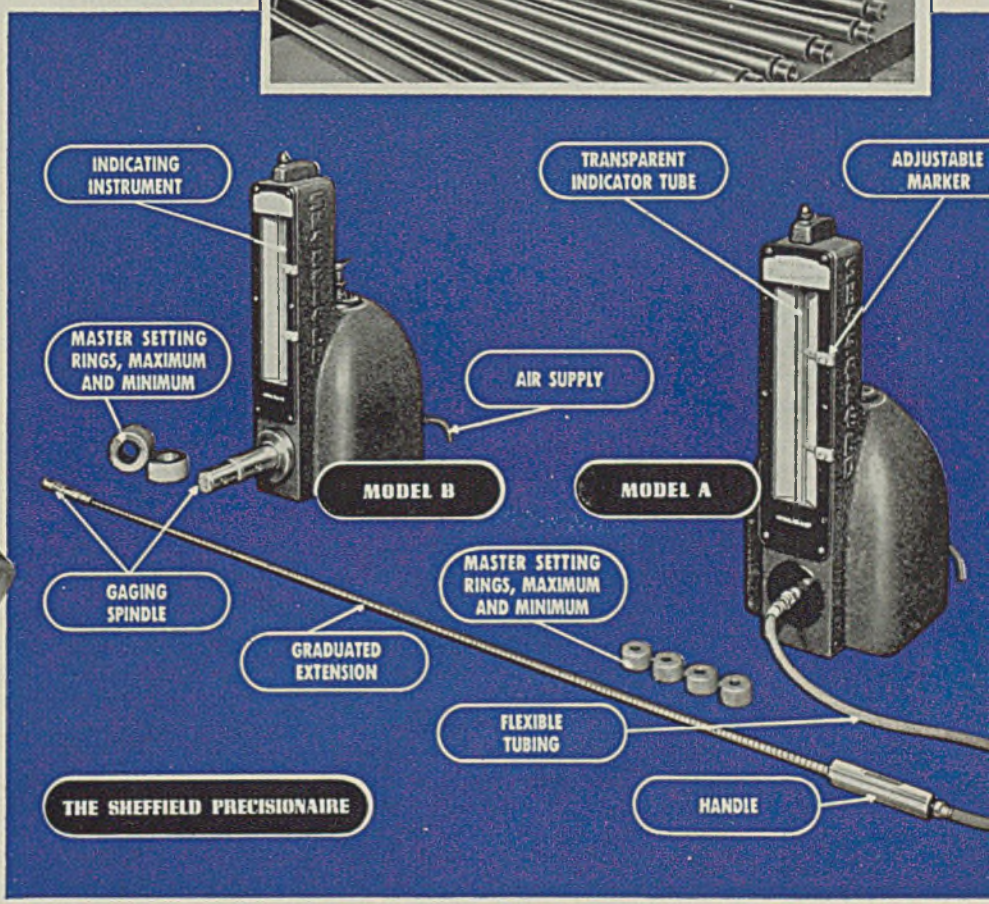
Contrast this speed and this accuracy with inspection by previous methods which were not only slow but which required the highest order of gaging skill in order to maintain accuracy.

The same instrument provided with two slightly different gaging spindles is used to check the bore before rifling and then, by changing the spindle, give it a final inspection after it is rifled.

The Precisionaire, while it is being used extensively for gun barrel inspection, has a number of other very important uses all described in bulletin 42-23. Write for your copy now.








THE *SHEFFIELD*
CORPORATION
DAYTON, OHIO, U. S. A.

SHEFFIELD GAGES
MASTER GAGEMAKERS

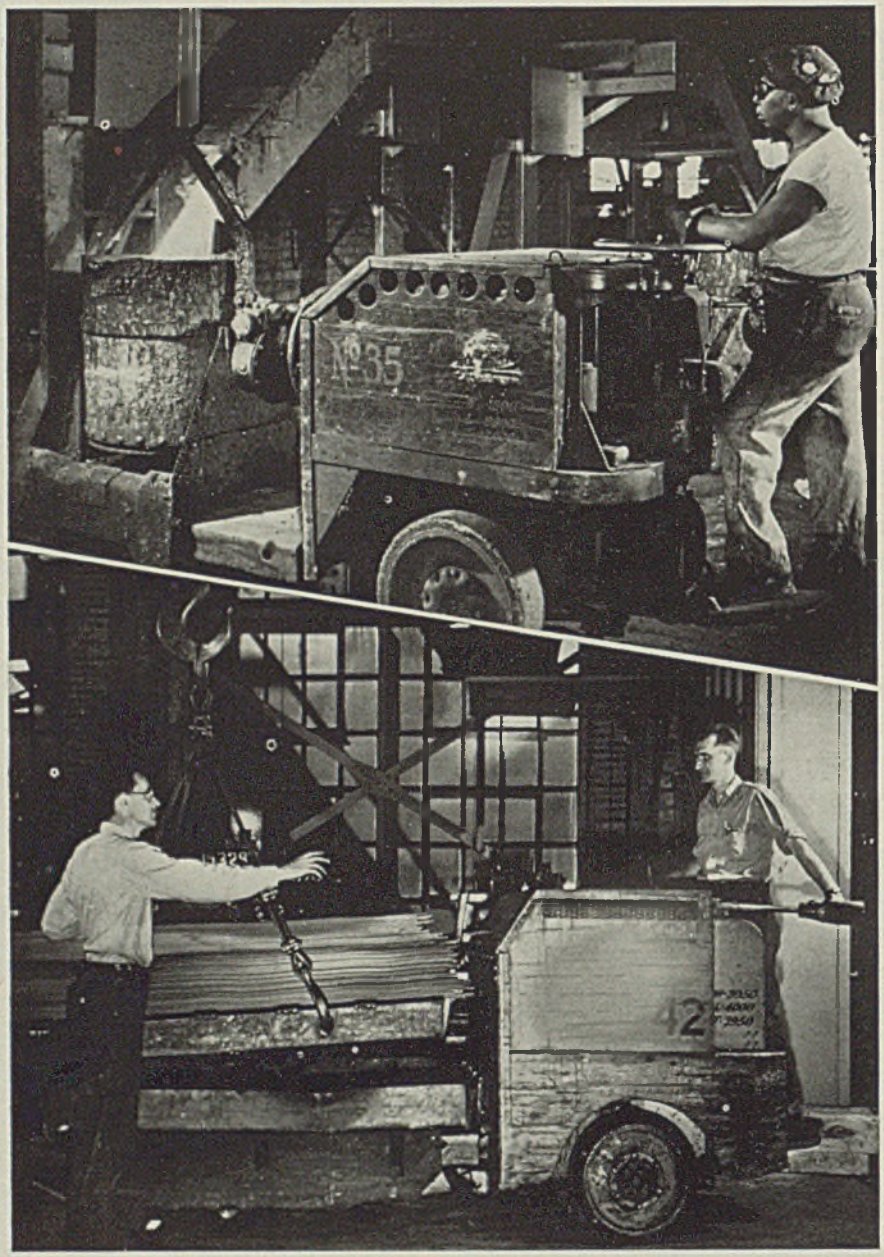


*Fig. 2. (Upper view)—In the foundry, battery-powered lift trucks carry skid-mounted ladles of molten metal from the cupolas to the pouring lines*

*Fig. 3. (Lower view)—Lift truck moves stock such as these heavy strips from the annealing furnaces to the sheet metal department in just 5 minutes. The same handling operation formerly required 2 hours when done on the yard railroad*

bines, generators, transformers, compressors, crushers and other heavy machinery is a good example of the latter. In the one case, the movement of work follows a routine, and in the other case continuous scheduling and supervision are required.

In the tractor shop, materials are received in skid containers from foundry, forge shop and sheet-metal shop, via the yard transportation system and are unloaded from car, truck or trailer by lift truck and taken to the point of use or tiered nearby. As customary in the automobile industry, there is no store room.

Throughout the production lines, materials are taken directly from the skid containers at the various machines and deposited in others. Lift trucks, their operators familiar with the sequence of operations, keep the skid containers progressing between process and spot empties in position at the same time.

Finished parts, like the incoming materials, are not taken to any central store room but as close as possible to the point on the assembly line where they are to be absorbed. There they are, if necessary, tiered for floor-space economy, with the single exception of the skid containers used for some of the sheet-metal parts. These are skid boxes 5 feet high, designed to provide unit loads of these bulkier items having approximately the same weight—2 tons—as the skid units in which other parts are handled.

Assembly of the tractors starts with torque tubes instead of frames but, with this exception, the operation is substantially the same as that of an automobile assembly line. Lift trucks maintain a constant supply of parts in skid containers beside the line.

A portion of the engine production is diverted for use in the manufacture of power units in another building. For this purpose, skid racks are provided which permit the handling of one or more engines, depending upon size, by lift truck, for loading on one of the yard carriers.

*(Concluded Next Week)*

## ASA Requested To Work on Color Code for Greases

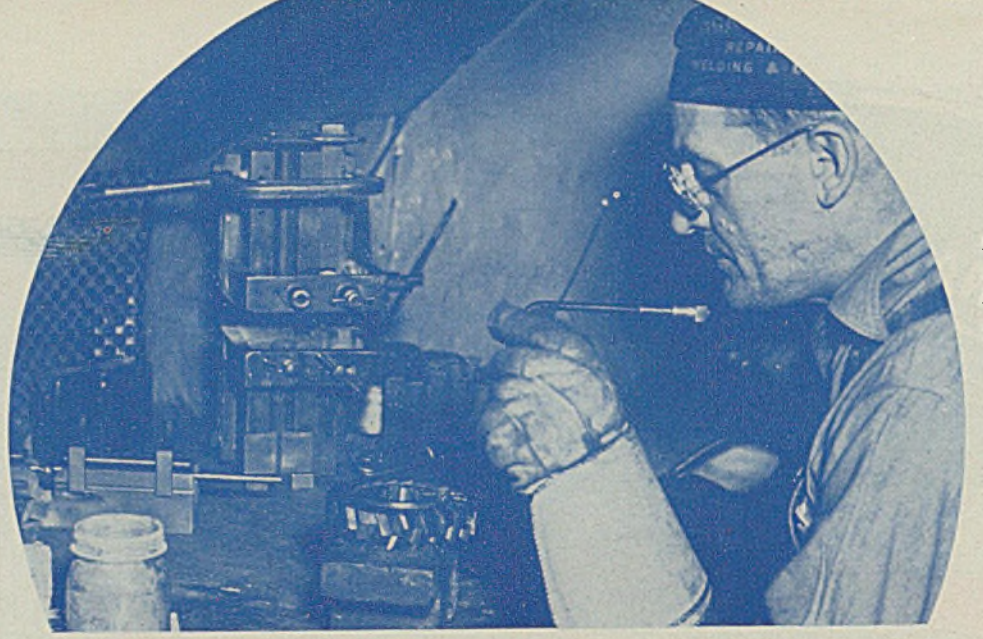
Both the War Production Board and the National Machine Tool Builders Association requested recently work be started at once on a standard color code for lubricants, as a war emergency project, according to the American Standards Association, New York. Purpose of this standard will be to indicate by color the grade of grease or oil to be used in a given part of a machine, thereby preventing costly mistakes on the part of the operator.

Standard color markings, it is reported, will be applied to the machine part to be lubricated and to the container carrying the lubricant required for that part. For example, the oil cap on the spindle bearing of a grinding machine might be painted red and the same color used to mark the container holding spindle oil.

Inexperienced workers now employed in manufacturing plants, make such a standard as the above a practical necessity, according to the machine tool builders who requested the job. A maintenance man erroneously putting grease into the spindle bearing of a grinding machine instead of the fine oil needed, can in a few minutes do enough damage to keep the machine idle for months.

## Flexrock Product Repairs Floors as Traffic Rolls

Instant-Use, a ready-mixed floor patch that enables quick repairs to be made to ruts and holes, allowing the floor to be used immediately is reported by Flexrock Co., Philadelphia. Its application requires only five simple steps—sweeping out of hole, priming, application of repair product and repriming edges for sealing.



By HERBERT E. FLEMING

*Fig. 6—Broken out section of an interlocking side-milling cutter is being brazed back into place. Note ventilator intake at rear of booth*

# RECLAIMING TOOLS


*. . . . by low-temperature brazing enables plant to handle tool breakages and tool shortages, assuring uninterrupted war production; low costs*

*(Concluded from Last Week)*

THERE ARE variations in the use of brazing materials and in the application of heat. One of the low-temperature brazing alloys used at Tractor Works is Handy & Harmon's Easy-Flo, an alloy which, as its literature states, has a silver content of 50 per cent, and which flows at 1175 degrees Fahr. This is used with Handy flux.

Another low-temperature brazing alloy used is Eutectic Alloys Inc.'s Castolin, and particularly a rod which it recommends for high-tensile, high-speed steels. The content of this brazing alloy is not published, but it is stated that the "binding temperature" of the material in this rod is approximately 1300 degrees Fahr. This, like each of the Castolin eutectic rods, is used with a corresponding Autochemic flux.

Since ordinary high-temperature brazing with copper alloys requires a temperature of 1600 degrees Fahr. or higher and since most high-speed steels lose their hardness at 1075 degrees, broken and worn cutting tools had to be scrapped in the days before the advent of low-temperature brazing. Thus when brazing at temperatures around 1175 degrees Fahr., heat is applied at 100 or more degrees beyond the ideal and there's where expert handling is required.

On such handling, it is important to have complete penetration by the brazing material of the surfaces to be joined and at the same time the thinnest effective joint to attain necessary tensile strength. For example in butt joints of stainless steel to stainless steel, it has been found that a joint 0.006-inch thick will have a tensile strength of only 90,000 pounds to the square inch, whereas a joint with a clearance of but 0.0015-inch will have the maximum attainable, 134,000 pounds to the square inch.

In view of such requirement, experience has shown that variations in methods of applying heat are necessary. In the case of broken broaches, the pieces with ends to be joined are placed in a vertical position in an alignment fixture. The lower piece is clamped solidly in position. Spring plungers hold the upper piece in place. The torch is applied along the lines of the prospective joint just long enough to cause the brazing material to run. Pressure is exerted by the weight of the upper piece.

The same practice is followed in brazing square forming tools. In some cases a double nozzle torch is used, so as to apply the heat to two sides at the same time. A horizontal fixture is used in brazing small drills that are broken, heat being applied at bottom of the joint. A vertical fixture is used on larger drills.

No fixture is used, however, in making new milling cutters from scrap materials. Slots are machined in a piece of mild steel for a hub blank. The outside corners of the slots are chamfered. Scrap high-speed milling cutter blades, cut off to the desired size, are pressed into this hub. The parts to be joined are laid flat on a metal bench. Chamfered edges are prepared with flux. Finally, with the torch applied to the end of the rod, it is run around the junctures of the blades and the slots.

For reclaiming a cracked slitting saw, a V-slot is chamfered down to a hairline. Here the heat is applied from the center outward. In every case it is applied in such manner as to keep it away from the cutting edges as far as possible.

The welder, in all this work, uses a small, feather-edge carburizing flame.

The tool reclaiming department at Tractor Works is in position to know how the perishable tools reclaimed by the low-temperature brazing method are standing up. All orders from the stores department for the thirty-one production departments using cutting tools go first to the tool reclaiming department to be filled if possible with reclaimed tools. Whenever the tool reclaiming department sends an order to the welding department to fabricate a worn tool by brazing for a given production department, the latter is charged with the cost of the reclaimed tool. The production departments would complain if the reclaimed tools did not give satisfaction.

Milling cutters and other perishable tools made or reclaimed by low-temperature brazing have been found to last as

# You can make HEAVY FORMING CUTS on

OSTER

## No. 601 "RAPIDUCTION" SIMPLIFIED TURRET LATHES

An unretouched photograph of an Oster No. 601 machine making a heavy forming cut. Note absence of chatter as demonstrated by the clean cut appearance of the stock.

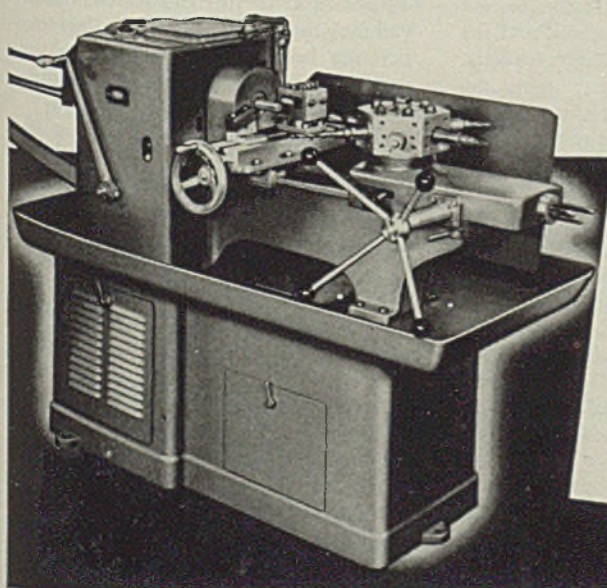
It takes a smooth, even flow of power (and plenty of it!) to make heavy forming cuts with absence of chatter, as illustrated in the above view. Batteries of Oster No. 601 machines are doing it on 'round-the-clock production schedules!

Equipped with *worm drive,* the smooth power of the No. 601 machine is obtained with the hardened and ground steel worm, which, like the spindle, is mounted in ball bearings.

(Where high speed work is required on small diameters and non-ferrous metals, the No. 601 is equipped with *direct drive* from motor to spindle. Spindle speeds up to 3000 R. P. M. are obtainable.)

### Low Cost! Prompt Delivery!

Exclusive of tooling, the Oster No. 601 costs less than $2000.00 F. O. B. factory. Orders placed *NOW* will be scheduled for delivery in less than 90 days from date of order.



**For Quick Action—USE THIS FORM!**

THE OSTER MFG. CO. • 2037 East 61st St., Cleveland, Ohio

Rush, by return mail.....copies of Catalog No. 27-A which contains full description and detailed illustrations of No. 601 Turret Lathe.

NAME .....

ADDRESS .....

CITY ..... STATE .....

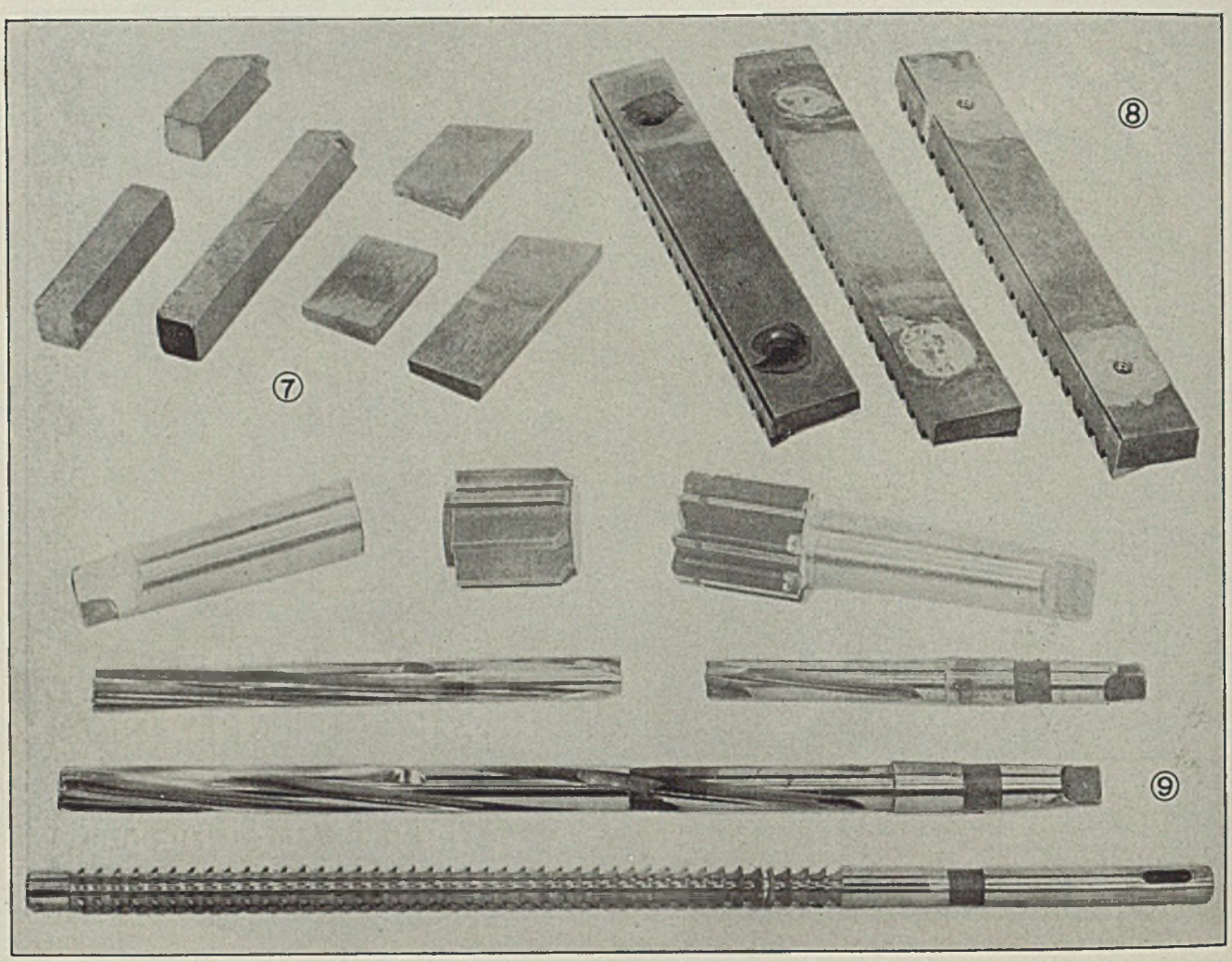



*Fig. 7—Mild steel ends are brazed on short turning tools to extend their life*

*Fig. 8—Tapped holes in flat surface broaches are filled up with braze metal, redrilled and tapped*

*Fig. 9—Broaches, reamers and cutters are made from odd parts and broken ones repaired by low-temperature brazing. These are typical jobs*

long as there is any grinding stock left in them. This applies to the regular 18-4-1 type of high-speed steel and to other types, although their reactions to heat are somewhat different. Even the now popular "moly", in which there is a reduction of tungsten and an addition of molybdenum, is suitable for low-temperature brazing since the addition of the molybdenum has no appreciable effect on this method.

The reclaiming of cutting tools at Tractor Works, as in the entire tool salvage program of Harvester, has been acknowledged as an emergency measure. It has made it possible for Tractor Works, even though over 60 per cent of its tools are specials, to go forward with vital war work which has completely replaced its production of farm tractors, replaced its production of gas and diesel power units, and greatly increased its production of Track-Tractors. And in addition it has resulted in a substantial cost reduction, for cost figures have been kept accurately.

For the current fiscal year, tool reclamation is resulting in a saving of 14.5 per cent of the total invoice value of all cutting tools used here. The basic features of the formula by which this figure was arrived at are as follows: To the amount expended for new cutting tools, add the value of the reclaimed tools, namely, their cost if purchased new, minus the cost of labor for reclaiming plus a specific labor burden cost. This means that the saving on an individual tool is much higher than the 14.5 per cent for the grand total of all tools.

As an example, take a side-milling cutter which if purchased new would cost $23. A scrap piece of bar stock and 18 scrap high-speed milling cutter blades would be used as materials for reclaiming. The operations called for are: Machine the hub with radial slots, shape up the scrap blades by grinding, braze the blades in place in the slots, grind cylindrically and on the side, backoff. The costs would be: Salvage materials, $1.25; labor, $6.50; burden, @ 65% of labor, $4.23; total, $11.98; saving, $23.00 minus $11.98 or $11.33. This is nearly 50 per cent. In this calculation, burden includes the materials used in low-temperature brazing, such as welding gas, welding rod and flux; also tool room overhead.

It is not surprising, therefore, that Mr. Philips, superintendent of Tractor Works, counts on low-temperature brazing as a permanent factor in that plant's method of holding down costs as well as in getting tools in a hurry.

Plant men of other companies will soon have an opportunity to see a movie showing low-temperature brazing at the Harvester Tractor Works. This film, one of several made at the request of the Industrial Salvage Section of the War Production Board, is among those to be circulated by the American Society of Mechanical Engineers. Its title is well chosen. It is "Save Those Tools." Any machinist or tool man will profit by seeing it.


## CORRECT SET-UP

The accuracy of a shaper cutter is no better than the accuracy with which it is mounted in the machine.

**1.** Be sure there is no play between shaper cutter and arbor.

**2.** Check concentricity with an indicator graduated to ten-thousandths. Maximum runout should not exceed 0.0005.

**3.** If runout exceeds 0.0005 in., unclamp and rotate the spacing collar—these collars usually having slight errors in parallelism.

**4.** Helix errors in tooth surfaces may be due to wear in ways guiding the spindle in the helical path.

**5.** When clamping the cutter in position, use the minimum number of spacing collars possible.

*Additional helpful information is available in a booklet on gear shaping and shaper cutters. Ask for Bulletin GS-42.*

## SHARPENING

A sharp cutter will cut faster with less power and wear. It will produce more accurate work with better finish.

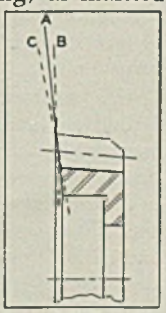
**1.** Use a soft wheel with medium grain. Keep wheel clean as a glazed wheel may crack cutter teeth.

**2.** Grinding too much metal at a time may cause heat-checks in the cutter teeth.

**3.** Never grind a cutter except on its face. "Touching up" sides or ends will alter the tooth form and spoil the cutter.

**4.** Be sure the cutting face is true with the bore. If not, cutting action will be irregular and tooth form changed.

**5.** Always grind to the correct face angle ("A" in drawing) as marked on the cutter.



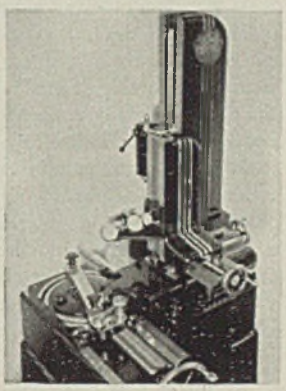

If the angle is decreased ("B") the pressure angle will be changed and cutting efficiency decreased. If the angle is increased ("C") the cutting efficiency may be increased but the pressure angle will be incorrect.

## CHECKING

Gear checking equipment should be such as to disclose the *exact nature* of the inaccuracy producing unsatisfactory gears.

**1.** Incorrect pitch diameter usually means machine-setting error or heat-treat distortion. Check with pins or balls.

**2.** Variable backlash is usually due to eccentricity. Use a master gear in preference to an indicator, if possible. Also check cutters and their mounting for eccentricity.

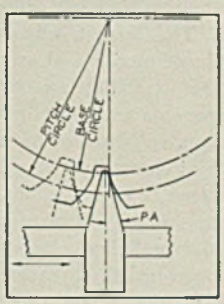


*Michigan Sine-Line Lead Checker*

**3.** Tooth form and spacing should be checked together, since the former is not dependent on depth at which measurement is taken.

*Michigan Sine-Line Involute Checker*

**4.** Check the spiral lead rather than the helix angle, since the former is not dependent on depth at which measurement is taken.




*Master Rack Tooth Simplifies Checking*

**5.** Get a copy of "Better Gears" from Michigan Tool Company for detailed information on locating gear troubles.

# MICHIGAN TOOL COMPANY

7171 E. McNICHOLS ROAD . . . DETROIT, U. S. A.

# Film Refining Process OF STEELMAKING

A FAST and continuous method of making good and clean steel and alloy steels of exact composition and in large tonnage is much desired and has been the object of many researches. A simplification of the steelmaking operation to make its control certain and automatic is also much needed.

The film-refining process—something new and original in the long history of steelmaking—makes the foregoing advantages available to the production of all steels and alloy steels in commercial use.

Steelmaking is a removal *by oxidation* of certain unwanted components, such as: Silicon, manganese, carbon, sulphur and phosphorus existing in a charge or bath of molten iron or molten steel. It also involves obtaining the refined steel as free as possible from oxides and other inclusions both solid and gaseous. The nature and amount of these inclusions constitute the main difference between bessemer, open-hearth, and electric steels, as now produced, affecting the use of these steels and even their sales price.

The fastest method of oxidation is by a blast of air whose oxygen oxidizes the silicon, manganese and carbon from the molten iron. This is effected both in regular bessemer converters and in smaller tropenas side-blow converters.

The largest tonnage of steel is produced under a slower method by which the oxidation of the unwanted components such as silicon, manganese, carbon, sulphur and phosphorus is obtained by iron ore or iron oxide (scale) and limestone brought in contact with the molten iron in the form of molten slags. This slag refining operation is effected in open-hearth furnaces and in electric arc furnaces. The oxidizing reactions between molten slags and the above components are obtained in a selective order and within certain temperature limits. These reactions are instantaneous at the surface of contact between iron and slag with instant chemical modification of both the iron and slag. However the molten slag covering only the top surface of a deep bath of molten iron or steel, the time required for full oxidation of the metalloids, is generally large, on account of the slow diffusion through the deep bath. During this time the composition of the molten iron or steel bath and floating slag, continuously change with danger of reversibility, in which case, one or more of the metalloids are reabsorbed from the slag by the molten iron or molten steel. Even with the help of repeated chemical analysis a long experience is essential to properly direct this method of steelmaking. Most of the oxidizing reactions between the molten iron and the molten slag are exothermic and consequently release a large amount of heat to the molten metal and the furnace containing it. However, on account of the radiation losses during the long time required, heat has to be supplied to the furnace throughout the refining period, even after the slag forming materials have been melted.

### Employs Both Methods

These two methods of oxidation are used under the film-refining process to oxide the previously mentioned unwanted components. The same chemistry is also used but it is effected under an entirely new set of physical conditions making the refining operation simple, fast, complete and effective while it is kept under exact control. Furthermore, the process being continuous, the rate of production is larger than with existing furnaces.

This new method offers many economical advantages including a small investment for equipment; considerable reduction in the cost of production by savings in the amount of fuel, power, refractories and labor, as now required; and cheap and efficient production of steel by small size plants.

It is the only method as far as known which makes possible the following operating conditions and technical advantages:

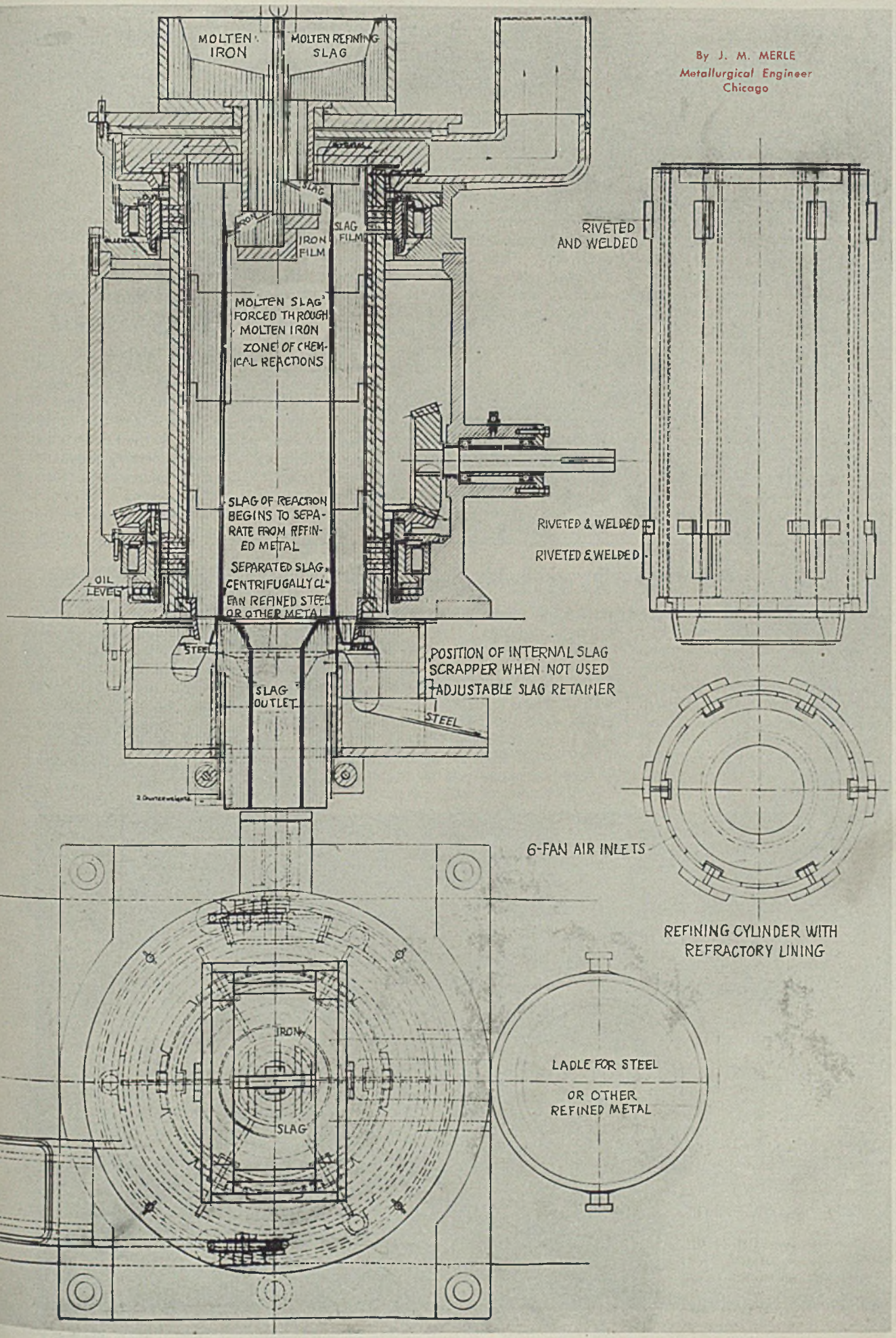
1. Creates, controls and maintains surfaces of contact between the molten metal to be refined and the required amount of air or of molten slag of the right composition and at the right temperature, in the form of superimposed films of constant thickness, until the chemical reactions have been completed.
2. Mechanically removes the slag from contact with the refined molten steel as soon as the oxidizing reactions have been effected and effectively prevents chemical reversibility.
3. Makes possible full oxidation of all metalloids and consequently permits production, at low cost, of purer ingot iron, as well as low-carbon alloy steels.
4. Effectively separates under centrifugal action, from the finished refined steel, not only entrapped slag but most of the oxides and gas inclusions, which at present remain occluded in steels made under other processes and consequently makes possible the obtention of cleaner and better steels than are now produced.
5. Fully uses the heat released by the exothermic oxidizing reactions to save fuel.
6. Refines steel continuously and makes available for casting purposes a continuous supply of clean steel, at the rate of 1 to 3 or more tons per minute, which can be cast into ingots or other castings. The handling is easier and more convenient than a bulk heat of 100 or 200 tons delivered in a ladle and which has to be cast within 30 minutes.
7. Permits a complete check-up and adjustment of the whole steelmaking operation, by a short test run lasting 3 to 4 seconds. In that short period, 200 to 300 pounds of molten iron will be transferred into steel, in a film-refiner by means of an air blast or an oxidizing slag. This steel can be collected and cast into ingots or test bars to determine the exact composition and physical properties. The used slag can also be collected and its exact composition determined. The foregoing information will indicate if any adjustments are necessary in slag composition and operating temperature. The whole supply of molten iron will subsequently be treated with a slag giving steel of the exact composition wanted, as test-proven by above short run.
8. Mechanically creates and maintains constant refining conditions to a whole supply of molten iron or molten steel.
9. Permits to reproduce and maintain identical refining conditions on any amount of molten iron or molten steel and to refine it into finished steel, entirely uniform in compositions, cleanliness and temperature.

The steelmaking operation, in present practice, is effected on a batch of molten iron or steel of a few tons and up to 200 tons, presenting a small and limited surface of contact with the molten slag, while the molten metal bath may be 18 to 36 inches deep. Speed-up methods using molten slags have been tried with an amount of success.

Under the film-refining method, the surface of contact between molten metal and molten slag is continuously created, controlled and kept uniform to make it

*Plan view of refining machine which can be built for vertical or horizontal operations and for ferrous, nonferrous and alloy metals*

By J. M. MERLE
Metallurgical Engineer
Chicago



many times greater than in present furnaces. As a result, the rapidity of the process becomes understandable. As an example, refining and finishing a 100-ton heat in an open-hearth furnace may require about 4 hours and the bath of metal may be 30 inches deep. In a Merle refiner, all this molten metal would be formed into a continuous film or layer about 3/16-inch thick, with a layer of molten slag, at proper temperature formed on both sides and as the chemical oxidizing reactions are completed, the refined steel would be continuously separated from the slag and collected. The capacity of production of such film-refiners is 1 to 3 tons per minute or more if required. In the film-refiner the surface of contact between the molten metal and molten slag is 30 : 3/32, or 320 times greater than in the open-hearth furnace and as the time required to complete the oxidizing reactions is a function of the surface contact when 4 hours or 240 minutes are required in the open-hearth furnace, the time required in a film-refiner is only 240 : 320 or less than one minute. This explains the extreme rapidity of operation of the Merle film-refiners. In a bessemer converter where a large surface contact is also created, 50 tons of metal is blown in 20 minutes, which is 2½ tons per minute, although available only when the whole charge has been blown.

### Type of Machine Varies

The film forming and refining operations can be carried out in various types of machine. Films of molten metal and slag can be formed over the cylindrical surface of a refractory roll, or over the surface of two rolls operating like a rolling mill. The film forming and refining operation can also be carried out by forming both the molten metal film and molten slag film or films against the inside surface of a revolving refractory cylinder with proper conicity to control a definite rate of travel of both films which will insure the required surface and time of contact for complete chemical reactions between the films before these materials are separated and collected. This centrifugal method is preferred for steelmaking because it makes available all the technical advantages heretofore mentioned.

Film refiners can be designed and built for any desired rate of production. They can be used for all kinds of refining operations on both ferrous and nonferrous metals and alloys. Whatever is the capacity or the use, the general construction is as follows:

These refining machines for steel are similar to centrifugal pipe casting machines. They can be built for vertical or horizontal operation, whichever is more suitable to handle the specific production to be carried out.

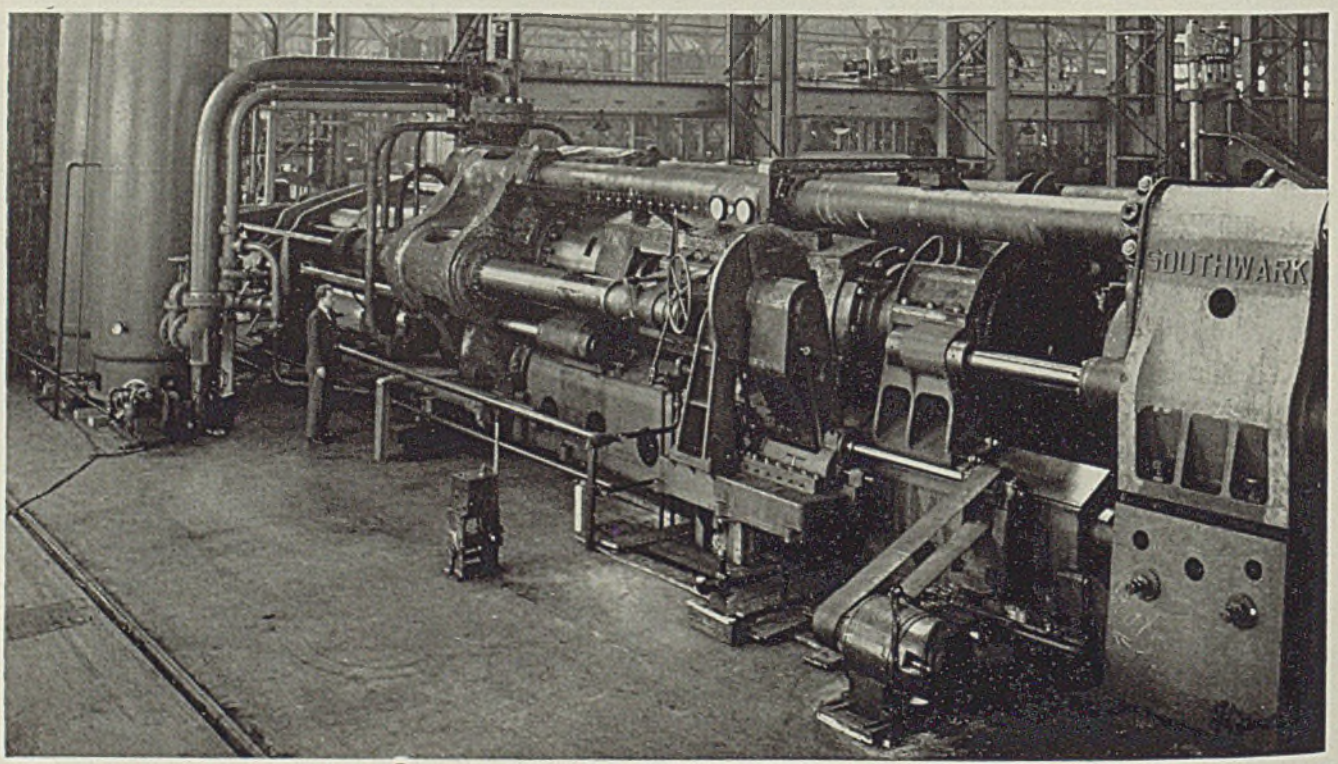
The unit includes a cast-iron or steel frame holding two steel rings spaced according to the length of the refiner cylinder used. The two rings have spline slots to fit the spline ribs or bars of the refiner cylinder. Radial and thrust roller bearings are fitted between the frame and rings insuring free rotation of the rings under full load conditions. These bearings are dust-sealed and kept running

## Baldwin Southwark Builds 3500-Ton Extrusion Press

DESIGNED for both direct and indirect extrusion, this powerful press, below, is one of five 3500-ton extrusion presses recently completed by Baldwin Southwark Division, Baldwin Locomotive Works, Philadelphia. It is equipped with a 250-ton hydraulic billet shear, two coarse-tooth saws driven by 40-horsepower motors and a billet handling device to take the heated billet from the furnace and deposit it in front of the extrusion container.

The press' main cylinder casting weighs 200,000 pounds, the machine proper 1,000,000 pounds and complete with auxiliaries 1,500,000 pounds. It is of the 4-rod type, with forged tension rods 16 inches diameter.

The 59-inch diameter ram, under 3200 pounds per square inch working pressure, will handle billets up to 24 inches in diameter and up to 36 inches long. Its working stroke is 7 feet. Main ram is rapid traversed to working position under a low pressure of 200 pounds. The press is operated from two 500-horsepower multiple plunger pumps in connection with the hydro-pneumatic accumulator system designed for 3500 pounds per square inch hydraulic pressure.



# IT'S EASIER WITH "PIPING POINTERS"


## 1. TO TRAIN NEW PIPING MAINTENANCE MEN

"Piping Pointers" Bulletins give them countless *do's* and *don'ts* and *rights and wrongs* that make for better installed and better operating pipe lines. The information is clear, concise, fully illustrated. Coming from Crane—leading maker of valves and fittings—you may be sure it is sound and practical. Use "Piping Pointers" as text material as so many important firms are now doing to help themselves in the worsening manpower situation.



## 2. TO KEEP VETERANS UP-TO-DATE ON WAR-TIME PRACTICES

Not all information in "Piping Pointers" is solely for trainees. The range of subjects is varied and applies to men who swing the wrenches, and whose job it is to make your piping systems work better and last longer under war operating conditions. Skilled workers say they like to keep "Piping Pointers" handy for *brushing up,* and know they're reliable because they're issued by Crane.

## GET AND USE THIS SERVICE *NOW* WHEN MOST VALUABLE

Inevitable materials shortages make better maintenance of piping a dire necessity. Everywhere, leading plants acknowledge the valuable aid of "Piping Pointers" Bulletins in training men for this job. Whether large or small, your plant will get equal benefit from this *free* Crane *Aid-to-Victory* Service. Use the coupon—or ask your Crane Representative for copies.

# CRANE

CRANE CO., GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO

*VALVES • FITTINGS • PIPE*
*PLUMBING • HEATING • PUMPS*

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

CRANE CO.
836 S. Michigan Avenue, Chicago Illinois S
Rush me .... set(s) of "Piping Pointers" Bulletins.
No obligation, of course.

*Name* .....
*Title* .....
*Company* .....
*Address* .....
*City* ..... *State* .....

in a bath of oil by a special oil circulating pump built in each ring and operating when the cylinder is rotated. Continuous air circulation keeps the bearings cold under continuous operation of the machine. A bevel gear is keyed and bolted to one of the two rings and geared to a driving pinion whose shaft can be directly coupled to an electric motor or can be belt driven. The power required is small and generally less than 10 horsepower for most refiners.

The refining cylinder is made of a seamless steel pipe in most machines—or rolled and welded plate in larger machines. This steel cylinder has riveted and welded outside two sets of six short driving teeth or bars fitting the spline slots of the two rings with ample clearance permitting free expansion and contraction of the steel cylinder. It also has short riveted and welded steel segments carrying the weight of the refining cylinder to the supporting ring or rings. Inside of the steel cylinder, three or six keys or bars are riveted to it and drive the refractory lining. The fully assembled refining cylinder can be set or removed from the machine, in an instant, without touching the whole driving mechanism or removing a bolt.

The refractory lining will fit inside the steel cylinder with enough clearance between cylinder and driving keys to allow for free expansion and contraction of the refractory. Usually a peripheral space will be left between steel cylinder and refractory cylinder through which air will be drawn or circulated to reduce the heat radiation of the refractory to the steel cylinder. The refractory refining cylinder will be made to suit the refining requirements—basic or acid operation—or it will be a neutral refractory material. The lining should be made preferably of a molded and baked cylindrical brick, either in one piece or in fitted cylindrical blocks. Sintered magnesia cylinders can be supplied, also cylinders of Mullite, which is neutral to the action of molten iron and steel and most molten slags. The material used should have a softening point above 3200 Fahr. and a higher melting point. Refractory linings also can be made with refractory cements properly rammed and dried, such as, magnesite, periclase, zirconia, chromite, ganister sand, etc., with proper bonding.

Besides the refractory lining, the steel cylinder has a steel cover plate with central hole large enough to admit the streams of molten iron or steel and molten refining slag. In vertical machines the steel cover plate will have fan blades welded to it and operating in the casing of an exhaust fan. This exhaust fan will operate when the machine is rotated with a triple effect. 1. It will draw a stream of cold air between the frame and rotating cylinder, thus cooling the bearings. 2. It will draw another stream of air between the steel cylinder and refractory cylinder, as indicated previously. 3. It will draw the hot gases produced by the chemical oxidizing reactions within the refractory cylinder and exhaust both air and gases through a vertical stack.

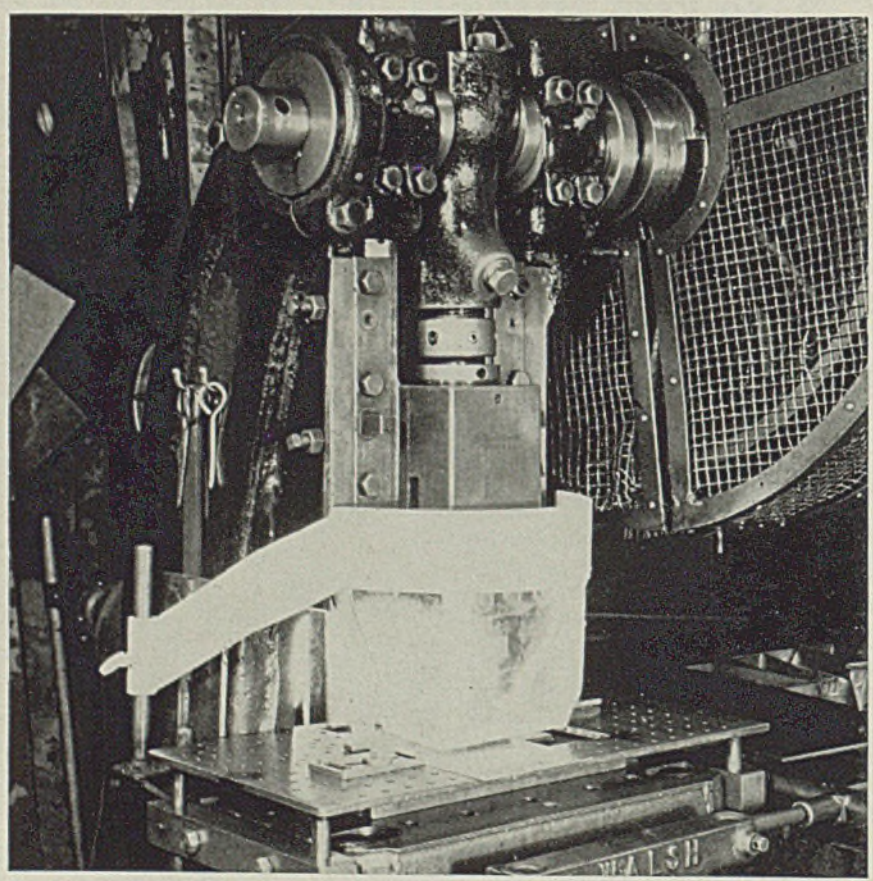
### Machine Weighs 2500 Pounds

The total weight of the rotating cylinder, in machines of 1 to 3 tons capacity per minute, is approximately 2500 pounds depending on the refractory material used. The weight of molten iron or steel plus slag carried by the rotating cylinder while it travels through it is small and uniform during the whole operation. For 1 ton per minute operation, this total weight will be approximately 45 pounds; for 2 tons per minute, 90 pounds; and, for 3 tons per minute, approximately 125 pounds. These molten materials, steel and slag, only circulate through the rotating cylinder and the power load hardly varies, whether the machine is run empty or operating.

Comparing the weight of molten iron or steel to the weight of the refractory lining supporting it, the proportions are: Four per cent for 1 ton per minute capacity, 7 per cent for 2 tons per minute and 10 per cent for 3 tons per minute capacity. Comparing the load of molten steel per square inch to load on hearth in open hearth and electric furnaces, where the load is from 6 to 9 pounds per square inch, a satisfactory situation also exists. In the Merle refiners, the load is made up of actual weight of the steel film plus centrifugal acceleration exerted upon it. However, at 300 revolutions per minute, the load is only 0.54-pound per square inch and at 600 revolutions per minute this load is 2.14 pounds per square inch and these speeds are sufficient and practical for operation. To attain a load of 9 pounds per square inch, the refining cylinder would have to be rotated at 1200 revolutions per minute, which is not required for practical

(*Please turn to Page* 131)

## "GLASS" GUARD FOR PUNCH PRESS OPERATIONS



FLEXIBLE glass panels act as a guard on this punch press operating in the Baltimore plant of Westinghouse Electric & Mfg. Co. Not only does it provide complete protection to the worker, but it has no moving parts to confuse his vision. Guard is mounted on a pin bolted to left side of press frame. It may be lifted or lowered on this pin and held in any desired position by a thumb screw. Material fed into die just clears bottom of guard frame, allowing no room for operator's hand to be inserted

# "BACKBONE" GIVES THEM RANGE AND HITTING POWER

## "BACKBONE" GIVES THE MILWAUKEE ACCURACY AND PERFORMING POWER

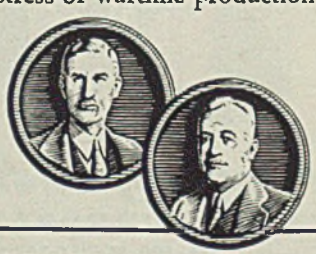
Lobbing shells, hour after hour, demands plenty of "backbone" in the big guns that are assigned the task of making enemy positions too hot to hold.

Milling tough metals and alloys at high speeds and to close tolerances, hour after hour, isn't quite as spectacular, but the machine that handles the work must have similar "backbone" to withstand the ceaseless strain and vibration.

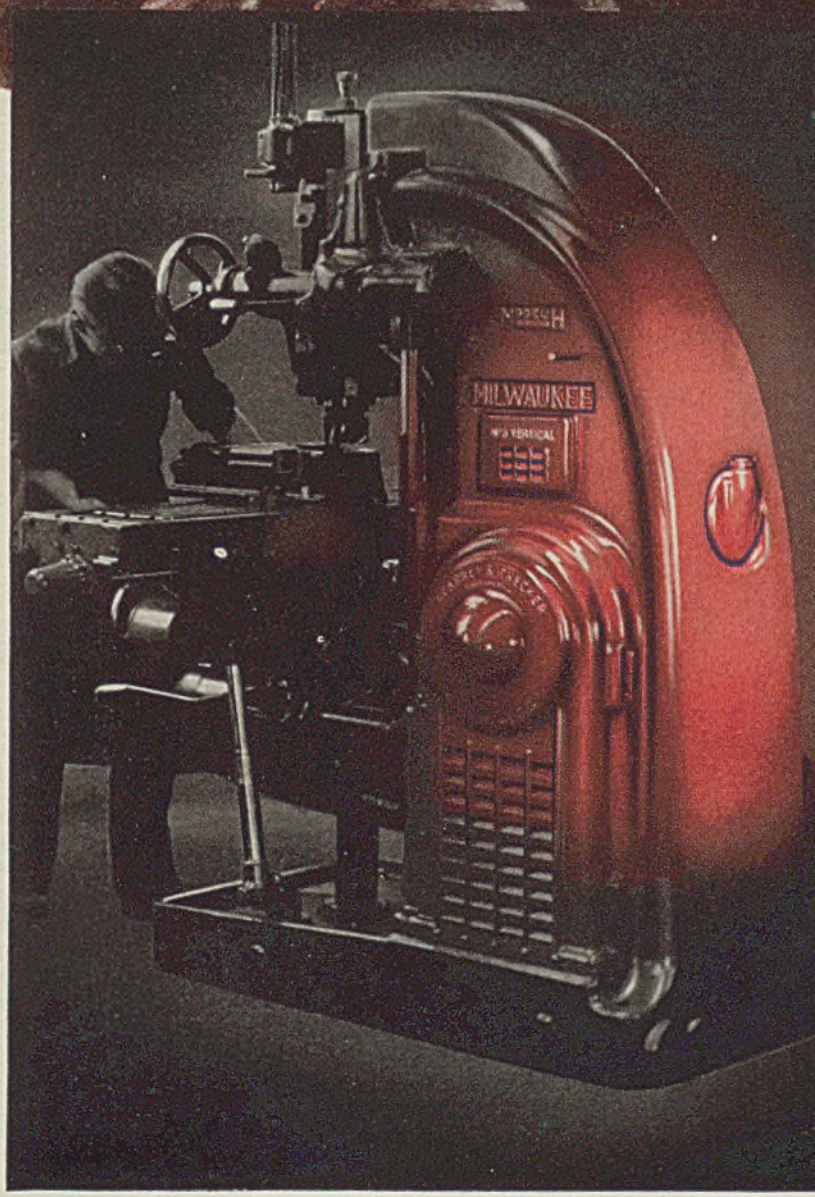
In milling machines, *rigidity* — an indispensable quality in any machine tool — originates in the column, the backbone of the machine. The column of a Milwaukee Vertical Milling Machine has been engineered for the proper distribution of metal to assure the maximum stability.

A look inside this husky backbone would reveal a horizontal wall, dividing the column into a double box-section. This provides an unusually rigid structure.

It is features like this which have enabled Milwaukee Milling Machines to do more than the "usual" under the stress of wartime production.



KEARNEY & TRECKER
CORPORATION
MILWAUKEE, WISCONSIN




Buy Victory with at least 10% in War Bonds!

Milwaukee MACHINE TOOLS

*OEM Photo by Palmer*

# *Steel Man with a Mission*

## . . TO KEEP THE ELECTRIC FURNACES MELTING

ALL of us—men or women—on the job or off it—are people with a mission these days. This war makes common cause for every one and spares no one.

The maintenance-man's job, atop an Allegheny Ludlum electric furnace, is no less essential than that of the crew who operate the furnace, nor than that of the fabricators who use the stainless, tool, valve or electrical steel it produces. Total war demands maximum cooperation on the supply fronts as well as the fighting fronts, and it asks also that every last bit of manpower and materials be used to maximum advantage.

Boiled down to a very few words, that simply means: *no waste—everybody help.* How can we help *you* to produce better and faster for war; to stop the loopholes of waste; and to plan your course in post-war production?

For your designers and technicians, complete and certified laboratory data on all Allegheny Ludlum alloy steels are available in "Blue Sheet" form. For your engineers and production men, our "Handbook of Special Steels" contains comprehensive and valuable information; and our "Elementary Discussions," covering Tool and Stainless Steels were developed particularly for training course and student use.

Write for any printed material that will help you; and if you need personal assistance, the services of our Technical Staff are at your command.

AL

STEEL FOR THE NATION'S WELFARE

**Allegheny Ludlum**

**STEEL CORPORATION**

PITTSBURGH, PENNSYLVANIA

A-8711 . . . W & D

By THOMAS A. FRISCHMAN
*Chief Metallurgist*
Axle Division
Eaton Mfg. Co.
Cleveland

# A Metallurgical Study of Some . . .

# NE (National Emergency) ALLOY STEELS

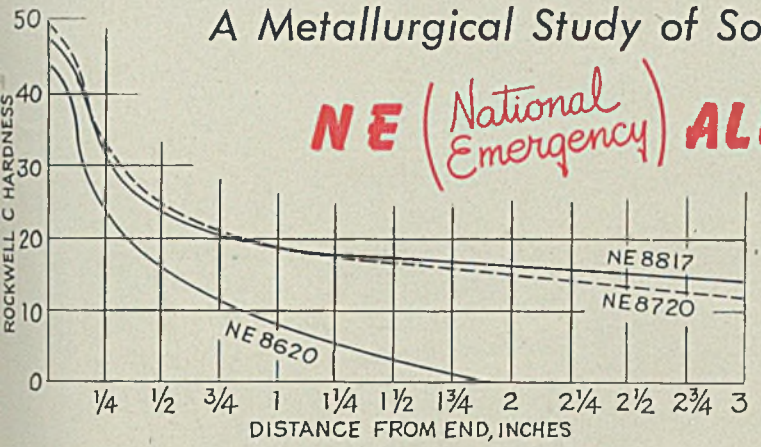



*Fig. 1—End quench characteristics for steels shown under Table IV*

**For information on development of NE steels and their properties, see STEEL, Feb. 9, 1942, p. 70; March 16, p. 72; June 8, p. 66; June 15, p. 66; July 13, p. 80; July 20, p. 86; Aug. 3, p. 70; Aug. 17, p. 40; Aug. 31, p. 41, p. 76; Sept. 7, p. 78; Oct. 19, p. 66; Nov. 23, p. 96.**

**For latest revised list, see STEEL, Nov. 9, p. 96.**

**For reports from users of NE steels, see STEEL, Nov. 16, p. 106; Nov. 23, p. 90; Nov. 30, p. 62; Dec. 7, p. 112.**

FOR MANY APPLICATIONS the National Emergency steels are rapidly becoming the steels of the hour. They are nevertheless still in the neophyte stage to many users, and just when some familiarity with them is being attained, as in the NE 8000 series, an NE 9000 series is being released. No doubt some wonder whether stabilization of chemical analysis is a luxury of prewar days—and it might well be, because the supply of critical materials is not too accurately predictable.

There was a time when the high alloy content of steels furnished reserve endurance when some anomaly—perhaps in steel quality, design, machining or heat treatment—occurred, and the parts so made gave satisfactory service regardless. With the reduction in alloy content, this class of production might conceivably suffer in applying the raw materials. However, there were many products manufactured in prewar times from steels more highly alloyed than was necessary for the imposed service conditions. Other factors such as availability, standardization, arrangement and type of manufacturing equipment were involved in the choice of the so-called "richer" steel. For instance SAE 2515 steel can be annealed to a lower hardness than SAE 4820 steel on a relatively fast cycle, or in other words it can be taken out of the furnace sooner than the SAE 4820 steel. Likewise SAE 2515 steel is rarely direct quenched from the carburizer, whereas SAE 4820 is. Thus the type of furnace equipment often influences the choice of the steel.

Where the prewar steel used might have been highly alloyed with nickel, chromium and molybdenum, either alone or in combinations with each other, operating under conditions of high stress with little safety factor, the new NE steels such as the NE 8000 and NE 9000 series might not always work out as satisfactory replacements without making design changes or placing some restrictions on the use of the part in service. However, as time passes there will be brought to light many instances where better steels than necessary have been used, and it is here the adoption of the NE steels will make the most impressive showing. At any rate the steel user today must know now, more than ever before, the limitations of the mate-

(*Please turn to Page* 119)

**TABLE I—Carbon Concentration in Pot-Carburized Samples Carburized at 1680 Degrees Fahr.; Cooled in Lime; In Per Cent**

| Cut No. | Depth Below Surface (In.) | NE 8620 | NE 8720 | NE 8817 | SAE 2315 | AISI 6120 | AISI 4027 |
|---|---|---|---|---|---|---|---|
| 1 | 0.000 -0.0025 | 1.18 | 1.22 | 1.24 | 1.03 | 1.74 | 1.04 |
| 2 | 0.0025-0.005 | 1.15 | 1.19 | 1.16 | 1.01 | 1.40 | 1.09 |
| 3 | 0.005 -0.010 | 1.12 | 1.12 | 1.11 | 0.94 | 1.09 | 1.07 |
| 5 | 0.020 -0.025 | 0.86 | 0.88 | 0.86 | 0.82 | 0.91 | 0.91 |
| 7 | 0.045 -0.050 | 0.40 | 0.46 | 0.46 | 0.46 | 0.52 | 0.56 |

**TABLE II—Comparison Between Carburizing Characteristics for Different Carburizing Media Samples Carburized Simultaneously in Each Media Carbon Content**

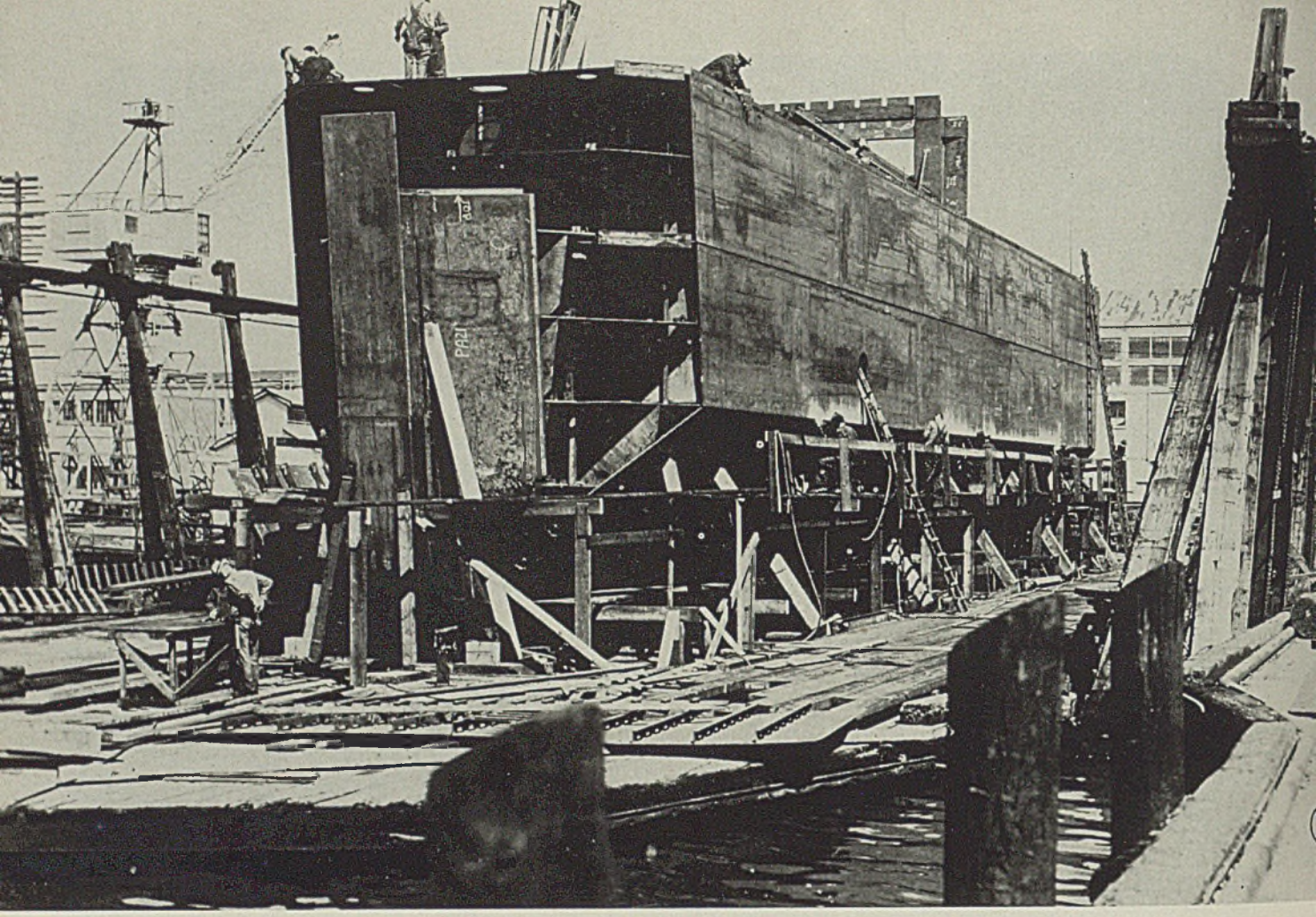
| Cut No. | Depth Below Surface (In.) | Pot Carburized 1700° Fahr. NE 8720 | Pot Carburized 1700° Fahr. SAE 4620 | Gas Carburized 1650° Fahr. NE 8720 | Gas Carburized 1650° Fahr. SAE 4620 |
|---|---|---|---|---|---|
| 1 | 0.000 -0.0025 | 1.19 | 1.16 | 1.28 | 1.08 |
| 2 | 0.0025-0.005 | 1.17 | 1.11 | 1.06 | 1.03 |
| 3 | 0.005 -0.010 | 1.13 | 1.10 | 1.04 | 0.97 |
| 5 | 0.020 -0.025 | 0.84 | 0.80 | 0.78 | 0.69 |
| 7 | 0.045 -0.050 | 0.38 | 0.38 | 0.36 | 0.30 |
| Total Case Depth by Brinnell Microscope | | 0.058 | 0.58 | 0.060 | 0.060 |

**TABLE III—Relation Between Case Depth and Hardness, Direct Quenched and Reheated NE 8620 Steel, All Drawn at 300° F.**

| Case Depth | 1700° F. Carburize | Treatment | Rockwell C Hardness Case | Core |
|---|---|---|---|---|
| 0.040 | pot | Direct quench | 62 | 29 |
| 0.040 | pot | Reheat 1525° F. | 65 | 28 |
| 0.068 | pot | Direct quench | 58 | 32 |
| 0.066 | pot | Reheat 1525° F. | 64 | 31 |
| 0.052 | gas | Direct quench | 59 | 30 |
| | | **NE 8720 Steel, Drawn at 300° F.** | | |
| 0.040 | pot | Direct quench | 60 | 39 |
| 0.040 | pot | Reheat 1525° F. | 64 | 40 |
| 0.068 | pot | Direct quench | 56 | 40 |
| 0.068 | pot | Reheat 1525° F. | 63 | 41 |
| 0.052 | gas | Direct quench | 57 | 41 |
| | | **NE 8817 Steel, Drawn at 300° F.** | | |
| 0.040 | pot | Direct quench | 61 | 35 |
| 0.040 | pot | Reheat 1525° F. | 63 | 33 |
| 0.066 | pot | Direct quench | 57 | 39 |
| 0.062 | pot | Reheat 1525° F. | 64 | 36 |
| 0.052 | gas | Direct quench | 57 | 35 |

**TABLE IV—Chemical Composition of NE Steels Shown in Table III**

| Steel | C. | Mn. | P. | S. | Si. | Ni. | Cr. | Mo. |
|---|---|---|---|---|---|---|---|---|
| NE 8620 | 0.19 | 0.73 | 0.016 | 0.022 | 0.26 | 0.46 | 0.48 | 0.23 |
| NE 8720 | 0.21 | 0.82 | 0.016 | 0.021 | 0.28 | 0.60 | 0.49 | 0.26 |
| NE 8817 | 0.19 | 0.84 | 0.015 | 0.015 | 0.29 | 0.48 | 0.52 | 0.33 |



# WELDED CAISSONS

## For Naval Dry Docks

By Capt. C. A. TREXEL (CEC) USN
*Director of Planning and Design*
And
A. AMERIKIAN
*Designing Engineer*
Bureau of Yards and Docks
Navy Department
Washington

A DRY DOCK is generally described as a water basin with a removable gate, which provides a dry berth for maintaining, repairing or building ships. The history of its growth and development is closely allied with that of ships because of the nature of the services which it renders.

Dry docks are important to the maintenance and operation of a naval fleet. While some service to smaller craft is rendered by marine railways, the repairs to major vessels must necessarily be carried out in floating dry docks. The importance of such shore facilities, particularly in time of war, is obvious, for without them, ships would become immobile and useless because of fouling of bottoms, damaged propellers or rudders. Too, many a battle-damaged ship would be lost if it were not possible to repair it in a dry dock.

**Dry Dock Closures:** The entrance closure is an integral part of a basin dry dock. Mobility is required for clearing the entrance quickly to facilitate movement of ships in and out. Strength is an obvious requirement for the structure must withstand the external water pressure when the dock is pumped out.

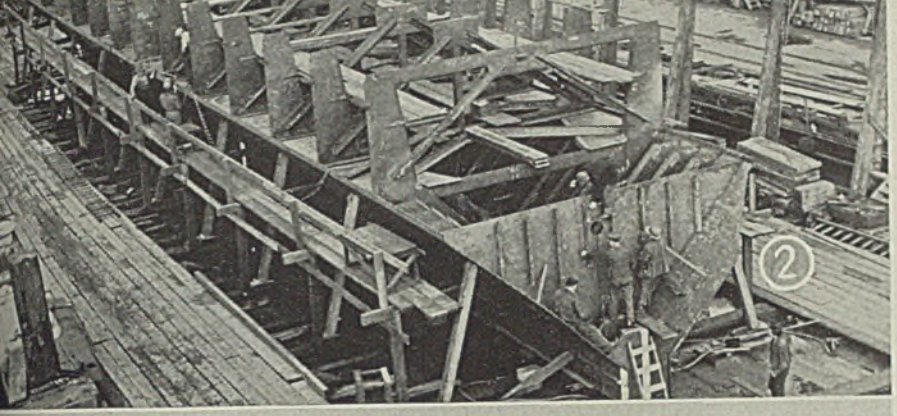
Mobility may be provided by hinged miter gates, similar to canal lock gates; sliding or rolling caissons; or removable floating caissons. Gates are employed in many European dry docks. The sliding type of caisson, which is drawn into a recess at the dock entrance to permit the entrance or removal of a ship, is a favorite at English and British colonial dockyards. In American practice, the floating caisson is the most commonly used form of dry dock closure.

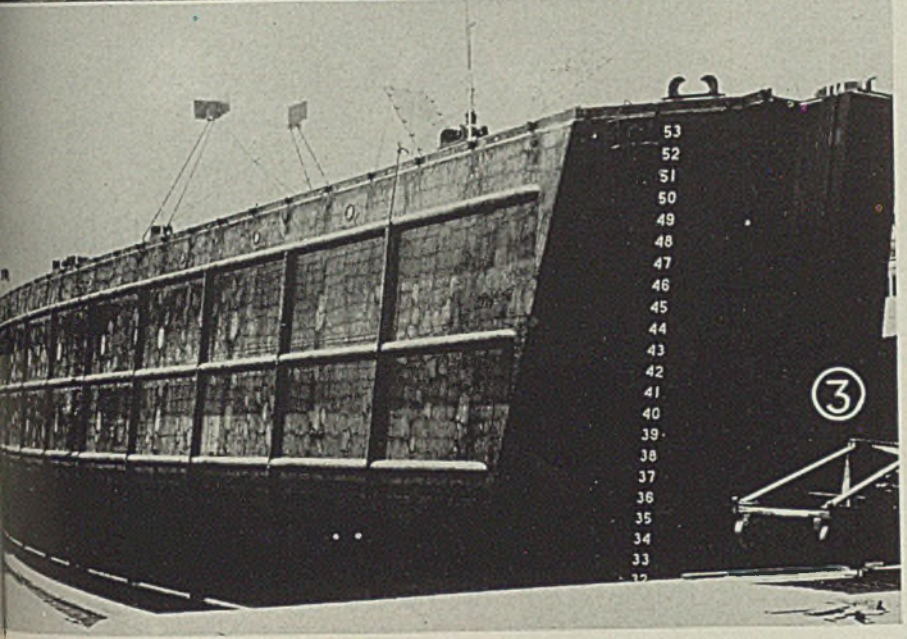
**Floating Caissons:** As the derivation of the word would indicate, a caisson is essentially a box. This box is composed of a system of interior framing and an enveloping skin plating. The interior framing, in turn, consists mainly of a series of trusses or girders, spanning longitudinally and transversely. The skin plating, which is of water-tight construction, is supported by a set of girts

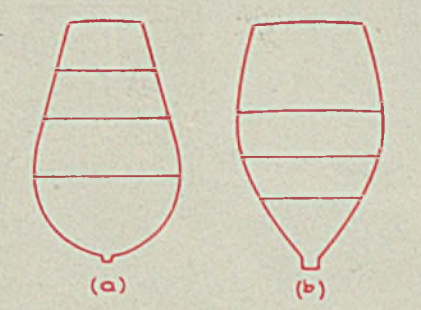
*Fig. 1—Parts of stem and end framing going together as caisson is assembled*

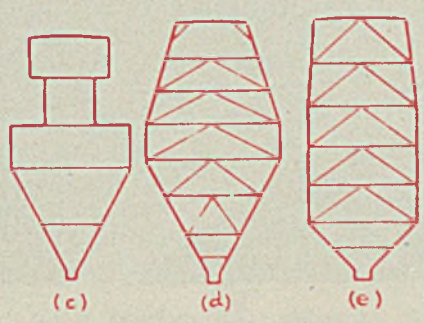
*Fig. 2—Partially assembled caisson, showing sections of main transverse framing*

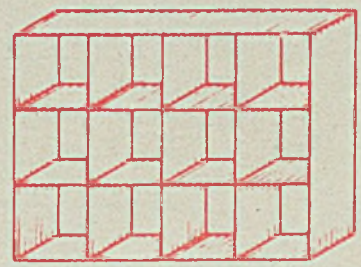
*Fig. 3—First all-welded caisson complete and afloat. Beam 22 feet, depth 54 feet, length 150 feet*





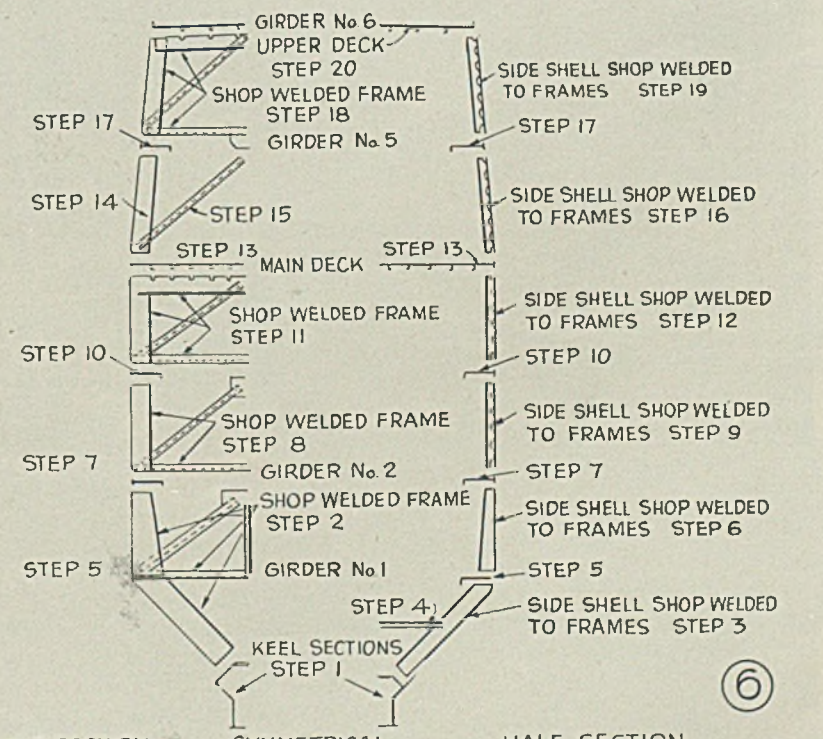


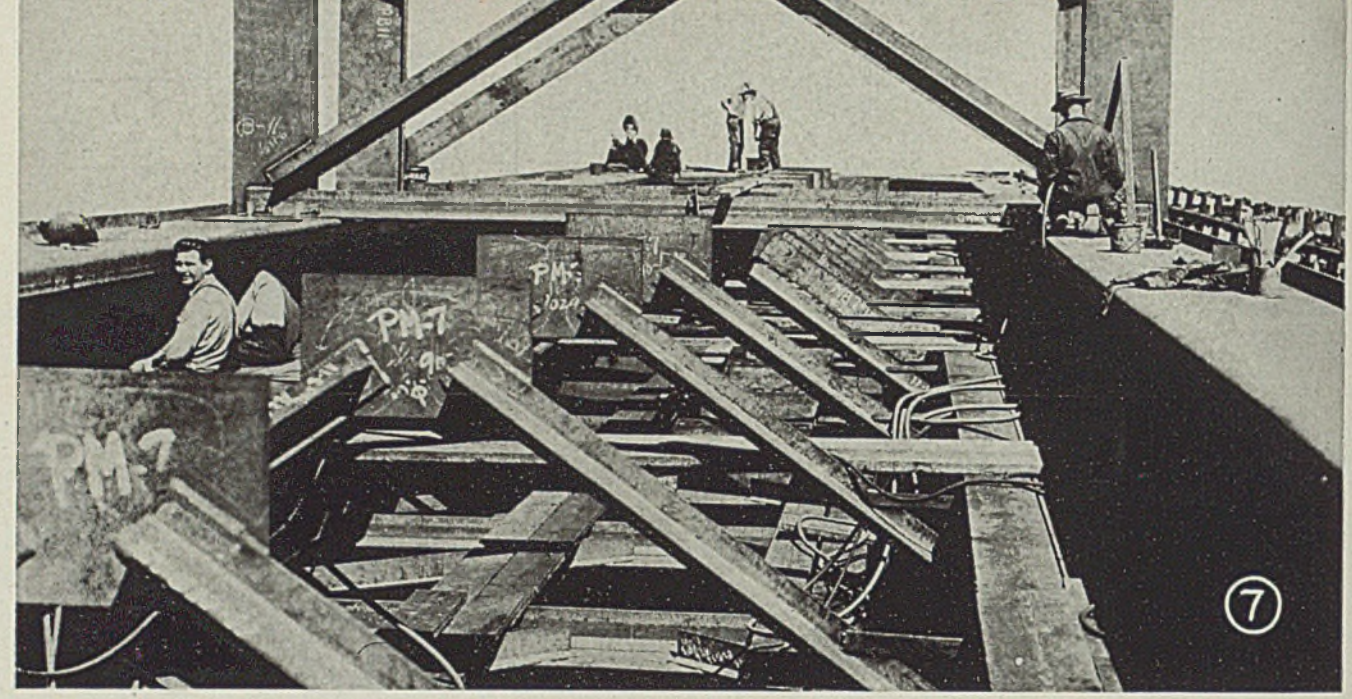

*Fig. 4 — Typical cross-sectional outlines of dry dock caissons shaped as (a) bulk, (b) ship, (c) hydro-meter, (d) barrel, and (e) box. The latter is the one utilized here*

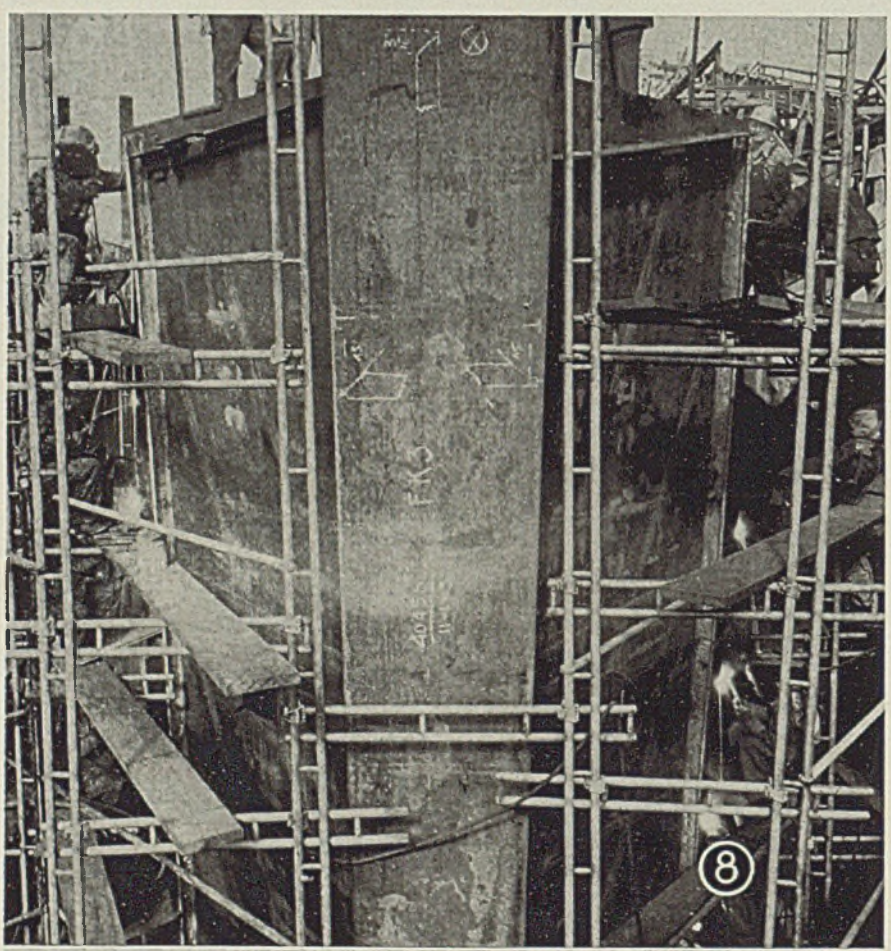
*Fig. 5—Interlocking box sections as shown here form main framing arrangement of caisson, with shell plating removed*

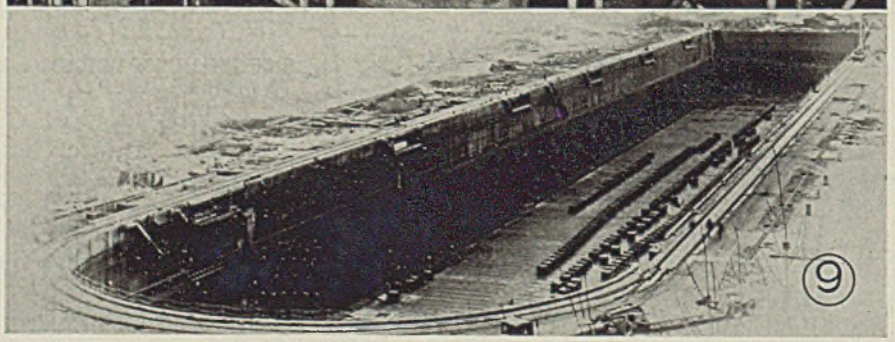
*Fig. 6—Erection procedure of shop subassemblies of welding caisson. Erection notes: Fabricated keel, stems, bulkheads, breast hooks and diaphragms shall be set up as work at midship section progresses, care being taken to maintain molded lines. All frames, girders, etc. shall be held by tack welds before full weld is applied. After all interior framing is fully welded, longitudinal welds for shell plates and decks shall be made. Vertical welds in shell and transverse welds of deck butts or laps shall be made last*

---

From paper winning first grand award of $13,700 in the 1940-42 Industrial Progress Award program sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland. Award papers showed a possible saving of $1,825,000,000, including 7,000,000 tons of steel and 153,000,000 man-hours of labor available by application of arc welding.





or stringers forming secondary framing.

The cross-sectional outline of a caisson is determined from the conditions of stability and minimum draft in flotation and the necessary strength when in the seat and subjected to the unbalanced water pressures. As in the case of ships, the cross-sectional outline has undergone considerable change. In the early days of naval construction, when labor was inexpensive and the time element not so pressing, the general tendency was to choose curved outlines of what would now be considered doubtful efficiency.

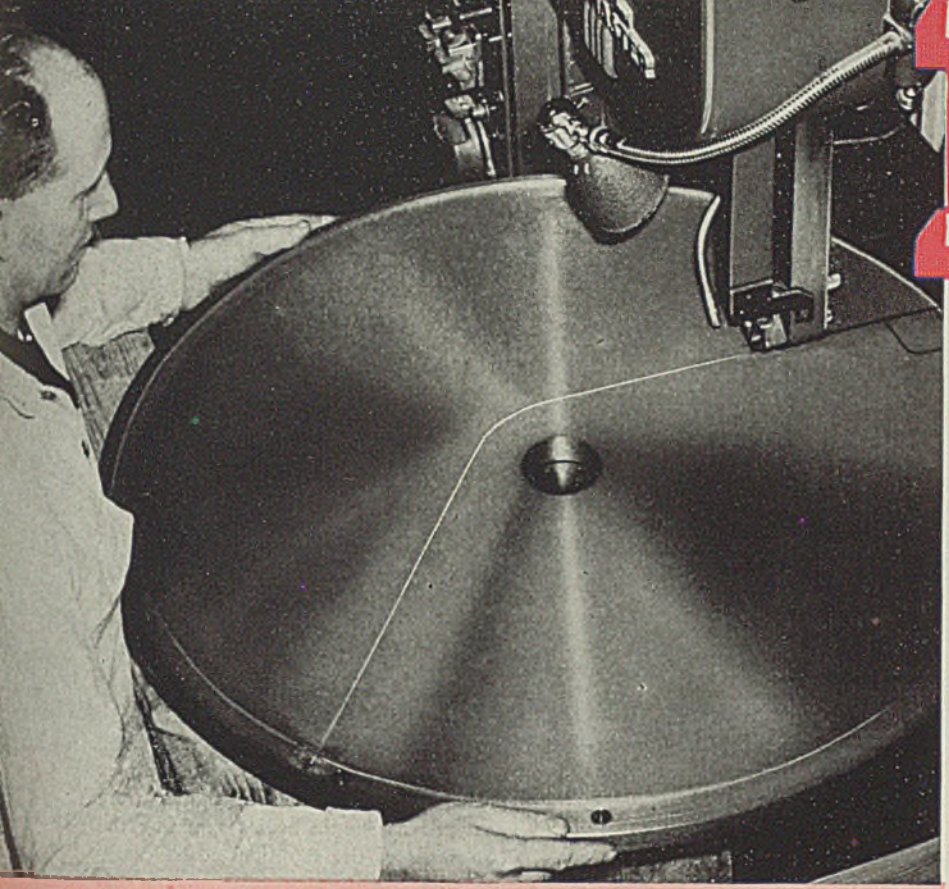
Some of these outlines are shown in a, b, c and d of Fig. 4, representing, in that order, the bulb, ship, hydrometer and barrel-shape types of caissons formerly used. In e is the modern, simple, yet efficient, box-type framing outline used by the Bureau of Yards and Docks, Navy Department, since 1940. The latter follows bridge practice rather than the more costly orthodox ship construction used in former caissons.

In the earlier days of shipbuilding

*Fig. 7—Top view of partially assembled caisson, showing some details of interior framing*

*Fig. 8—End view of partially completed caisson, showing 12 welding operators working simultaneously on six different levels welding three strakes of shell plating. Four more are at work inside, welding butts at two decks. Note special scaffolding made of welded pipe sections clamped together*

*Fig. 9—View of modern dry dock, with caisson in the background. Caisson is end-gate, must seal dock watertight to be effective*



# DoAll

## THE TIM
## STRETCHE

Left—"Drill Jig for gun mounting cut in hours by the DoAll. Diameter 35", thick 1¼". Due to accuracy required, the p could not be torch cut. The only other to do the job was to slit it on a miller or it in a planer. Our DoAll solves these p lems in one-quarter the former time."

## MAKES 4 MAN HOUR OUT OF 1

Below—Special Jig Clamp used to hold a sight casting. "A three-dimensional cut job 3¼" x 3¼" x 6". The usual way wa shape it, requiring at least eight ho DoAll cuts it in 2 hours."

# FOR BUSY PLANTS!

## THE WORLD'S GREATEST MACHINE TOOL VALUE

- Slices contours through thick sections
- Fastest precision method of internal and external cutting of any metal or alloy.
- Cuts so clean, further machining is unnecessary.
- Relieves miller, shaper and lathe of hundreds of over-load jobs.
- ★ Eliminates bottlenecks on regular production lines.
- ★ Avoids shut downs of important machines by actually making new replacement parts.
- ★ Makes special tools without dies or molds.
- ★ Saves hundreds of man hours — tons of metal.

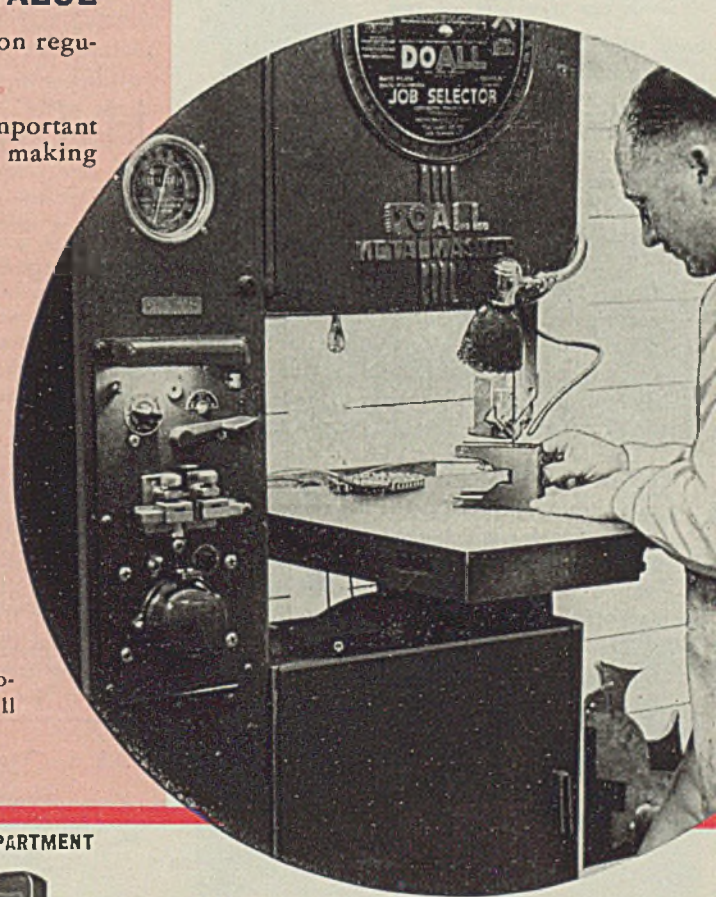
### WANT TO SEE IT WORK?

A factory trained man will call with a DoAll and show you how this wonder machine will aid in getting your jobs out ahead of schedule.

## CONTINENTAL MACHINES, INC.

**1324 S. Washington Ave., Minneapolis, Minn.**

Associated with the DoAll Company, DesPlaines, Ill. Manufacturers of Band Saws and Band Files for DoAll Contour Machines

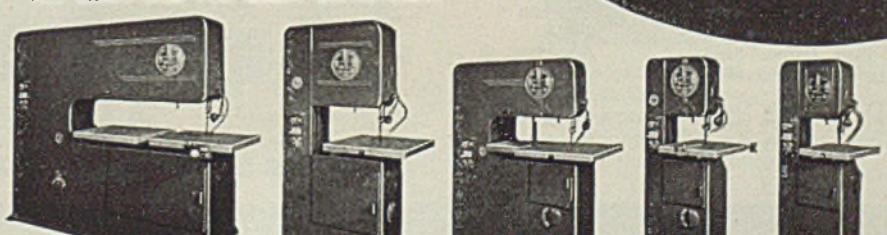



STRIP-OUT CONTAINER


Pat. No. 1,555,577 Des. No. 137,313 Other Pats. Pending

**EASY READING** — "DoAll on Production", an illustrated book you'll want to send for today.

THE EXACT SIZE FOR EVERY DEPARTMENT



1. Under $500
2. Under $250
3. Under $200
4. Under $150
5. Under $100

All Models with

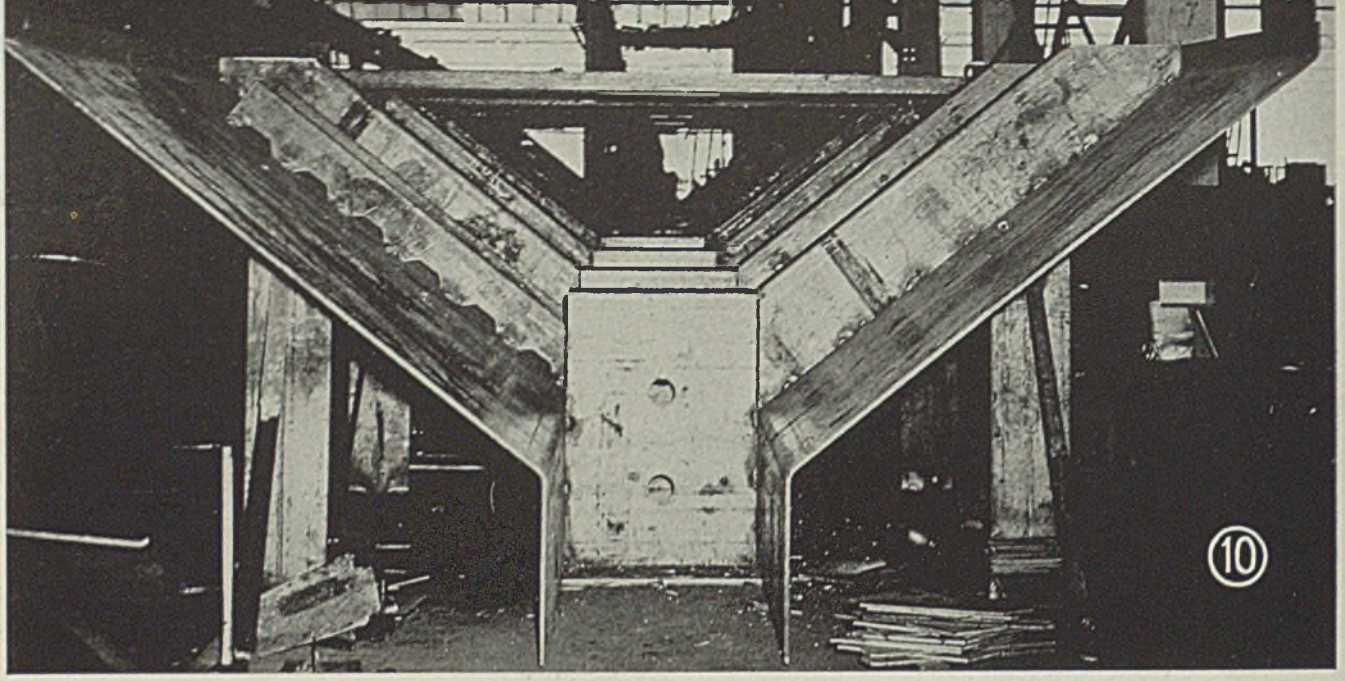



*Fig. 10—Section of keel of caisson in second group, shown as subassembled in the shop*

when the dock closures were of rather small dimensions, caissons or gates were built exclusively of timber. Later, with the advent of the iron ship, this material was utilized to a great extent. In the present era of naval construction, caisson material consists mainly of steel.

**Analysis of Caissons:** In the earlier forms of framing arrangement, the design of the caisson involved no complex problems. The panels of timber were analyzed as simple beams spanning the two walls of the dry dock, each carrying the hydrostatic load within its

(*Please turn to Page* 123)

# HEATING DATA

*. . . . affords easy-to-use guide in many low-temperature heat treating operations such as preheating for welding*

PREHEATING prior to welding is important on many types because it has the advantages of tending to eliminate the danger of formation of cracks and of reducing resulting hardness, distortion and shrinkage stresses, according to data recently released by Tempil Corp., 132 West Twenty-second street, New York.

Table I shows information reproduced from the "Tempil Heating Chart" copyrighted by this company. The purpose of this table is to indicate in the extreme righthand column the type of Tempil or Tempilstik to use to indicate the recommended preheat temperature. These are small pills or sticks which are placed on or rubbed against the metal to indicate when the particular temperature range for which they are designed has been reached. They constitute a simple yet fairly accurate temperature-measurement method.

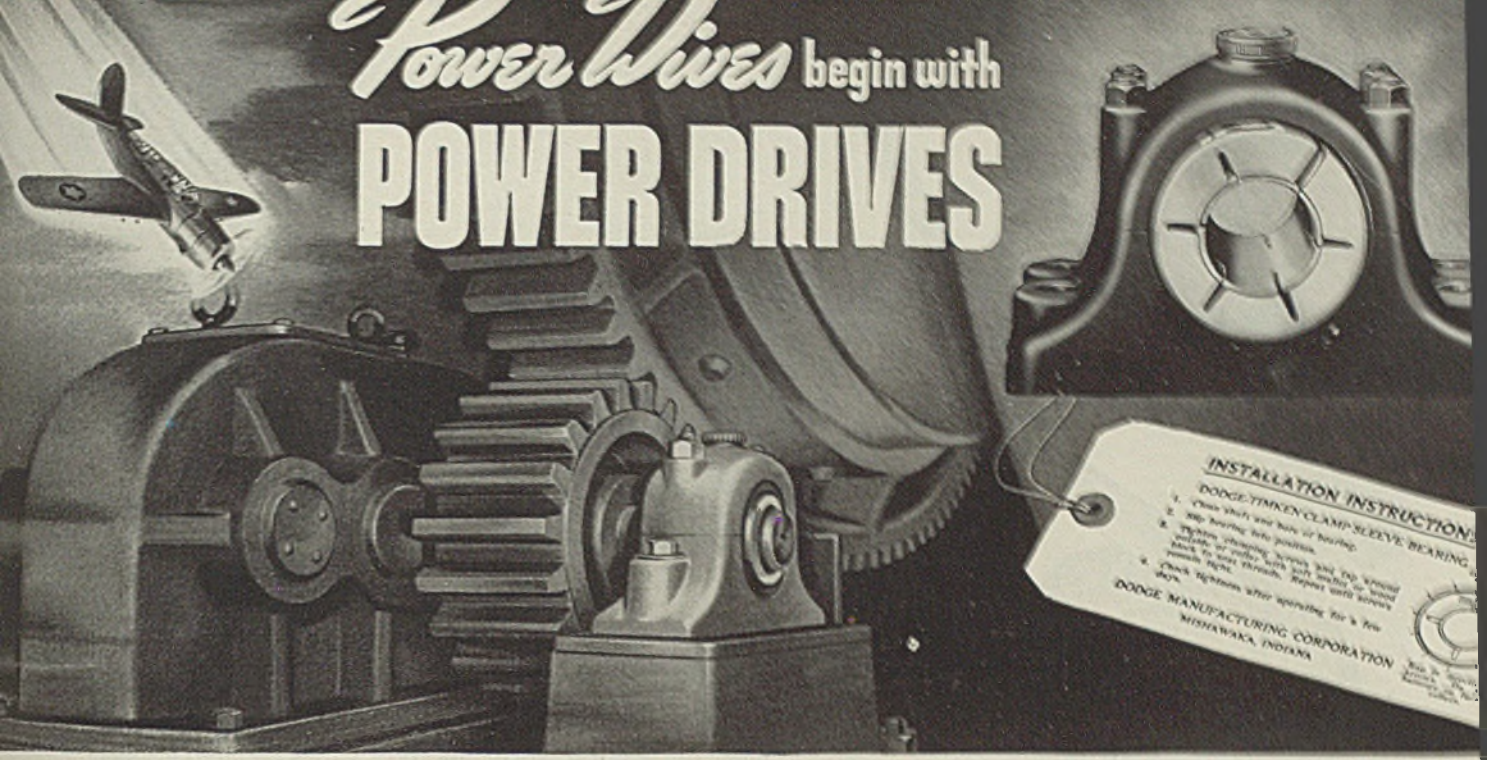
The need for preheating increases as the following factors are changed:

—The larger the mass being welded.
—The lower the temperature of the pieces being welded.
—The lower the atmospheric temperature.
—The smaller the weld rod in diameter.
—The greater the speed of welding.
—The higher the carbon content of the steel.
—The higher the manganese content.
—The greater the alloy content in air-hardening steels.
—The more the air-hardening capacity of the steel.
—The greater the difference in mass between the two pieces being joined.
—The more complicated the shape or section of the parts.

In addition to indicating preheat temperatures for welding, the use of Tempils or Tempilstiks is also recommended for indicating temperatures in hard surfacing, torch or flame-cutting, heat treating, making shrink fits, brazing, soldering and similar work.

**TABLE I—"Tempil" Heating Data**

| Metal Group | Metal Designation | Approximate Composition—Per Cent C. | Mn. | Si. | Cr. | Ni. | Mo. | Cu. | Recommended Preheat, Deg. Fahr. | Use These Tempils or Tempilstiks |
|---|---|---|---|---|---|---|---|---|---|---|
| Plain Carbon Steels | Plain Carbon Steel | Below .20 | . . | . . | . . | . . | . . | . . | Up to 200 | 200 |
| | Plain Carbon Steel | .20-.30 | . . | . . | . . | . . | . . | . . | 200-300 | 200-300-400 |
| | Plain Carbon Steel | .30-.45 | . . | . . | . . | . . | . . | . . | 300-500 | 300-400-500 |
| | Plain Carbon Steel | .45-.80 | . . | . . | . . | . . | . . | . . | 500-800 | 500-600-700-800 |
| Carbon Moly Steels | Carbon Moly Steel | .10-.20 | . . | . . | . . | . . | .50 | . . | 300-500 | 300-400-500 |
| | Carbon Moly Steel | .20-.30 | . . | . . | . . | . . | .50 | . . | 400-600 | 400-500-600 |
| | Carbon Moly Steel | .20-.35 | . . | . . | . . | . . | .50 | . . | 500-800 | 500-600-700-800 |




THE power dive that ends in vengeance for the treachery of Pearl Harbor, begins with power drives which convert horsepower into battle power.

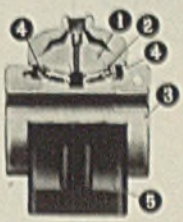
Power drive efficiency begins with bearings — guardians of vital horsepower on every power drive. Dodge Rolling Bearings insure factory-engineered efficiency for your drives. They are completely assembled, factory adjusted, prelubricated, shipped ready to install on the shaft and run at full load. There is no possibility of dirt entering Dodge Bearings as they are sealed both on and off the shaft. Ease of mounting saves precious time, and unit installation protects them from possible damage.

The right bearing for many of today's production jobs is the Dodge-Timken Clamp Sleeve Bearing. It is a general purpose bearing — rugged and dependable — designed for a life expectancy of 30,000 hours of service under conditions for which it is adapted. It is sealed against dust, dirt and lubrication leakage — 50,000,000 revolutions can be expected from one lubrication. Many types and sizes available immediately from local stocks.

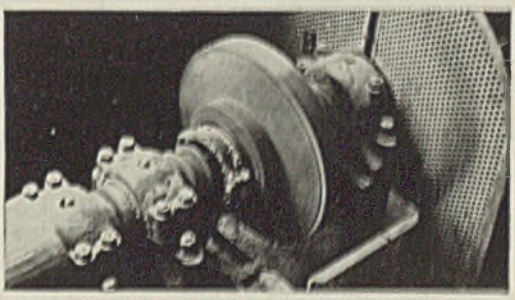
*Dodge Distributors specializing in "The Right Drive for Every Job" provide industry with a source of supply from local stocks, including alternate selections. They offer their services in checking performance — assisting in modernization and extending equipment life. You can depend on them for valuable assistance in putting all your power in the job.*

**DODGE MANUFACTURING CORPORATION**
Mishawaka, Indiana, U. S. A.

## Features of Dodge-Timken Clamp Sleeve Bearings



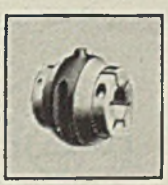

1. Full ball and socket self alignment guards against wear and power waste — simplifies installation.
2. Timken tapered roller bearings give full radial and thrust load capacity — vital to putting all power in production.
3. Full length sleeve gives larger distribution of load — reduces pressure — saves wear and power — lengthens drive life.
4. Indestructible steel seals guard against lubrication loss and admission of dirt — insure long hours of operation with little maintenance.
5. Rugged, well proportioned outer housing gives over-all protection to bearing.



*Dodge-Timken Clamp Sleeve Pillow Blocks on Paper Machine Drive. Note also the Dodge Diamond "D" Clutch. This combination of Dodge-Timken bearings and Dodge clutches has been adopted in many mills because of dependable operation and low maintenance.*

Dodge-Timken Clamp Sleeve Ball and Socket Pillow Block.

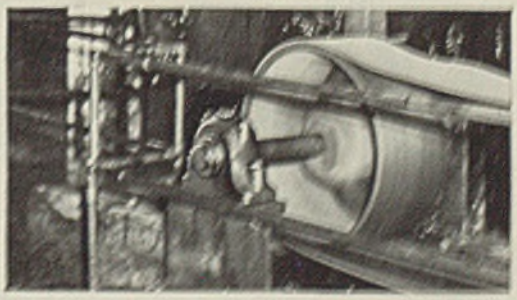
Dodge-Timken Clamp Sleeve "S1" Pillow Block.



Dodge-Timken Clamp Sleeve "D" Unit Mount.

Dodge-Timken Clamp Sleeve "B1" Unit Mount.

Dodge-Timken Clamp Sleeve "S1" Unit Mount.



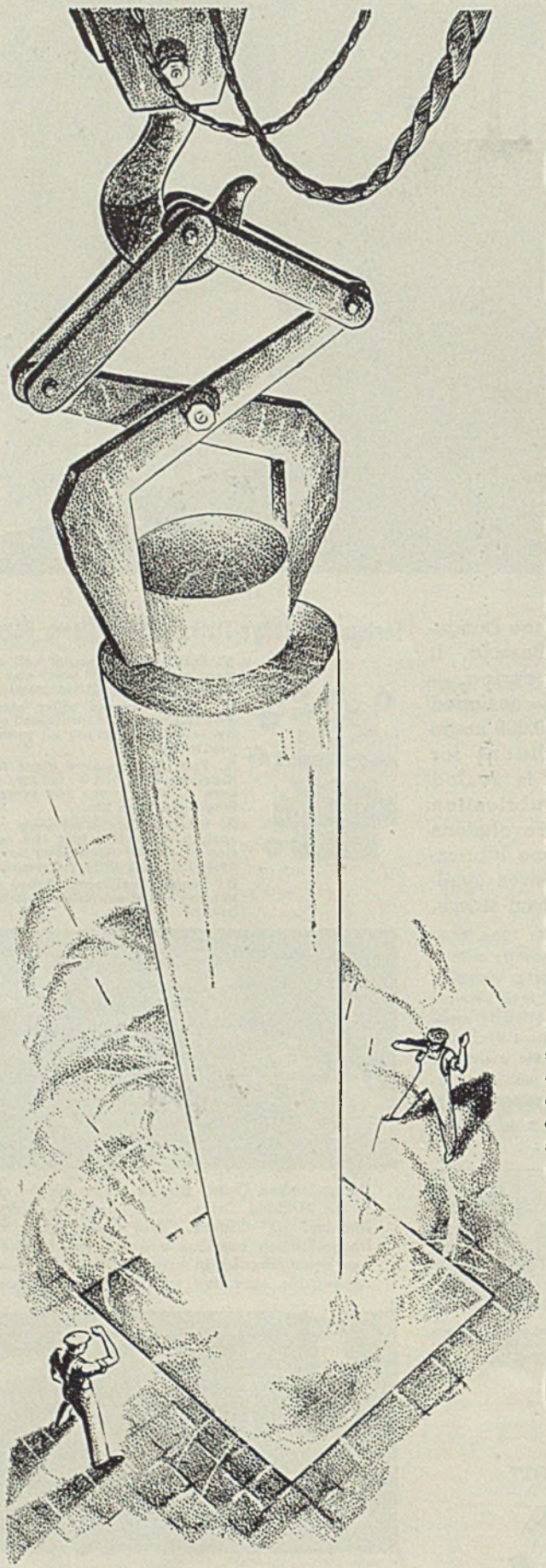
*Dodge-Timken Clamp Sleeve Bearings on Draw Rack Drive in Steel Mill. These bearings are designed for a life expectancy of 30,000 hours and normally require renewal of lubricant every 50,000,000 revolutions.*

*THROW YOUR SCRAP INTO THE SCRAP*

*BUY U. S. WAR BONDS FOR VICTORY!*

**DODGE**
MISHAWAKA

THE RIGHT DRIVE FOR EVERY JOB



# CITIES SERVICE HELPS TOUGHEN THE MUSCLES OF VICTORY

There's a crying need for more *and better* steel. It's your job to meet that demand . . . and Cities Service can help you do it.

Under the severest on-the-job tests, Cities Service Oils have proved *precision-perfect* for the exacting demands of wartime steel production. You'll welcome their help on such vital problems as quenching, heat-treating, machining, scale formation and rust.

You'll find it helpful, too, to confer with a Cities Service Lubrication Engineer, an experienced specialist who is right up-to-the-minute on lubrication developments in the steel industry. You'll value his suggestions on how to meet your quotas more efficiently, more economically.

Get in touch with your nearest Cities Service office and ask to have a Cities Service Lubrication Engineer call on you. No cost nor obligation, of course.

### A NOVEL INSTRUMENT

The Cities Service Industrial Heat Prover is a special instrument developed by the Cities Service Research Laboratory. It enables those engaged in the oxygen control of furnace atmospheres to achieve certain physical results desired in the processing of metal, or in the control of the amount of combustibles present. Recordings are continuous and almost instantaneous. Full informationon request.

CITIES SERVICE OILS
ONCE-ALWAYS

## CITIES SERVICE OIL COMPANY

**Room 1326, Sixty Wall Tower, New York**

**or any of the following offices:**

**CHICAGO . CLEVELAND . ST. PAUL**
**KANSAS CITY . BOSTON . TORONTO**

**or to**

## ARKANSAS FUEL OIL COMPANY

**SHREVEPORT . ATLANTA . BIRMINGHAM**

Table—Cont. from Page 104.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manganese Steels | Silicon Structural Steel | .35 | .80 | .25 | | | | | | | 300-500 | 300-400-500 |
| | Medium Manganese Steel | .20-.25 | 1.0-1.75 | | | | | | | | 300-500 | 300-400-500 |
| | SAE T 1330 Steel | .30 | 1.75 | | | | | | | | 400-600 | 400-500-600 |
| | SAE T 1340 Steel | .40 | 1.75 | | | | | | | | 500-800 | 500-600-700-800 |
| | SAE T 1350 Steel | .50 | 1.75 | | | | | | | | 600-900 | 600-700-800-900 |
| | 12% Manganese Steel | 1.25 | 12.0 | | | | | | | | Usually Not Required | |
| High Tensile Steels (See Also Steels Below) | Manganese Moly Steel | .20 | 1.65 | .20 | | | .35 | | | | 300-500 | 300-400-500 |
| | Jalten Steel | .35 Max. | 1.50 | .30 | | | | .40 | | | 400-600 | 400-500-600 |
| | Manten Steel | .30 Max. | 1.35 | .30 | | | | .20 | | | 400-600 | 400-500-600 |
| | Armco High Tensile Steel | .12 Max. | | | | .50 Min. | .05 Min. | .35 Min. | | | Up to 200 | 200 |
| | Double Strength No. 1 Steel | .12 Max. | .75 | | | .50-1.25 | .10 Min. | .50-1.50 | | | 300-600 | 300-400-500-600 |
| | Double Strength No. 1A Steel | .30 Max. | .75 | | | .50-1.25 | .10 Min. | .50-1.50 | | | 400-700 | 400-500-600-700 |
| | Mayari R Steel | .12 Max. | .75 | .35 | .2-1.0 | .25-.75 | | .60 | | | Up to 300 | 200-300 |
| | Otiscoloy Steel | .12 Max. | 1.25 | .10 Max. | .10 Max. | | | .50 Max. | | | 200-400 | 200-300-400 |
| | NAX High Tensile Steel | .15-.25 | | .75 | .60 | .17 | .15 Max. | .25 Max. | Zr. .12 | | Up to 300 | 200-300 |
| | Cromansil Steel | .14 Max. | 1.25 | .75 | .50 | | | | | | 300-400 | 300-400 |
| | A.W. Dyn-El Steel | .11-.14 | | | | | | .40 | | | Up to 300 | 200-300 |
| | Corten Steel | .12 Max. | | .25-1.0 | .5-1.5 | .55 Max. | | .40 | | | 200-400 | 200-300-400 |
| | Chrome Copper Nickel Steel | .12 Max. | .75 | | .75 | .75 | | .55 | | | 200-400 | 200-300-400 |
| | Chrome Manganese Steel | .40 | .90 | | .40 | | | | | | 400-600 | 400-500-600 |
| | Yoloy Steel | .05-.35 | .3-1.0 | | | 1.75 | | 1.0 | | | 200-600 | 200-300-400-500-600 |
| | Hi-Steel | .12 Max. | .6 | .3 Max. | | .55 | | .9-1.25 | | | 200-500 | 200-300-400-500 |
| Nickel Steels | SAE 2015 Steel | .10-.20 | | | | .50 | | | | | Up to 300 | 200-300 |
| | SAE 2115 Steel | .10-.20 | | | | 1.50 | | | | | 200-300 | 200-300 |
| | 2½% Nickel Steel | .10-.20 | | | | 2.50 | | | | | 200-400 | 200-300-400 |
| | SAE 2315 Steel | .15 | | | | 3.50 | | | | | 200-500 | 200-300-400-500 |
| | SAE 2320 Steel | .20 | | | | 3.50 | | | | | 200-500 | 200-300-400-500 |
| | SAE 2330 Steel | .30 | | | | 3.50 | | | | | 300-600 | 300-400-500-600 |
| | SAE 2340 Steel | .40 | | | | 3.50 | | | | | 400-700 | 400-500-600-700 |
| Medium Nickel Chromium Steels | SAE 3115 Steel | .15 | | | .60 | 1.25 | | | | | 200-400 | 200-300-400 |
| | SAE 3125 Steel | .25 | | | .60 | 1.25 | | | | | 300-500 | 300-400-500 |
| | SAE 3130 Steel | .30 | | | .60 | 1.25 | | | | | 400-700 | 400-500-600-700 |
| | SAE 3140 Steel | .40 | | | .60 | 1.25 | | | | | 500-800 | 500-600-700-800 |
| | SAE 3150 Steel | .50 | | | .60 | 1.25 | | | | | 600-900 | 600-700-800-900 |
| | SAE 3215 Steel | .15 | | | 1.00 | 1.75 | | | | | 300-500 | 300-400-500 |
| | SAE 3230 Steel | .30 | | | 1.00 | 1.75 | | | | | 500-700 | 500-600-700 |
| | SAE 3240 Steel | .40 | | | 1.00 | 1.75 | | | | | 700-1000 | 700-800-900-1000 |
| | SAE 3250 Steel | .50 | | | 1.00 | 1.75 | | | | | 900-1100 | 900-1000-1100 |
| | SAE 3315 Steel | .15 | | | 1.50 | 3.50 | | | | | 500-700 | 500-600-700 |
| | SAE 3325 Steel | .25 | | | 1.50 | 3.50 | | | | | 900-1100 | 900-1000-1100 |
| | SAE 3435 Steel | .35 | | | .75 | 3.00 | | | | | 900-1100 | 900-1000-1100 |
| | SAE 3450 Steel | .50 | | | .75 | 3.00 | | | | | 900-1100 | 900-1000-1100 |
| Moly Bearing Chromium and Chromium Nickel Steels | SAE 4140 Steel | .40 | | | .95 | | .20 | | | | 600-800 | 600-700-800 |
| | SAE 4340 Steel | .40 | | | .65 | 1.75 | .35 | | | | 700-900 | 700-800-900 |
| | SAE 4615 Steel | .15 | | | | 1.80 | .25 | | | | 400-600 | 400-500-600 |
| | SAE 4630 Steel | .30 | | | | 1.80 | .25 | | | | 500-700 | 500-600-700 |
| | SAE 4640 Steel | .40 | | | | 1.80 | .25 | | | | 600-800 | 600-700-800 |
| | SAE 4820 Steel | .20 | | | | 3.50 | .25 | | | | 600-800 | 600-700-800 |
| Low Chrome Moly Steels | 2% Cr.-½% Mo. Steel | Up to .15 | | | 2.0 | | 0.5 | | | | 400-600 | 400-500-600 |
| | 2% Cr.-½% Mo. Steel | .15-.25 | | | 2.0 | | 0.5 | | | | 500-800 | 500-600-700-800 |
| | 2% Cr.-1% Mo. Steel | Up to .15 | | | 2.0 | | 1.0 | | | | 500-700 | 500-600-700 |
| | 2% Cr.-1% Mo. Steel | .15-.25 | | | 2.0 | | 1.0 | | | | 600-800 | 600-700-800 |
| Medium Chrome Moly Steels | 5% Cr.-½% Mo. Steel | Up to .15 | | | 5.0 | | 0.5 | | | | 500-800 | 500-600-700-800 |
| | 5% Cr.-½% Mo. Steel | .15-.25 | | | 5.0 | | 0.5 | | | | 600-900 | 600-700-800-900 |
| | 8% Cr.-1% Mo. Steel | .15 Max. | | | 8.0 | | 1.0 | | | | 600-900 | 600-700-800-900 |
| Plain High Chromium Steels | 12-14% Cr. Type 410 | .10 | | | 13.0 | | | | | | 300-500 | 300-400-500 |
| | 16-18% Cr. Type 430 | .10 | | | 17.0 | | | | | | 300-500 | 300-400-500 |
| | 23-30% Cr. Type 446 | .10 | | | 26.0 | | | | | | 300-500 | 300-400-500 |
| High Chrome Nickel Stainless Steels | 18% Cr. 8% Ni. Type 304 | .07 | | | 18.0 | 8.0 | | | | | Usually do not require preheat but it may be desirable to remove chill. | |
| | 25-12 Type 309 | .07 | | | 25.0 | 12.0 | | | | | | |
| | 25-20 Type 310 | .10 | | | 25.0 | 20.0 | | | | | | |
| | 18-8 Cb. Type 347 | .07 | | | 18.0 | 8.0 | | | Cb. 10XC | | | 200 |
| | 18-8 Mo. Type 316 | .07 | | | 18.0 | 8.0 | 2.5 | | | | | |
| | 18-8 Mo. Type 317 | .07 | | | 18.0 | 8.0 | 3.5 | | | | | |
| Irons | Cast Iron | | | | | | | | | | 700-900 | 700-800-900 |
| | Ni Resist | | | | | | | | | | 500-1000 | 500-700-900-1000 |
| Nonferrous | Aluminum | | | | | | | | | | 500-700 | 500-600-700 |
| | Monel | | | | | | | | | | 200-300 | 200-300 |
| | Nickel | | | | | | | | | | 200-300 | 200-300 |
| | Inconel | | | | | | | | | | 200-300 | 200-300 |
| | Copper | | | | | | | | | | 500-800 | 500-600-700-800 |
| | Zinc | | | | | | | | | | 200-300 | 200-300 |

## Designs for Nonmetallic Reflectors Approved

Proposed simplified designs for nonmetallic reflectors for industrial fluorescent lighting fixtures recently were approved by the industry, and will he promulgated as a simplified practice emergency recommendation according to the Division of Simplified Practice, National Bureau of Standards, Washington.

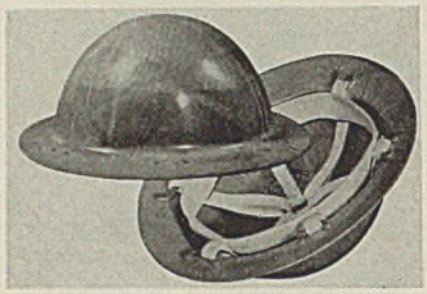
The recommendation was developed at the request of the Building Materials Branch of the War Production Board to assist the industry to comply with the provisions of the amended Limitation Order L-73, "Fluorescent Fixtures", issued by WPB Oct. 19, this year. This order includes the requirement that nonmetallic materials be substituted in the manufacture of reflectors for fluorescent lights. The recommendation became effective Oct. 20 for new production, where the manufacturers would have to make any additions to existing dies or forming equipment, and will be designated as simplified practice emergency recommendations ER1-42.

This simplification of designs covers recommended dimensions, with tolerances, on standard R.L.M. reflectors, and will result in an estimated savings of steel of at least 50 tons a day it is reported.

# INDUSTRIAL EQUIPMENT

## Safety Hat

B. F. McDonald Co., 1248 South Hope street, Los Angeles, has introduced a new type P safety hat of laminated bakelite which features exceptional strength

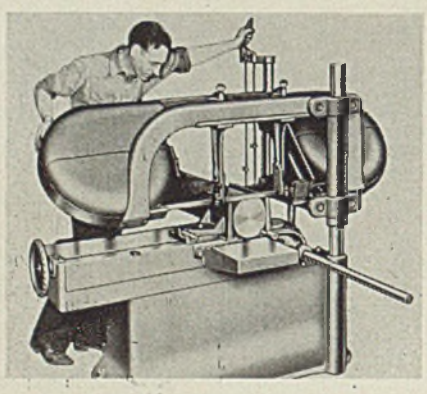


and resistance to heavy blows. It provides the wearer with adequate ventilation in hot weather, and its light weight makes it comfortable to wear over day-long periods. Headband of the helmet is fully suspended to provide a cushioning hammock against the shock of heavy blows. In addition it is adjustable to all head sizes.

## Cut-Off Saw

Wells Mfg. Co., Three Rivers, Mich., recently developed a V-12 metal cut-off saw for use in production cutting. It has a rectangular capacity of 16 x 12 inches and handles rounds up to 12 inches in diameter.

The machine features speeds of 53,



94 and 148 feet per minute. Its power is derived from a ¾-horsepower motor, by means of a V-belt. Bed of the machine measures 12 inches. Blade size used is 1 x 0.32 x 13 feet 9 inches.

## Welding Machine

Wilson Welder & Metals Co. Inc., 60 East Forty-second street, New York, announces a new improved Bumble Bee alternating-current welder feature of which is its low open-circuit voltage of 42 volts, automatically and positively maintained by means of recent developments.

Two primary coils are used instead of the usual one, with a magnetic contactor in the circuit of one primary. Each primary contributes approximately 42 volts to the total open-circuit voltage, which is actually 84 to 85 volts. However, when the machine is idle one primary is automatically cut out, restricting the open circuit value to 42 volts. As soon as the electrode contacts the work, the second primary is thrown into the circuit, and if there were not a dead short, the voltage would be 84-85 volts.

When the operator draws an arc, this open-circuit potential of 84-85 volts enables him to establish his arc quickly and begin welding. When welding is completed and the operator pulls out or lengthens his arc, the arc voltage rises. The moment it reaches 45 volts, the con-


tactor opens and cuts out one primary, leaving only 42 volts in the open circuit.

Welder is portable and streamlined, and its 18-inch width permits easy passage through narrow doors. It has dual voltage connections for either 220 or 440 volts and thermal overload protection provided by a cutout coil buried in the winding. A single hand-wheel control gives an infinite number of current adjustments

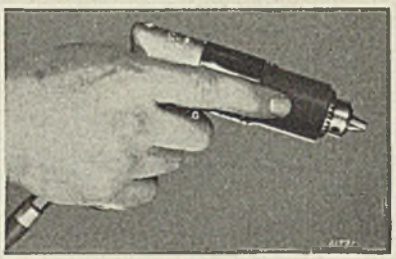
## Pocket Protractor

Industrial Engineering Co. Inc., Board of Trade Building, Chicago, announces a new pocket protractor for use by those engaged in the manufacturing-design or servicing of all classes of tools and machine work. It will measure directly any small or large surface angle such as are ground in tool bits without the aid of any attachments; measure the taper on shallow blind holes or tooth angles on broaches.

The adjustable sliding arm of the device can be swung 360 degrees. These degree graduations are arranged so the component angle can be read directly as well as the angle required. The sliding arm of the protractor also has been graduated so that the exact depth of holes can be measured.

## Pneumatic Drill

Ingersoll-Rand Co., 11 Broadway, New York, announces a new lightweight size OCA pneumatic drill which weighs less

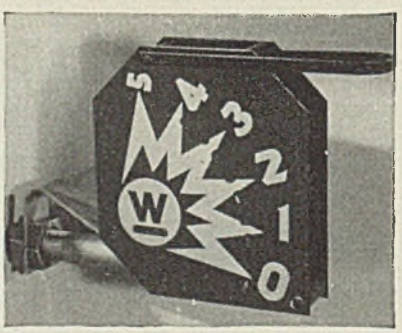


than two pounds, and powered by a Multi-Vane air motor constructed to stand three-shift operations. It features a built-in speed regulator that can be set for desired performance. A split-second throttle action permits quick, accurate hole-starting. Lubrication is provided by a built-in automatic oiler.

Because of its light weight and pistol grip, the drill can be used hour after hour without fatigue making it an ideal tool for women operators. A chuck protective shield also enables the operator to guide the drill more effectively by grasping the shield with fingers of his free hand.

## Operation Counter

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new operation counter for protector tubes used on 13.8 to 138 kilovolt transmission lines. It is designed to be mounted




on the vent pipe from the protector tube.

When the protector tube operates, part of the gas blast leaves through the small horizontal tube on which the counter is mounted, blows off on the copper blades in the counter box causing the box to fall into another angular posi-

# With Their Help We'll Win

*These women, machining precision parts on South Bend Lathes in a vital war plant, are typical of thousands of women who are doing their part to win the battle of production.*

With eager hearts and nimble fingers, thousands of American women are working shoulder to shoulder with men in vital war industries — replacing those who have left their machines to defend their country. And they are doing a fine job of filling men's shoes, for they know that the battle of production must be won to keep their men at the front supplied with the guns, planes, tanks, bullets, and thousands of other things an army must have to be victorious.

Women learn to operate South Bend Lathes in a surprisingly short time. Not that just any girl can become an expert machinist or toolmaker over night. But on certain classes of work—the kind of work you would expect a beginner to do—women are highly successful.

Quick to appreciate quality, women like South Bend Lathes. They like the fully enclosed design with no exposed pulleys, belts, or gears—the smooth operation of conveniently placed controls—the absence of rough edges and sharp corners that might catch their clothing—the dependable precision that enables them to turn out maximum production, even when extremely close tolerances are specified. And, most of all, they appreciate the ease of operation which reduces fatigue to a minimum and seemingly shortens the work-day by hours.

South Bend Engine Lathes and Toolroom Lathes are made in four sizes, 9″ to 16″ swings. South Bend Turret Lathes are available in three sizes. Write for information, specifying size and type of lathe in which you are interested.


**"HOW TO RUN A LATH**

A valuable handbook for a prentice training. Explains t operation and care of engi lathes. 128 pages—365 illust tions. Sent postpaid for a 2 War Stamp.

ARMY E NAVY

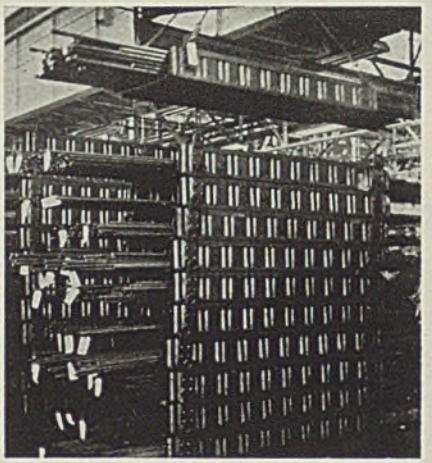
SOUTH BEND LATHE WORKS

tion. Each time a blade is blown out the new position of the counter indicates the number of times the protector tube has operated.

Instructions for the device give methods of mounting it on practically all types of protector tubes. Blades are available for reloading, and the counter is provided with a loop-shaped strap which makes it possible to install and remove it by means of a hook stick.

## Skid Platform

Union Metal Mfg. Co., Canton, O., announces a new type materials handling unit, an open-end inverted skid for moving and storing long bars or odd-shaped parts. Units actually are standard skid



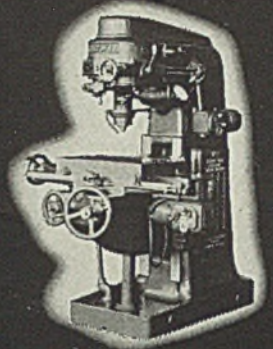
platforms, turned upside down and equipped with eyed brackets for insertion of crane hooks. Their corrugated design provides added strength and durability, and they can be handled well with crane, hand pallet or power fork trucks.

## Turret Lathe

International Machine Tool Corp., Foster Division, Elkhart, Ind., announces a new No. 5 ram type turret lathe featuring a collet chuck capacity of 2 inches in diameter, and having a 17½ inch swing over the ways. Supplied complete with tools for both bar and chucking work, it will accommodate 8, 10 and 12-inch diameter chucks, in addition to special attachments which conform to specific types of turret lathe work.

Attachments include bar feed and collet chuck, taper attachment and threading attachment. The heavy machine bed of the lathe features cross ribs that provide reinforcement for supporting the carriages. The headstock top supports the transmission shafts. The double bed ways are of semi-steel, tongued and grooved. Spindle control is provided by a lever mounted on top of the headstock, which controls the double multiple disk clutch on the main drive

**Machines, Accessories and Attachments for a Wide Variety of Needs:**



Rotary Head Milling Machine

Autometric Jig Boring Machine

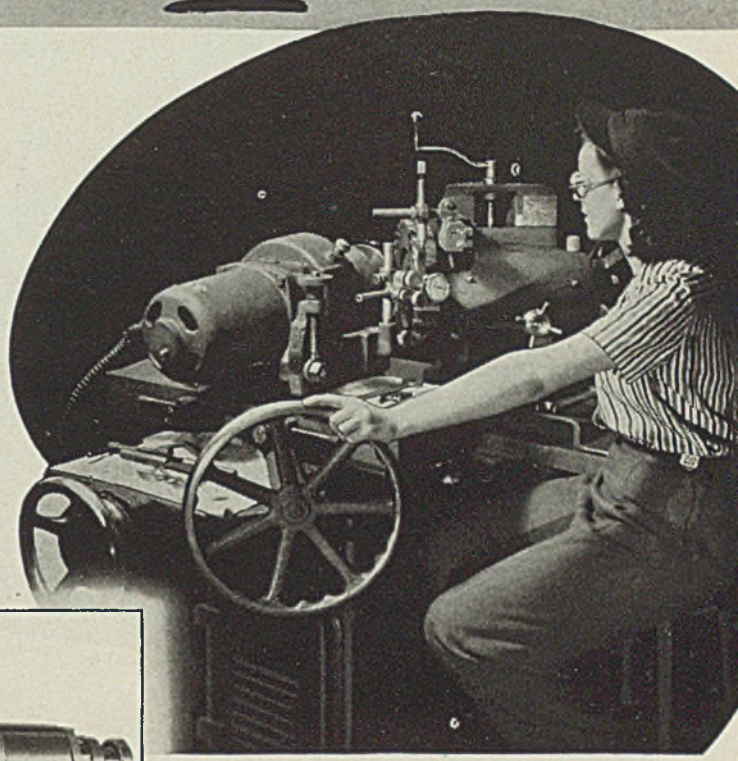
Milwaukee Midgetmill

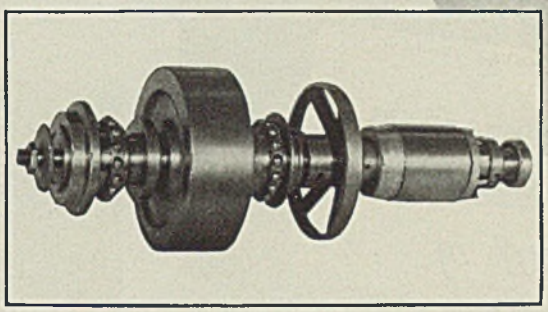
Milwaukee Speedmill

Milwaukee Face Mill Grinder

# THE MILWAUKEE FACE MILL GRINDER GIVES YOU *ALL* THREE!

1. UNUSUAL RIGIDITY
2. REDUCED SHARPENING TIME
3. ACCURACY TO WITHIN .0002 PER INCH





The three-bearing spindle rotates at 3,400 R.P.M. and carries a heavy flywheel, the inertia of which when in motion successfully keeps the abrasive wheel up to grinding speed. Sharpening time has been considerably reduced as a result.

THE basic design of the Milwaukee Face Mill Grinder embodies strength, precision, and capacity. It is capable of sharpening Tungsten Carbide Cutters ranging from 3" to 16" in diameter — grinds the blades to within .0002 per inch.

Set-ups are quickly made with graduated dials, facilitating adjustments. Other controls are handily located for simplified operation.

## OTHER IMPORTANT FEATURES:

1. Jeweled bearing dial indicator for accurate checking.
2. Finger tip control.
3. Fine thread precision saddle screw.
4. Hand screw permits angular setting of 15° on either side.
5. No adapters necessary.
6. Spindle has No. 50 National Standard Taper.
7. Blower system at slight extra cost.

## Reject the Source of the Error . . . not the Finished Product . . . Use CENTER SCOPE!

The Center Scope is an optical locating machine shop tool, constructed for use on any machine from jig borers to bench drills. No technical knowledge or training is needed to use it. It is a necessary production tool — necessary today because you are interested in saving time — tomorrow, because you will be interested in saving cost.

Built in various models; variable and rotating Center Scope priced at $97.00, with taper shank, $125.00; Special Center Scope, $125.00 — Edge Block, $23.00 additional.

*Write Department CS, for complete information.*

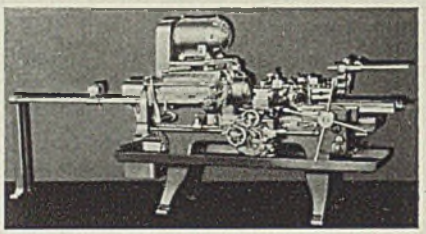
**KEARNEY & TRECKER PRODUCTS CORPORATION • *Milwaukee, Wisconsin***

**Kearney & Trecker *Products* CORPORATION**

shafts. It is used to shift the machine into neutral. Lever marked R controls forward and reverse spindle rotation.

The all-geared headstock provides 8 spindle speeds which are controlled by 3 levers mounted on top of the headstock convenient to the operator. Individual motor drive is provided for the machine, and power is transmitted by silent-operating multiple V belts. The carriage is provided with 6 reversible cross and longitudinal feeds which operate independent of the hexagon turret carriage. Feeds are engaged by individual levers which operate large diameter friction clutches. Machine's cross slide holds the quick indexing square turret at the front. Rear of the slide is drilled and tapped for holding rear tool holders and forming tool holders.

Six power feeds are available with the hexagon turret ram slide carriage. These are engaged by a quick-acting lever on the turret apron. Automatic feed trip



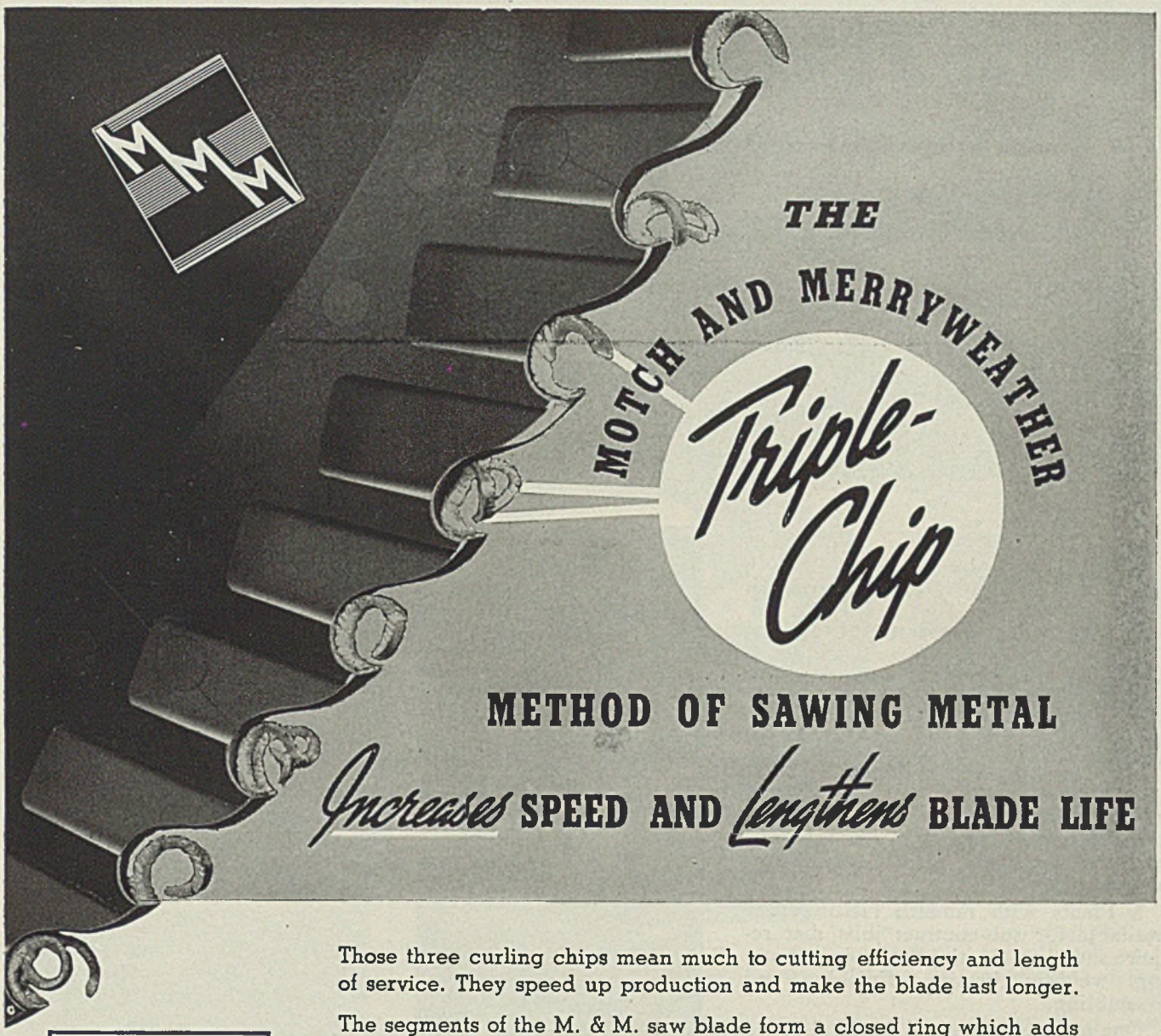
and dead stop is provided for each face of the hexagon turret by means of a 6-screw stop roll. The hexagon turret is automatically unclamped, indexed and reclamped by means of a 4-spoke pilot wheel which controls the forward and reverse movement of the ram slide. Lubrication is applied automatically to the machine, the headstock serving as a reservoir.

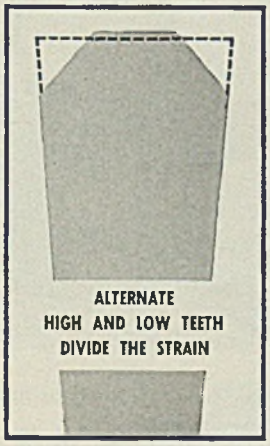
## Bonding Ring

Cannon Electric Development Co., Los Angeles, announces a new bonding ring which may be used wherever there is a need for bonding between an electrical plug shell and wire shielding, and may be used with either flexible conduit coupling nut or cable clamp. It is used almost exclusively at present in bonding shielded radio and instrument circuits but is adaptable to many other applications where a tight bond is required. The unit is said to fit a variety of conduit nuts.

## Motor Relay

Barber-Colman Co., Rockford, Ill., announces a new Motorelay for use with any floating contact device in applications where the control current exceeds the contact rating of the control instrument. Construction of the unit includes




Those three curling chips mean much to cutting efficiency and length of service. They speed up production and make the blade last longer.

The segments of the M. & M. saw blade form a closed ring which adds strength and rigidity. Each two teeth, ground alternately high and low, make a cycle. The first, or higher, tooth has the corners bevelled off at a 45-degree angle. The middle third of the cutting edge meets the work, *taking out the center of the cut.* The second or finishing tooth, slightly lower but full width, *removes the two remaining corners.*

This distributes the shock. One wide and two narrow chips are formed. The bevelled blade does not have to "get under" the full load. The strain on the finishing tooth is likewise divided.

Strain and frictional heat per tooth are reduced. Heavier feeds lower cutting time. Squarer cutting results. The blade "lives longer."

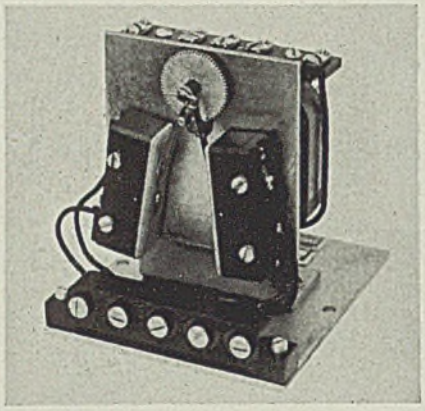
*Many other practical advantages, too. Get the full story in our new "Flyer."*

**THE MOTCH & MERRYWEATHER MACHINERY COMPANY**
Penton Building Cleveland, Ohio

*Built by* **MOTCH & MERRYWEATHER**

MOTCH AND MERRYWEATHER THE MACHINERY CO
CLEVELAND CINCINNATI DETROIT PITTSBURGH

a shaded pole, reversible geared-head motor, totally enclosed switches and switching mechanism. An enclosed type

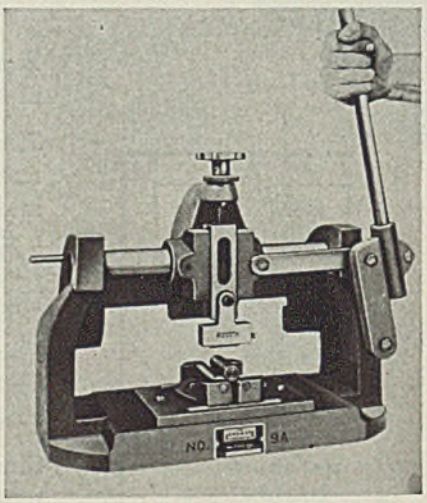


drawn steel cover also is available.

Units' switch contacts have a non-inductive load capacity of 10 amperes at 110 or 230 volts alternating current. The control circuit current is 0.35 amperes at 25 volts.

## Marking Machine

Acromark Corp., 398 Morrell street, Elizabeth, N. J., announces a new No. 9A marking machine designed to permit untrained personnel to make perfect markings at all times on shell, shot, tubular and cylindrical parts and pieces. It is offered with a diversity of accessories for precision markings



with either the hand operated or motor-driven marking machine.

Operation is claimed to be extremely simple. At the pull of the lever, a uniform mark of any desired depth is made; another part is marked on the return stroke. The motorized unit can be operated at a set speed to suit the feeding speed of the operator.

Construction consists of gray iron castings for base and head, shaft and bearing bar of cold drawn steel, head

gibs and slide of tool steel, and all bearing surfaces are cast iron against steel. Unit measures 14⅜ inches in height, 17¼ inches in length and 7¾ inches in depth.

## Safety Clothing

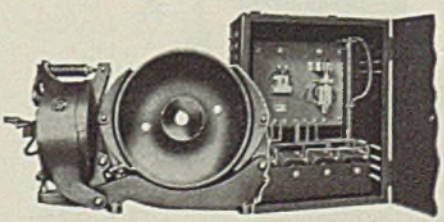
General Electric Co., Schenectady, N. Y., announces a complete line of safety clothing designed especially for women welding operators. Safety, durability, and smart styling are combined in the new line which is based on the results of an extensive industrial survey of safety requirements for women welders, according to the company.

Featured in the line are leather

sleeves, aprons, jackets, leather gloves, and a special women's head and hair covering. The head covering protects the hair from sparks and slag, and can be used with any of the modern welding helmets. All items in the line are comfortable, and light in wei_ht—yet they provide full protection.

## Crane Brake

Electric Controller & Mfg. Co., Cleveland, announces a WPB crane or hoist brake for service on alternating-current circuits. Its main feature is its speed of operation in setting and releasing to



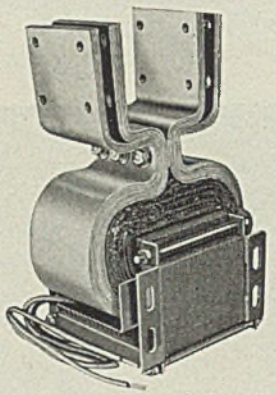
make possible accurate inching of hoists, cranes etc. The brake is spring-set and magnetically released. It and its rectifier-unit are available for use with any

magnetic or manual control.

A standard brake includes the following apparatus: Proper size brake with Ecamite wheel for floor mounting; copper-oxide rectifier; double-break contactor between rectifier and brake; current-reducing, adjustable resistor and relay.

## Welding Transformer

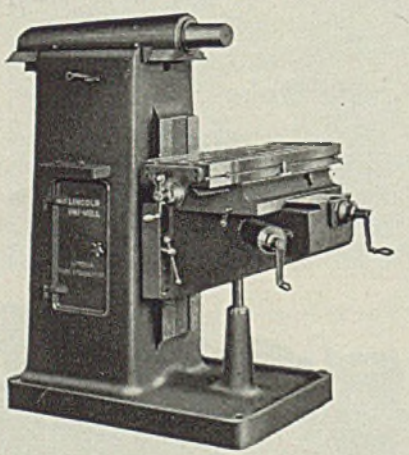
Acme Electric & Mfg. Co., Cuba, N. Y., announces development of special welding transformers for operation on primary circuits of 115 volts, single



phase, 60 cycle and having secondary characteristics of 0.75 volt, 1600 amperes. The development already is said to be playing a vital part in the country's war effort.

## Precision Miller

Lincoln Machine Specialties Co., 549 West Washington street, Chicago, has introduced a new heavy duty Uni-Mill machine which accommodates any high speed milling head. It is designed to

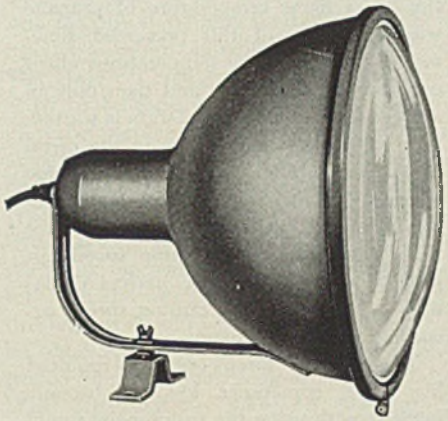


handle heavy duty high precision jobs thereby releasing power driven milling equipment for other essential work. The unit with its unusually large table—10 x 42 inches—handles up to a 30-inch cut. Ample stability for heavy pre-

cision work is assured by its 2300 pound weight. The machine is supplied either with or without detachable head.

## Floodlight

Commercial Metal Products Co., 2255 West St. Paul avenue, Chicago, has introduced a one-piece formed steel Comp-



co floodlight which can be installed and adjusted to almost any position because of its 3-way mounting. It is offered in all sizes from 200W to 1500W units.

## Slide Rule Helps User To "Find" Right Motor

To help motor users fill wartime motor needs with least possible delay, and conform to recent WPB recommendations, Allis-Chalmers Mfg. Co., Milwaukee, is offering a new "motor finder" which shows quickly how to select various types of squirrel-cage motors.

Standard types of the squirrel-cage—the most readily obtainable motor—are actually even more versatile than is commonly realized, the motor manufacturer points out.

With the "motor finder" slide-rule, the motor user is able to match the conditions under which the motor must operate at the proposed installation with the required motor characteristics and instantly learn the right motor type and its features. The slide-rule is offered free on request.

## Substitute Lighting Unit Saves 27 Pounds of Steel

Substitution of a new wooden fluorescent lighting unit for its metal products is announced by Wakefield Brass Co., Vermilion, O. This substitution is reported to effect a saving of 27 pounds of steel per 4-lamp unit.

Lighting characteristics of the metal unit are retained in the newer product. Its bass-wood louvers provide adequate shielding and are hinged for easy cleaning and relamping.

## Propane Cutting

(*Continued from Page 82*)

the metal. This makes for low machining costs.

It was once believed that oxypropane cutting time was slower, but this is quite decidedly disproved by the Dodge Steel Co.'s experience. The thought was that the lower flame temperature of propane was the cause of this presumed slowness. However, flame temperatures affect only the preheat time, and then only in a small degree. Once the action is started, it is the oxygen that burns up the metal in the cut. The function of the flame is mainly to maintain, control and direct the course of the oxidation. The lower flame temperature and flame speed appear to result in a more perfect oxidation and a more rapid cutting speed, according to this company.

The average torch operator required five days, sometimes less, to become familiar with using the oxypropane torch. Some patience is required to attain proper "feel" and manipulation. Cutters find that the quickest technique is to cut parallel to the greatest thickness wherever possible. To reduce preheat time, cuts should be started at some point which presents a rough edge rather than a smoothly rounded surface.

The oxypropane flame does not require a clean surface for the cutting operation. This reduces the amount of the cleaning and chipping required to prepare castings for cutting. The slightly lower flame temperature of the oxypropane torch melts a minimum amount of metal on each side of the cut. As a result, less molten metal flows down into the cut.

Aside from riser cutting, other industrial propane uses are being extended. Propane has replaced oil for annealing castings, in many instances permitting closer control over scaling conditions and operating temperatures. And when drying cores, the use of automatic temperature control with industrial propane lessens the hazard of burned cores. In fact, a better quality of core results. Too, smoke and fumes are eliminated.

Propane is also advantageous for the skin drying of molds. Having a specific gravity of 1.5, a fairly rich setting of the mold-drying torch produces a heavy air-gas mixture with high penetration through every portion of intricate molds and particularly those points below floor levels that are difficult to reach by other methods. A drying depth of better than 6 inches is easily obtained.

All this indicates there is sufficient evidence to warrant a restudy of propane as an industrial fuel by those technicians who may previously have ruled it out of consideration. Much progress has been made in equipment and technique.

(*Continued from Page 99*)

rials he is using and the use to which his product is being put.

We all know that in previous days the development of a new steel coursed along a thorny path and had to overcome many obstacles as well as prejudices. Not so with the NE steels; their introduction was rapidly made and their subsequent use even more rapidly accomplished. The chemical compositions were arrived at by conferences rather than by a series of experimental researches. Questions arose in the minds of the users and will continue to do so until the new steels "become of age". Some of these questions were: How will the new steels react to normalizing heat treatments for optimum machinability? How will they carburize and what type of case will be obtained? What hardness can be expected on direct quenching or reheating? What about fatigue life? Or chipping in clash gears?

All of these questions could arise with only one steel in earlier days, and here are two whole series in our midst. The task of learning all these things at first looked formidable, but in a remarkably short time considerable information from many laboratories was accumulated and made available to all publications—particularly the *Manufacturer's Standard Practice Supplementary Information Sheets* published by the American Iron and Steel Institute, all of which have appeared in STEEL. See list of articles p.99. Such data as resistance to fatigue and wear, torsional properties and carburizing characteristics as have been accumulated over a period of years on our prewar steels must yet be accumulated on the new steels. On the basis of the data made available so far, the NE 8000 series steels conform within certain limits to our former steels and appear to be measuring up to the predictions voiced for them by their originators.

**Conditioning for Machining:** The series of new steels running from NE 8615 up through the NE 8749 respond to normalizing heat treatments for machinability somewhat as do the regular SAE steels except that in general somewhat faster cycles can be used for equivalent carbon contents. This evidently is associated with the reduction in nickel content. The carburizing grades, especially, can be annealed faster with less tendency to form martensite as a result of withdrawal too early from the furnace at temperatures below 1000 degrees Fahr.

According to dilatometer tests the $Ar_1$ point of NE 8620 is 1270 degrees Fahr., whereas it is 1175 degrees Fahr. for SAE 4620. For a somewhat accelerated cool from the austenitizing tempera-

ture, an even greater divergence is possible. For the same cooling cycle from 1700 degrees Fahr., some idea of the decreased hardness obtainable with NE 8620 and NE 8720 in comparison with SAE 4600 and SAE 2515 is shown below:

Average Brinell Hardness After Retarded Cool from 1700 Degrees Fahr.

| | |
|---|---|
| NE 8620 | 137 |
| NE 8720 | 156 |
| SAE 4620 | 170 |
| SAE 2515 | 187 |

The above hardness values suggest that machine operations such as drilling, shaping and broaching might best be accomplished with a straight air cool from the normalizing temperature when employing the NE 8620 steel if the smoothest finish is required. Reports so far indicate that there has been no sacrifice in finish where the NE 8600 and 8700 carburizing grades have been used as alternates for prewar steels. Some reports are even optimistic enough to claim decided improvements. There has also been favorable comment on the machinability of the medium and higher carbon NE steels of the 8600 and 8700 series used in the automotive field.

**Carburized Case Characteristics:** The NE 8620, NE 8720 and NE 8817 steels carburize very similarly as shown in Table I, which gives the carbon concentration by depth of these steels carburized simultaneously at 1680 degrees Fahr. in a high percentage coke-charcoal compound. For comparison, SAE 2315 and SAE 6120 steels are inserted in the same table. Though they were not carburized simultaneously, they do represent typical values obtained from periodic tests through the same furnace and cycle. One test on NE 4027 is also included.

In Table II is shown a more direct comparison between the carburizing characteristics of NE 8720 steel and SAE 4620 steel carburized adjacent to each other in coke-charcoal type compound at 1700 degrees Fahr. and also in a pit-type gas carburizer at 1650 degrees Fahr., using a liquid-type carburizing fluid. The NE 8720 appears to be more reactive to gaseous carburizing media. This phenomenon was rechecked at a later date, and the same results were found. At a carburizing temperature of 1700 degrees Fahr. this reactivity in gaseous carburizing media would be even greater; otherwise, below the surface the NE 8720 and SAE 4620 are strikingly similar in their rates of carbon absorption under identical carburizing conditions.

Test pieces in the form of 1.1-inch diameter by ⅜-inch thick disks from NE 8620, NE 8720 and NE 8817 steel were carburized simultaneously with regular production parts to two case depth ranges—0.035 to 0.050-inch and 0.050

to 0.065-inch respectively. One-half the test pieces were quenched direct into oil from the pot, and the other half were allowed to cool in the pot for a reheat later to 1525 degrees Fahr. followed by an oil quench. All samples were then drawn at 300 degrees Fahr. for 1 hour. Another set was carburized in a continuous gas carburizer at 1700 degrees Fahr. on a cycle to produce 0.050 to 0.065-inch case depth and then was quenched direct into oil followed by a 300-degree Fahr. draw.

Microstructures of case and core resembled those obtained from the familiar SAE 4620 steels except the case depth range of 0.050 to 0.065-inch caused the formation of disconnected globular-type carbides at the corners of the samples. No accumulation of these carbides was visible on the samples carburized 0.035 to 0.050-inch case depth. This observation might become useful in combatting chipping of teeth in clash gears. After hardening and drawing, the disks were tested for case and core hardness, the values being shown in Table III and the chemical analysis in Table IV.

The somewhat lower case hardness value of around 56 to 58 rockwell C shown for the direct-quenched samples in Table III, either pot or gas carburized to 0.068-inch case depth, is comparable to that of the more familiar SAE 4620 steel. As is to be expected, the lesser amount of retained austenite in the more shallow case depth of 0.040-inch permits a case hardness of 60 rockwell C or more even though direct quenched. The reheated samples, regardless of whether carburized to 0.040 or 0.068-inch case depth, develop case hardness above 62 to 65 rockwell C.

The corners of the cases produced with the NE 8620, NE 8720 and NE 8817 steels in actual gears can be peened with hammer blows without chipping similar to the popular prewar steels such as SAE 4620, SAE 3115, SAE 2315 steels. In other words, the carburized cases have some degree of malleability. Fracture tests of case and core made of both direct-quenched and also pot-cooled and reheated parts so far appear to be somewhat coarser than the former steels alloyed higher with nickel, chromium and molybdenum. There is more of a tendency to form crystalline breaks, especially in the core, as compared with fibrous breaks such as are common to SAE 4620 steel.

**Response to Jominy End-Quench Test:** As a matter of additional interest, the Jominy or end-quench test results for the three steels shown under Table IV are included. These show how some of the original commercially made heats conform to the early data published by the American Iron and Steel Institute

and which, because of the urgency, were obtained from small experimental furnace heats. The curves for the end-quench tests are shown in Fig. 1. The tests were performed according to recommended procedure—that is, quenching from approximately 50 degrees Fahr. above the $AC_3$ point of the steel. The quenching temperature used therefore was 1575 degrees Fahr.

Incidentally, during the past few years we have used the end-quench test interchangeably with our standard 1-inch round by 3-inch long hardenability test piece. The hardness produced at the center of our 1-inch round test bar has been proved after many tests to be approximately close the hardness at ⅜-inch from the end of the regular Jominy test piece, each having been cut adjacent to each other from the same bar sample. Table III shows how close is this relationship, the values for end quench and standard Eaton test being obtained from the same pieces of steel. In the Eaton test, a quenching temperature of 1525 degrees Fahr. was used, and the samples were vigorously quenched in oil. After this they were cut in half, and the hardness measured at the center of the cut face. The Jominy tests were quenched from 1575 degrees Fahr. In this respect the NE 8620, NE 8720 and NE 8817 steels react the same to hardenability tests as the former SAE steels.

In order to harden fully the cores of the NE 8620, NE 8720 and NE 8817 steels, reheating temperatures of at least 1525 degrees Fahr. should be employed. This conforms with published data of the American Iron and Steel Institute giving approximately 1525 degrees Fahr. as the upper critical or $AC_1$ point of these steels. This was verified by a series of quenching cycles in which disks ½-inch thick were successively quenched from temperatures in increments of 25 degrees Fahr. starting with 1475 and ending with 1550 degrees Fahr. No increase in hardness was obtained above 1500 degrees Fahr.

A sample of the NE 8744 and one of NE 8949 stetel were likewise tested, and no increases in hardness were obtained above 1475 degrees Fahr. for the NE 8744 steel nor above 1425 degrees Fahr. for the NE 8949 steel. While the former higher nickel steels such as SAE 4620, SAE 3115, SAE 4820 and SAE 2515 steel could be hardened at lower reheating temperatures than the new NE steels, the latter certainly are an improvement over some of the popular first substitute steels resorted to, such as SAE 6120 and SAE 4120, which required reheating temperatures somewhere in the neighborhood of 1550 degrees Fahr., where scale formation becomes a problem.

**TABLE V—Relation Between Jominy Test and Standard One Round Eaton Hardenability Test**

| Steel | Jominy Test at ⅜" | Eaton—Center of 1" Round |
|---|---|---|
| NE 8620 | C20 | C20 |
| NE 8720 | C28 | C30 |
| NE 8817 | C26 | C27 |

Unless the furnace atmospheres are controlled, it is a task to keep decarburization down as well as to avoid the file-soft surfaces or "soft skin" that often occurs with the straight-chromium, chromium-molybdenum and chromium-vanadium steels. Where no grinding of the working surface is done, such as on gear teeth after hardening, the NE 8620, NE 8720 and NE 8817 steels resemble the former SAE 4600 and 4800 series, which were well known for their truly file-resistant cases even under poor hardening conditions. This new series has similarly shown low distortion characteristics typical of the prewar nickel steels.

Reports from several sources so far have encouragingly stated that the NE 8600, NE 8700, NE 8800 and NE 8900 series have given good accounts of them-

selves on laboratory dynamometer tests and breakdown tests in the field, which indicates that this series at least is adequate for many uses without fear of experiencing trouble from their adoption. They have their proper application like any of our former steels with which we are familiar, and care is needed perhaps more than ever before to prevent misapplication because of their lesser alloy content.

## Welded Caissons

(*Continued from Page* 104)

boundary. According to this arrangement, the entire load was transmitted to the side walls of the dry dock, and the pressure distribution was assumed to vary from zero at the top of the side wall seats to a maximum at the bottom.

With the introduction of the so-called grid-system of framing, in which the horizontal girders were supplemented by a similar series of vertical frames, the analysis became statically indeterminate. The function of the vertical framing is two-fold—to transfer a part of the water pressure from the heavily-loaded lower girders to the more lightly loaded upper girders and to assist the horizontal girders by transmitting a part of the hydrostatic load to the bottom seat.

Fig. 5 is an isometric presentation of the grid or cellular box, consisting of the interior framing with the shell plating removed. The hydrostatic load acting on the box is transmitted to the three supports first by local bending of the various members of the secondary framing and then by bending of the main framing as a whole. For the first part, the problem is rather simple. The shell plating, spanning over the secondary supporting frame, acts as a continuous member to transmit the distributed loading to the supporting stringers. The latter, in turn also bending as continuous beams, transfer the water pressure to chords of the main framing in the form of a series of concentrated loads. The chords, likewise bending locally, carry the intermediate concentrated loads to the main panel points located at the intersections of the vertical and horizontal frames.

**New Caisson Design:** In preparing a new design of caisson, the available data of the caisson for the last conventional design were utilized both as a guide as well as a basis of comparison. Main features of the new framing included a new cross-sectional outline in the form of a slenderized box that presents a striking contrast to the bulky, barrel-shaped outline of the former design. Other changes consisted of revised girder and frame spacings, elimination of doubleplates from girder flanges and redistribution of material throughout the framing.

The estimated weight of the caisson was 1,950,000 pounds, exclusive of concrete ballast, representing a reduction of 306,700 pounds from the weight of the former design.

**Welded Framing:** While the design drawings for the new riveted caisson framing were being prepared, the question was raised as to whether the original decision to use riveted construction ought not to be reconsidered in view of the number of new caissons involved and the economies which might be achieved by welding. Up to that time the bureau had not used welding in the fabrication of its floating caissons.

As support for the adoption of welding, it was argued that, since the elastic cellular slab concept adopted in the new design was predicated on rigidity of connections, there was great justification for using the new analysis in welded construction of proved rigidity. To obtain a direct comparison, it was agreed to prepare an alternate design of welded framing and to submit both schemes

of construction for bids.

**Details of Welded Design:** The success of any welded design depends greatly on its planning and development as a new and entirely distinct structure, free from the influence of the details of the riveted design which it displaces. With this in mind, in preparing the details of the alternate welded design, the parts for each member girder and frame were carefully selected to provide not only the lightest weight and maximum strength but also the most advantageous section for welding. To this end, generous use was made of serrated channel sections, cold-formed angle sections and wide-flange T-sections. All horizontal girders have a combination T-angle flange section. The small T's, while not needed for strength, were added to provide a landing and backing strip for welding of the horizontal seams of the shell plating. The connections were further improved by substituting two separate fillet welds in lieu of the customary butt weld, thus allowing a tolerance gap between the edges of two adjoining shell strakes, at the same time reducing the possibility of locked-up stresses which might result from long butt seams.

The employment of serrated sections results in a saving in channel material and the use of a minimum amount of welding with sealed connections at the lines of contact with the plating. The flanged sections of the girder and frame chords furnish the required stiffness and stability in flexure, obviating the need of welded legs.

**Working Stresses:** In determining the amount of welding at the various points, the following unit stresses were used: Fillet welds, 13,560 pounds per square inch; butt welds, tension, 15,600 pounds per square inch; butt welds, compression, 18,000 pounds per square inch; butt welds, shear, 12,000 pounds per square inch. Other details and welding requirements were in accordance with Bureau of Yards and Docks welding specifications 12yb-Supplement No. 1a and 22yb.

The estimated weight of the steel and fittings of the caisson was 1,505,000 pounds or 445,000 pounds less than the weight of the new riveted design and 751,700 pounds less than that of the old riveted design.

**Comparative Caisson Costs:** Drawings for the two designs were completed early in 1940. Bids were asked for each caisson separately as well as for the two units together. Eight contractors participated in the bidding, the list including the builder of the bureau's last riveted design. Of the eight bidders, four quoted prices for the welded design only, three gave incomplete bids for the riveted design and one submitted bids for both designs. The lowest figures were as follows:

| | |
|---|---|
| Welded Design: | |
| One caisson for Navy Yard X | $266,703 |
| One caisson for Navy Yard Y | 276,203 |
| Both caissons | 522,570 |
| Riveted Design: | |
| One caisson for Navy Yard X | $355,540 |
| One caisson for Navy Yard Y | 366,740 |
| Both caissons | 630,600 |

It is particularly interesting to note that the low figures of the welded group were those of the builder who had actually fabricated the bureau's last riveted caisson mentioned above, the work being sublet to him by the successful bidder of that project.

**Fabrication and Construction:** The contracts for the two caissons were awarded to the low bidder of the welded design. The caisson being a floating structure, the event marked also the beginning of a large-scale utilization of welding in such structures under the cognizance of the bureau.

By the terms of the specification, the contractor was required to submit the proposed method and order of assembly

and sequence of welding for approval before proceeding with the actual fabrication. The submitted procedure in outline form is shown in Fig. 6. The erection being confined to the vertical position of the caisson, the proposed method differed but little from the one envisaged in the design. Another clause in the specification gave the contractor the option to use, upon approval by the bureau, welding details other than those shown on the design drawings. No important changes, however, were proposed to alter the original details.

Fig. 11 shows the placing of the first keel section of the first caisson at the assembly site. Fig. 2 shows the assembled keel section and the lower parts of the main transverse framing. Fig. 1 is a view of the partially assembled end framing, consisting of a part of the stem section, the breast hooks, the watertight bulkhead and the shell plating up to the elevation of girder No. 3. In the foreground a subassembled plate panel with serrated-channel stiffeners can be seen. Fig. 7 is a top view of the partially assembled caisson, showing some details of the interior framing. Fig. 3 shows the completed caisson afloat.

**Additional Welded Caissons:** As a result of the favorable bids received for welded caissons the bureau decided to use welded construction in all subsequent work. Accordingly on June 1, 1940, contracts were let for the construction of two additional caissons of smaller dimensions, involving 430 tons of steel by welded design. Fig. 10 illustrates an interesting feature of construction of this second group—a keel section subassembled in the shop and ready for shipment to the erection site. Fig. 8 is a view of the caisson at an advanced stage of erection, illustrating the adaptability of welding to high-speed production at the assembly site, in this case showing simultaneous welding by 16 welders (4 inside and 12 outside).

In addition to these four caissons built during the period of July 1940, to January 1942, designs were prepared and contracts were awarded for additional caissons of varying sizes. The total amount of steel required for these new projects is in the neighborhood of 12,000 tons. Some of these caissons have already been completed and are now in successful operation; others are at various stages of completion at fabricating shops or at the assembly sites.

**Savings in Cost:** One of the first considerations in any project is obviously the cost. The contract prices of the last conventionally designed caisson and the new welded design indicate a maximum cost differential of $122,947 for one caisson. Deducting from this sum $34,110 as a saving due to the improved method of stress analysis, the balance of $88,837 represents the net saving resulting from use of welding. This is a 25 per cent saving. It is equivalent to approximately $118 per ton of steel used. On this basis, the net savings realized from caissons built or presently under contract, involving a total of 14,000 tons of steel, is $1,652,000. Anticipated savings from projected construction in the immediate future, involving some 30,000 tons of steel, is $3,540,000.

**Savings in Weight:** As stated, weight of steel in the first welded caisson was 751,700 pounds less than the former design. Of this, 306,700 pounds was due to the application of the elastic slab theory to the design. The balance of 445,000 pounds represented the net saving from welding. Expressed in percentage, the reduction from the old design is 33.3 per cent or approximately 0.5-pound per one pound of metal used in the welded caisson. On this basis, the total saving in weight for the caissons under the present construction program is about 4200 tons. That for the projected construction will approximate 9000 tons.

**Saving in Time:** Completion and de-

livery of the last old-type caisson was approximately 18 months. The first welded caisson was contracted for and delivered in about 12 months and the second one 3 months later. With improving technique, shop fabrication is steadily approaching the pace of high production, thus resulting in yet faster production.

**Savings in Maintenance Cost:** In floating structures, welded construction possesses a distinct advantage in that no caulking is required to provide the required watertightness. Caulking is not only costly but often ineffective, resulting in leakage and corrosion and consequent overhaul and repairs. Welded construction, if properly done, automatically provide watertight seams and thus

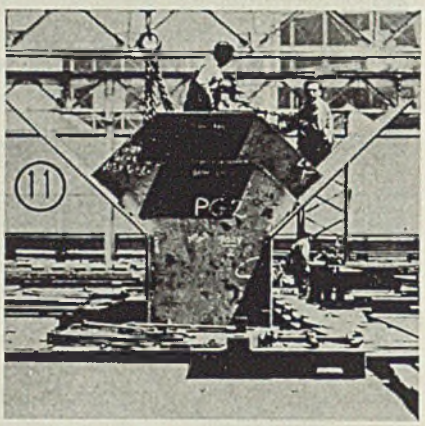



*Fig. 11—Shop welded keel section of caisson*

assures appreciable savings in the cost of maintenance.

**Added Strength and Stability:** Paradoxical as it may seem, the welded caisson of reduced weight is stronger than the heavier design which it displaces. This is due to the fact that its rigidity of connections helps to develop fully the strength of the various sections of the framing. At the same time a part of the savings from the eliminated deadweight connectors as well as from substituted sections of high stress efficiency are utilized in the form of added strength. In addition, the lighter welded caisson requires relatively shallower draft in flotation and has greater stability.

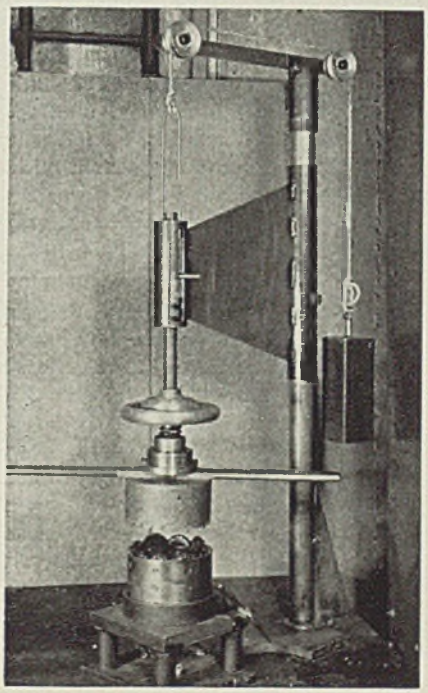
**Incidental Benefit:** These advantages are in addition to a still greater benefit which cannot be measured by the standards of a world at peace. A part of the savings in steel tonnage was reused in a different form in some of the caissons —as armor plating to provide protection against bombing. Another part made it possible to construct some of the spare caissons now in the process of fabrication, and still another part went into the construction of ships and other combat weapons. These transformed sav-

ings constitute the real contribution which welding, as applied to Naval dry dock caissons, has made to the violent effort which the United Nations are now making to insure a more secure way of living.

## How To Remove Varnish From a Bracket Fit

Usually after parts have been dipped in varnish and baked, it is necessary to remove part of the varnish from the metal. This, sometimes, is done by sanding or buffing, but if the parts are identical and in large numbers, other methods may be quicker and more thorough.

At Westinghouse Electric & Mfg. Co., Lima, O., it was learned recently, a hollow mill supported from a stand and counter-balanced for ease of operation is used to remove varnish from the



bracket fit of small motor frames. In this instance, the cutter is lowered until a pin in the slide nut engages in the lowest notch in the guide. The cutter then is rotated manually and the desired pressure is supplied by turning a hand wheel. When the bracket fit has been properly cleaned, the pressure is released; the slide nut is disengaged from the pin, and the cutter is pulled upward by a counter-balancing weight.

A shell cutter is required for each frame size. A side clearance on the teeth is omitted to prevent the diameter of the frame fit from being affected. To keep the depth of the cleaned surface constant four of the 12 teeth have no back clearance. A spring under the handwheel cushions the cutter to permit starting on irregular surfaces, compensating for any misalignment.

## Method Minimizes Errors In Precision Work

Possibility of error in precision lathe work requiring an accuracy of five one hundred thousandths of an inch is now minimized as the result of a pilot-light indicating method developed recently by M. M. Cunningham, foreman, General Electric Co., Schenectady, N. Y.

The method eliminates the human element inherent in the old practice of using a magnifying glass to see when the tool makes contact with the surface to be cut.

In Cunningham's method, electrical contact between tool and work is used to close a light circuit, telling the operator exactly when to set the dial indicator at zero, thus establishing a sure basis for making a cut within the required accuracy of 0.00005 inch.

The tool is brought up to the surface to be cut in the regular manner until it is just about to make contact. From this point on it is brought up very slowly until the pilot light flickers. Very little further movement is required until the light is steady. When it is, the indicator is set at zero. A cut of any desired thickness can then be made with the accuracy of the cut dependent only on the accuracy of the indicator and its reading.

Either an incandescent or a neon indicating lamp can be used for the pilot light. A small transformer is required to reduce the standard 110-volt circuit to 6 volts for the detecting circuit. One line from the transformer is connected to the bed of the lathe, and the other line to the screw shell of the light socket. The center contact of the light socket is connected to a metal strip which makes contact with the lathe tool, being set against the tool when it is locked in the tool post. The tool is insulated from the tool post with a piece of varnished cambric or light cardboard.

This pilot-light indicating method, it is reported, also can be used where the work is stationary, such as on milling machines, by insulating the work from the machine and connecting the center contact of the light socket to the work.

## Develops Gum To Stick Paper Labels to Metal

Paper or linen labels may now be stuck to metal products by means of a new special stick-to-metal gum recently developed by Ever Ready Label Corp., 141 East Twenty-fifth street, New York.

According to the company, main reason labels have never found great adaptability in plants producing metal products is the fact that ordinary gumming does not adhere to metal surfaces.

# Helpful Literature

### 1. Large Gas Valves

Wm. M. Bailey Co.—6-page illustrated bulletin on "Mechanical Goggle Valves" describes various sizes of these units for use in conjunction with gas washers, precipitators, boiler plants and blast furnace gas mains. Design features use of no mechanical parts in gas stream and affords positive method of valve-to-goggle plate clamping. Design, dimensions, operation and installation are covered.

### 2. Conveying Chains

American Manganese Steel division, American Brake Shoe & Foundry Co.—16-page illustrated bulletin No. 742-CN gives complete data on manganese steel chain for conveying and elevating applications. Described are chains for elevators and conveyors, steel industry, dredging, saw and paper mills, drags and special purposes. Elevator buckets, sprocket wheels and welding products are also covered.

### 3. Industrial Controls

Brown Instrument Co.—64-page illustrated bulletin, "The Technique of Precision Control in Industrial Processes," is designed to acquaint engineers, operators and management with manifold applications of automatic controls to industrial processes. Indicating, recording, controlling and signalling equipment for temperatures, flows, pressures and liquid levels are covered.

### 4. Welding Accessories

General Electric Co.—32-page illustrated bulletin No. GEA-2704-B presents complete line of arc welding accessories which are designed to make welding safer and easier. Among items described are goggles, shields, head protectors, leather clothing, welding screens, protective paint, electrode holders, clamps, cable connectors, chippers and fillet-weld gages.

### 5. Time Recorders

Foxboro Co.—4-page illustrated bulletin No. A-321 describes and explains applications of electric and mechanical operation-time recorders. Instruments are used in test engineering, setting job standards, cost accounting and production control. Typical installations are shown. Specifications are given for single and multiple pen instruments.

### 6. Steel Standards

American Steel & Wire Co.—14 x 18-inch wall chart No. 6235 tabulates composition limits, as well as AISI, SAE and NE numbers for carbon, molybdenum, free cutting, chromium, manganese, nickel, nickel chromium, chromium vanadium, silicon manganese and National Emergency steels.

### 7. Industrial Equipment

S. F. Bowser & Co.—40-page illustrated, "Industrial Equipment Catalog," presents complete specifications on equipment for filtration and distillation, lubrication, metering, pumping, refueling, storage and dispensing, as well as miscellaneous apparatus for use wherever liquids are handled.

### 8. Pipe Threading

A. M. Byers Co.—19 by 30-inch instruction chart is entitled, "The Trouble-Shooter for Correcting Threading Ills." Improper threading is shown in large size pictures. Causes and cures for hand and machine threading operations are given. Also listed are "do's and don'ts" to be considered in threading.

### 9. Welding Positioner

Ransome Machinery Co., Industrial division—4-page illustrated bulletin No. 205 is descriptive of 20-ton capacity welding positioners. In addition to giving specifications on this machine, typical applications are shown. Equipment permits position welding for maximum production.

### 10. Aluminum Welding

Progressive Welder Co.—4-page illustrated bulletin No. 101 describes new line of "Revers-O-Charge" welding equipment which is designed for welding of aluminum alloys. Both rocker arm and pedestal type welders are covered. Latter has built-in refrigeration unit for electrode cooling.

### 11. Lighting Equipment

Fostoria Pressed Steel Corp.—8-page illustrated bulletin No. 442 shows typical applications of "Localite" lighting fixtures which provide localized lighting for close, accurate operations in industry. Typical fixtures of both incandescent and fluorescent types are described in detail.

### 12. Metal Parts Washers

Detroit Rex Products Co.—24-page illustrated catalog, "Detrex Metal Parts Washers," describes various types of washing equipment for use with alkali cleaning compounds, petroleum spirits and emulsion cleaners. Adaptations of equipment for armament and aircraft production are shown and discussed. Cleaning and stripping compounds for metal parts cleaning operations are described.

### 13. Screw Products

Manufacturers Screw Products — 96-page illustrated catalog and price list No. 14 lists and describes aviation products; machine, cap, set, wood, sheet metal and Phillips head screws; bolts, studs and rods; nuts; stampings; rivets and eyelets; pins; bright wire goods; toggle bolts, anchors and shields; and special screw products. Sectional indexes facilitate use.

### 14. Industrial Furnaces

Johnson Gas Appliance Co.—4-page illustrated bulletin No. 820 is descriptive of the new No. 820 tempering and drawing furnace which is designed for tempering of tools, dies, non-ferrous castings and small parts; heating aluminum forging and rivets; or any other job requiring temperature range from 275 to 1200 degrees Fahr.

### 15. Milling Practice

Kearney & Trecker Corp.—136-page illustrated book, "Right and Wrong in Milling Practice," is first of a series of educational books on milling practice. Correct and incorrect procedures relating to setup, operation and maintenance of milling machines; selection, use and care of cutters; keeping house and safe operation are covered in text and through use of sketches.

### 16. V-Belt Drives

Allis-Chalmers Manufacturing Co.—12-page illustrated bulletin No. B6051-C is designed as aid to selection of correct V-belt drives for wartime applications. List prices, stock sizes, dimensions and construction details are included for all "Texrope" drives. Additional descriptions cover application of "Texrope Vari-Pitch" sheaves and drives and "Vari-Pitch Speed-Changer."

---

**STEEL** *Readers' Service Dept.*

1213 West Third St. Cleveland. Ohio

12-14-42

Please have literature circled below sent to me.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35

Name _____ Title _____

Company _____

Products Manufactured _____

Address _____

City _____ State _____

*This card must be completely filled out. Please TYPE or PRINT*

### 17. Metal Working

Whiting Corp., Quickworth-Whiting division—4-page illustrated bulletin No. QW-106 contains condensed information on rotary shears and attachments, throatless shears, power hammers and stamping trimmers for metal-working applications. Features of machines are shown and operation is explained.

### 18. Centrifugal Pumps

Worthington Pump & Machinery Corp.—2-page illustrated bulletin No. W-310-B11 presents specifications, ratings and dimensions of type CY, single stage, open impeller, belt or motor driven centrifugal pumps for handling hot or cold water, brine, light oil, drainage, process waste and similar liquids.

### 19. Resistance Starters

Allen-Bradley Co.—4-page illustrated bulletin No. 640 describes line of resistance starters for manually starting polyphase squirrel cage motors. These units are recommended for loads which must be accelerated smoothly or for applications where starting currents must be kept low to prevent lamp flicker.

### 20. Plastics

Durez Plastics & Chemicals, Inc.—8-page illustrated bulletin, "Durez Plastics", traces development of plastics from raw product to finished materials. Various types of plastics are discussed and typical applications in finished equipment shown. Properties of various types are covered.

### 21. Valve Repair

Crane Co.—6-page illustrated folder, "How To Repair Valves", is No. 5 of a series of "Piping Pointers" bulletins. It explains and illustrates various steps to take in repairing leaky gate and globe valves, as well as hints on how to reclaim discarded valves.

### 22. Fire Truck

Cardox Corp.—4-page illustrated bulletin, "Cardox Airport Fire Truck," is descriptive of machine which carries ample supply of carbon dioxide and dispensing equipment for combating all types of fires. It is particularly designed for airport use.

### 23. Gear Finisher

Michigan Tool Co.—4-page illustrated bulletin No. 861 describes series 861-4B light duty rotary crossed-axis gear finishers for gears ranging from ¼-inch to 4-inch diameters and up to 1-inch face widths. Complete specifications, applications and design details are covered.

### 24. Refractories

Basic Refractories Inc.—4-page illustrated bulletin No. 211G is entitled, "Keep the Ends High—and the Rest of the Bottom will Take Care of Itself." Suggestions are included for maintenance of basic open hearth furnaces. Refractories for industrial furnaces are briefly described.

### 25. Bronze Alloy

Ampco Metal, Inc.—8-page illustrated booklet, "Contribution to Victory", describes pictorially use of "Ampco Metal" in war industries. Booklet contains views of various types of war equipment containing this aluminum bronze alloy, as well as pictures of weapons of war made by machine tools of this material.

### 26. Sheet Metal Operations

E. W. Bliss Co.—52-page booklet is entitled, "Computations for Sheet Metal Workers." Various types of power presses are described. Also covered are principles underlying such metal operations as blanking and shearing, drawing and reducing, ironing, coning, sizing and forging.

### 27. Tool Salvage

Eutectic Welding Alloys, Inc.—4-page illustrated folder, "A New Welding Process To Speed Victory", covers the subject of salvaging tools and machine parts. Pictures of actual jobs done show how salvaging saves thousands of dollars worth of scarce tools yearly and keeps production uninterrupted.

### 28. Resins

Carbide & Carbon Chemicals Corp.—20-page illustrated bulletin, "Vinylite Resins—Their Forms, Properties and Uses," discusses various types of resins which are available in rigid sheets, flexible sheets and films, molding and extrusion compounds, adhesives and base resins for surface coatings. All data are in readily usable form.

### 29. Broaching

Colonial Broach Co.—20-page illustrated bulletin No. 942 contains answers to frequently asked questions on broaching. Also given are recommendations for correct broach sharpening. Important factors which contribute to maximum broach life are discussed. Shown are standard broaching machines.

### 30. Inspection Magnifier

Boyer-Campbell Co.—4-page illustrated folder, "Super Sight", shows how this product combines magnification and properly directed light for close inspection work, fine assembly and precision machining. It is available in 4-inch and 5-inch units or double lens units for increased magnification.

### 31. Rubber Guide

B. F. Goodrich Co.—30-page illustrated booklet No. 2-8981-GA lists applications and properties of many types of products for industrial and aeronautical purposes using natural, synthetic or reclaimed rubber. Booklet is divided into eleven indexed sections. Cross-sectional drawings add to clarity of presentation.

### 32. Flow Meters

Cochrane Corp.—56-page illustrated catalog No. 3010 is new edition on complete flow meter line. Besides describing electric, mechanical, linameter, ring balance, liquid level and weir meters, catalog also covers new two-pen electric flow recorder, improved low pressure electric meter and ultra high pressure ring balance meter.

### 33. Heat Insulation

Eagle-Picher Sales Co.—8-page illustrated bulletin on "Eagle Super 66 Plastic Insulation" presents applications and characteristics of this material for heat insulation purposes for temperatures up to 1800 degrees Fahr. Advantages, installation and heat savings are covered.

### 34. Bearing Metals

Magnolia Metal Co.—8-page illustrated bulletin, "Magnolia Bearing Metals," describes various lead-base metals which are claimed to have long wearing qualities on shock loads, heavy sustained pressures and general service. Included are bearing maintenance data and recommendations for 135 different types of machinery.

### 35. Resistance Welding

P. R. Mallory & Co.—80-page illustrated, "Resistance Welding Data Book," covers theory and practice of resistance welding. Sections include fundamentals of resistance welding, materials to be welded, engineering tables, and data on hard, high conductivity alloys for resistance welding applications.

## Film Refining Process

(*Concluded from Page 96*)

uses. This shows that no unusual strains are placed on the materials used. As a matter of fact heavier loads are sustained in similar cylindrical refractory linings used for large scale production of cast-iron pipe centrifugally cast by the sand spun process, also gun barrels cast in the same manner.

The molten iron or steel and molten refining slag are simultaneously and continuously fed into the refiner through the hole in the steel cover plate. The flow of these molten materials is controlled, either from the pouring ladles or through proper nozzles in the machine pouring boxes, to correspond to the rate of production required of 1 to 3 tons per minute. The refined steel and used slag are continuously separated and collected by means of a simple 2-way collecting box set at the receiving end of the machine.

(*Concluded in next issue*)

## Electric Metal Makers Guild Plan Meeting

*CHICAGO*

Plans for a regional conference to be held in this city next March are being made by the Electric Metal Makers Guild Inc. Groundwork for the event was laid at a meeting of the Chicago section of the Guild with national officers at the Union League Club, Dec. 5.

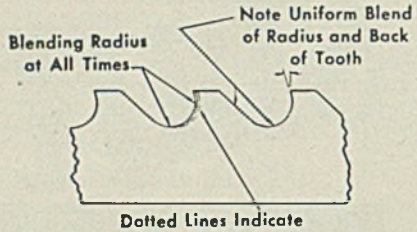
Herman Schultz, superintendent of electric furnaces, South Works, Carnegie-Illinois Steel Corp., Chicago, heads a committee appointed to arrange for the conference and prepare the program. Other members of the committee are A. J. Scheid Jr., metallurgist, Columbia Tool Steel Co., Chicago Heights, Ill., and B. J. Aamodt, superintendent, National Malleable & Steel Castings Co., Cicero.

The Chicago meeting, which was attended by more than 20 members in this area and adjacent territory of the midwest, was conducted with Burt W. Reynolds, melting foreman, Burnside Steel Foundry Co., Chicago, and head of the Guild's Chicago section, as chairman. Discussed at length at afternoon and evening sessions was the organization's policy and program for next year.

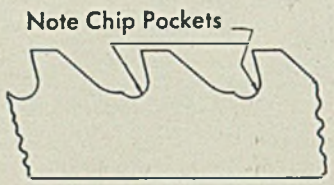
Harry F. Walther, electric furnace superintendent, Timken Roller Bearing Co., Canton, O., is national president of the Guild. James Sweitzer, superintendent, Sivyer Steel Casting Co., Milwaukee, is vice president; and John E. Arthur, superintendent of melting, Park Works, Crucible Steel Co. of America, Pittsburgh, is secretary-treasurer.

Annual convention of the Guild will be held at the Onesto hotel, Canton, O., June 4-5.

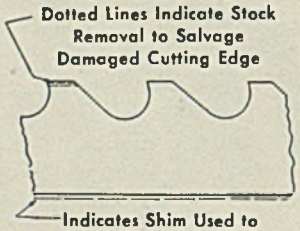
① ILLUSTRATES CORRECT RESHARPENING FORM



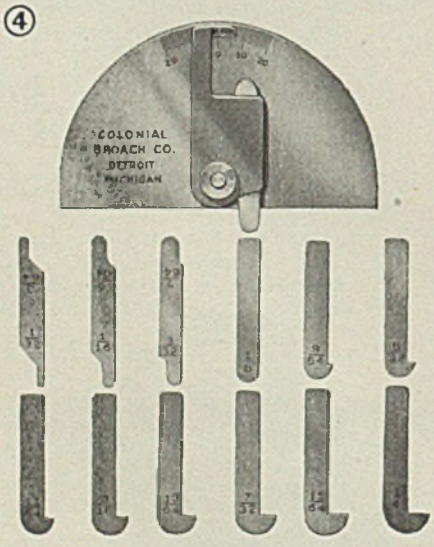

② ILLUSTRATES INCORRECT SHARPENING FORM




③ ILLUSTRATES REGRINDING FOR SALVAGE




④




# How to get more production with your Broaches.....

## 2. BY PROPER SHARPENING

(a) Any marked departure from the original size and form of teeth in resharpening broaches will result in incorrect cutting action. Have the manufacturer supply you with a blueprint for use as a guide.

(b) Always blend the radius of the broach when sharpening teeth. Fig. 1 shows how to successively resharpen a broach.

(c) Don't sharpen a broach in the manner illustrated in Fig. 2. The pockets at the base will prevent chips from clearing the teeth, slow up production and possibly break broach teeth.

(d) Where surface broaches can be adjusted for height, it is permissible to sharpen broaches as shown in Fig. 3. When this is done, care must be taken to maintain proper stepping, backing off and tooth depth.

(e) It is always advisable to check the radius at the bottom of the tooth with simple radius gages as shown in Fig. 4, to keep broaches at peak of efficiency and prevent broach damage from incorrect sharpening.*

(f) Play safe: Don't use makeshift equipment to sharpen broaches.**

*Available in sets at a nominal price from Colonial.

**Colonial Universal Broach Sharpening Machines are equally adaptable to sharpening of both flat and round broaches.

**colonial BROACH COMPANY**

*Broaching Machines* — *Broaches-Broaching Equipment*

DETROIT . . . . . U. S. A.

# Steel Buying Activity Awaits New War Needs

*First quarter PRP allocations to be spur to active ordering. . . Armament readjustment brings more cancellations. . . Ore season ends with tonnage above quota. . . Scrap improvement holds*

**DEMAND**
*Ordnance shift slows buying.*

**PRODUCTION**
*Unchanged at 99½ per cent.*

**PRICES**
*Steady at ceilings.*

ANNOUNCEMENT of Production Requirements Plan quotas for first quarter, scheduled to be made by Dec. 15, is expected to stimulate placing of orders for steel materials.

Many consumers have been holding back orders until they receive their allocations, to avoid a repetition of experiences of fourth quarter, which resulted in many suspensions and cancellations. Some improvement in buying has been noted in products where deliveries have been most extended, such as sheets and bars. Further delay has been considered unwise, possibly jeopardizing chances of getting favorable position on mill books. In large rounds and flats most users have not delayed placing their orders, in view of the pinch in these products.

Readjustment in the armament program continues to cause some cancellations and larger placements under PRP may not serve to balance this. At the same time specifications against long-term contracts are heavy. Shifting of emphasis in the war program has affected principally ordnance items, including tanks, guns and shells. Some changes also are being made in contracts for steel landing mats, regarded as a result of rescheduling in advance of the Controlled Materials Plan.

• • •

Deliveries are still deferred on most products although there has been some easing during the past fortnight on small bar rounds, which may be obtained in six to eight weeks on top ratings. On large rounds best promises are about 15 weeks. Most sheet sellers have little tonnage for delivery against top priorities before the middle of February, in hot and cold-rolled and galvanized. An exception is noted in the case of one eastern mill which can promise some galvanized tonnage for late January shipment as low as AA-3. Structural shapes are much easier and four to six weeks delivery is available down to and including AA-5 rating.

War Production Board has released some locomotive and freight car orders which, had been frozen earlier in the year, as a start toward the equipment desired by the carriers for 1943.

Ore transportation on the Great Lakes has come to an end and the goal of 92,000,000 gross tons has been exceeded, through the exact figures for the season are not yet available. Ore on hand at furnaces and lower lake docks is ample for steelmaking until the 1943 season opens. All records were broken in 1942 and preparations are under way for a larger movement in 1943 to support an expanded steelmaking program if the war continues through that period. Additional carriers will be in service and trip capacity will be considerably larger.

American Iron and Steel Institute reports steelworks had in stockpiles Oct. 31 reserves of 3,254,000 gross tons of scrap, sufficient for 3½ weeks at the current rate of consumption. This is about 1,460,000 tons more than they held April 1 but about 700,000 tons less than reserves as of Jan. 1, 1941. The latter was about equal to six weeks requirements at the rate of operation then prevailing. Present supplies put the industry in a much better situation than at any time for several months and with considerable tonnage in yards awaiting preparation future supplies cause less apprehension. Salvage drives continue to be pushed, tending to maintain the flow, recent collections being of better grade.

• • •

Steelmaking last week continued at virtual capacity, 99½ per cent, the only bar to a higher rate being necessity for renewing open-hearth brickwork, scrap supply having faded from the picture as a limiting factor. Changes in district rates were few and for the most part producers held at the rates of the previous week. Chicago mills returned some open-hearth capacity and gained ½-point to 101 per cent, the highest in three weeks. Wheeling also gained ½-point to 86½ per cent. Cleveland declined 1½ points to 92½ per cent. Rates were unchanged as follows: Pittsburgh 99 per cent, eastern Pennsylvania 96, Buffalo 90½, St. Louis 94, Cincinnati 92, Youngstown 97, Detroit 95, Birmingham 95 and New England 92.

Steel ingot production holds near the high mark of recent months and in November made the largest output in history for a 30-day month, with 7,184,560 tons. It failed to equal the all-time high made in October but was well above production in November last year. Average per week in November was 1,674,723 tons, slightly below the 1,712,159 tons averaged per week in October.

Composite prices of steel and iron are steady and unchanged from levels prevailing for some time under Office of Price Administration ceilings. Finished steel composite is $56.73, semifinished steel at $36, steelmaking pig iron at $23.05 and steelmaking scrap at $19.17.

# COMPOSITE MARKET AVERAGES

| | Dec. 12 | Dec. 5 | Nov. 28 | One Month Ago Nov., 1942 | Three Months Ago Sept., 1942 | One Year Ago Dec., 1941 | Five Years Ago Dec., 1937 |
|---|---|---|---|---|---|---|---|
| Finished Steel | $56.73 | $56.73 | $56.73 | $56.73 | $56.73 | $56.73 | $62.18 |
| Semifinished Steel | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 | 40.00 |
| Steelmaking Pig Iron | 23.05 | 23.05 | 23.05 | 23.05 | 23.05 | 23.05 | 22.90 |
| Steelmaking Scrap | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 13.40 |

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

| | Dec. 12, 1942 | Nov. 1942 | Sept. 1942 | Dec. 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 | 2.49 | 2.49 | 2.49 | 2.47 |
| Shapes, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Shapes, Philadelphia | 2.22 | 2.22 | 2.22 | 2.22 |
| Shapes, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Philadelphia | 2.15 | 2.15 | 2.15 | 2.15 |
| Plates, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, hot-rolled, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, cold-rolled, Pittsburgh | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Pittsburgh | 3.50 | 3.50 | 3.50 | 3.50 |
| Sheets, hot-rolled, Gary | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, cold-rolled, Gary | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Gary | 3.50 | 3.50 | 3.50 | 3.50 |
| Bright bess., basic wire, Pittsburgh | 2.60 | 2.60 | 2.60 | 2.60 |
| Tin plate, per base box, Pittsburgh | $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 $\frac{9}{32}$-inch, Pittsburgh | 2.00 | 2.00 | 2.00 | 2.00 |

## Pig Iron

| | | | | |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $25.19 | $25.19 | $25.19 | $25.34 |
| Basic, Valley | 23.50 | 23.50 | 23.50 | 23.50 |
| Basic, eastern, del. Philadelphia | 25.39 | 25.39 | 25.39 | 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 | 20.38 |
| Southern No. 2, del. Cincinnati | 24.30 | 24.30 | 24.30 | 24.06 |
| No. 2X, del. Phila. (differ. av.) | 26.265 | 26.265 | 26.265 | 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 | 31.54 | 31.54 | 31.54 | 31.34 |
| Gray forge, del. Pittsburgh | 24.19 | 24.19 | 24.19 | 24.19 |
| Ferromanganese, del. Pittsburgh | 140.65 | 140.65 | 140.65 | 125.33 |

## Scrap

| | | | | |
|---|---|---|---|---|
| Heavy melting steel, Pitts. | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt. steel, No. 2, E. Pa. | 18.75 | 18.75 | 18.75 | 18.00 |
| Heavy melting steel, Chicago | 18.75 | 18.75 | 18.75 | 18.75 |
| Rails for rolling, Chicago | 22.25 | 22.25 | 22.25 | 22.25 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 21.215 |

## Coke

| | | | | |
|---|---|---|---|---|
| Connellsville, furnace, ovens | $6.00 | $6.00 | $6.00 | $6.25 |
| Connellsville, foundry, ovens | 7.25 | 7.25 | 7.25 | 7.25 |
| Chicago, by-product fdry., del. | 12.25 | 12.25 | 12.25 | 12.25 |

## STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

### Semifinished Steel

**Gross ton basis except wire rods, skelp.**

**Carbon Steel Ingots:** F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

**Alloy Steel Ingots:** Pittsburgh base, uncropped, $45.00.

**Rerolling Billets, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

**Forging Quality Billets:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

**Open Hearth Shell Steel:** Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

**Alloy Billets, Slabs, Blooms:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

**Sheet Bars:** Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

**Skelp:** Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

**Wire Rods:** Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

### Bars

**Hot-Rolled Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced on its 8-inch mill.)

**Rail Steel Bars:** Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

**Hot-Rolled Alloy Bars:** Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethhlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

| AISI Series | (*Basic O-H) | AISI Series | (*Basic O-H) |
|---|---|---|---|
| 1300 | $0.10 | 4100 (.15-.25 Mo) | 0.55 |
| | | (.20-.30 Mo) | 0.60 |
| 2300 | 1.70 | 4340 | 1.70 |
| 2500 | 2.55 | 4600 | 1.20 |
| 3000 | 0.50 | 4800 | 2.15 |
| 3100 | 0.70 | 5100 | 0.35 |
| 3200 | 1.35 | 5130 or 5152 | 0.45 |
| 3400 | 3.20 | 6120 or 6152 | 0.95 |
| 4000 | 0.45-0.55 | 6145 or 6150 | 1.20 |

*Add 0.25 for acid open-hearth; 0.50 electric.

**Cold-Finished Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

**Cold-Finished Alloy Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

**Turned, Ground Shafting:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

**Reinforcing Bars (New Billet):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

**Reinforcing Bars (Rail Steel):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

**Iron Bars:** Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

### Sheets, Strip

**Hot-Rolled Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

**Cold-Rolled Sheets:** Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del 3.39c; Pacific ports 3.70c.

**Galvanized Sheets, No. 24:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

**Corrugated Galv. Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

**Culvert Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

**Enameling Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

**Electrical Sheets, No. 24:**

| | Pittsburgh Base | Pacific Ports | Granite City |
|---|---|---|---|
| Field grade | 3.20c | 3.95c | 3.30c |
| Armature | 3.55c | 4.30c | 3.65c |
| Electrical | 4.05c | 4.80c | 4.15c |
| Motor | 4.95c | 5.70c | 5.05c |
| Dynamo | 5.65c | 6.40c | 5.75c |
| Transformer | | | |
| 72 | 6.15c | 6.90c | ..... |
| 65 | 7.15c | 7.90c | ..... |
| 58 | 7.65c | 8.40c | ..... |
| 52 | 8.45c | 9.20c | ..... |

**Hot-Rolled Strip:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

**Cold Rolled Strip:** Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

**Commodity C. R. Strip:** Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

**Cold-Finished Spring Steel:** Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

## Tin, Terne Plate

**Tin Plate:** Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

**Tin Mill Black Plate:** Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

**Long Ternes:** Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

**Manufacturing Ternes: (Special Coated)** Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

**Roofing Ternes:** Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

## Plates

**Carbon Steel Plates:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)

**Floor Plates:** Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

**Open-Hearth Alloy Plates:** Pittsburgh, Chicago, Coatesville, 3.50c.

**Wrought Iron Plates:** Pittsburgh, 3.80c.

## Shapes

**Structural shapes:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

**Steel Sheet Piling:** Pittsburgh, Chicago, Buffalo, 2.40c.

## Wire Products, Nails

**Wire:** Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

| | |
|---|---|
| Bright basic, bessemer wire | 2.60c |
| Galvanized wire | 2.60c |
| Spring wire | 3.20c |

**Wire Products to the Trade:**

| | |
|---|---|
| Standard and cement-coated wire nails, polished and staples, 100-lb. keg | $2.55 |
| Annealed fence wire, 100 lb. | 3.05 |
| Galvanized fence wire, 100 lb. | 3.40 |
| Woven fence, 12½ gage and lighter, per base column | .67 |
| Do., 11 gage and heavier | .70 |
| Barbed wire, 80-rod spool, col. | .70 |
| Twisted barbless wire, col. | .70 |
| Single loop bale ties, col. | .59 |
| Fence posts, carloads, col. | .69 |
| **Cut nails,** Pittsburgh, carloads | $3.85 |

## Pipe, Tubes

**Welded Pipe:** Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

| | Butt Weld Steel Blk. | Galv. | | Iron Blk. | Galv. |
|---|---|---|---|---|---|
| In. | | | In. | | |
| ⅛ | 56 | 33 | ¼ | 24 | 3½ |
| ¼ & ⅜ | 59 | 40½ | ⅜ | 30 | 10 |
| ½ | 63½ | 51 | 1-1¼ | 34 | 16 |
| ¾ | 66½ | 56 | 1½ | 38 | 18½ |
| 1-3 | 68½ | 57½ | 2 | 37½ | 18 |

| | Lap Weld Steel Blk. | Galv. | | Iron Blk. | Galv. |
|---|---|---|---|---|---|
| In. | | | In. | | |
| 2 | 61 | 49½ | 1¼ | 23 | 3½ |
| 2½-3 | 64 | 52½ | 1½ | 28½ | 10 |
| 3½-6 | 66 | 54½ | 2 | 30½ | 12 |
| 7-8 | 65 | 52½ | 2½, 3½ | 31½ | 14½ |
| 9-10 | 64½ | 52 | 4 | 33½ | 18 |
| 11-12 | 63½ | 51 | 4½-8 | 32½ | 17 |
| | | | 9-12 | 28½ | 12 |

**Boiler Tubes:** Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

| O. D. Sizes | B.W.G. | —Seamless— Hot Rolled | Cold Drawn | —Lap Weld— Steel | Charcoal Iron |
|---|---|---|---|---|---|
| 1" | 13 | $ 7.82 | $ 9.01 | ..... | ..... |
| 1¼" | 13 | 9.26 | 10.67 | ..... | ..... |
| 1½" | 13 | 10.23 | 11.72 | $ 9.72 | $23.71 |
| 1¾" | 13 | 11.64 | 13.42 | 11.06 | 22.93 |
| 2" | 13 | 13.04 | 15.03 | 12.38 | 19.35 |
| 2¼" | 13 | 14.54 | 16.76 | 13.79 | 21.63 |
| 2¼" | 12 | 16.01 | 18.45 | 15.16 | ..... |
| 2½" | 12 | 17.54 | 20.21 | 16.58 | 26.57 |
| 2¾" | 12 | 18.59 | 21.42 | 17.54 | 29.00 |
| 3" | 12 | 19.50 | 22.48 | 18.35 | 31.38 |
| 3½" | 11 | 24.63 | 28.37 | 23.15 | 39.81 |
| 4" | 10 | 30.54 | 35.20 | 28.66 | 49.90 |
| 4½" | 10 | 37.35 | 43.04 | 35.22 | ..... |
| 5" | 9 | 46.87 | 54.01 | 44.25 | 73.93 |
| 6" | 7 | 71.96 | 82.93 | 68.14 | ..... |

## Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

## Tool Steels

**Tool Steels:** Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

**High Speed Tool Steels:**

| Tung. | Chr. | Van. | Moly. | Pitts. base, per lb. |
|---|---|---|---|---|
| 18.00 | 4 | 1 | - | 67.00c |
| 18.00 | 4 | 2 | 1 | 77.00c |
| 18.00 | 4 | 3 | 1 | 87.00c |
| 1.5 | 4 | 1 | 8.5 | 54.00c |
| | 4 | 2 | 8 | 54.00c |
| 5.50 | 4 | 1.50 | 4 | 57.50c |
| 5.50 | 4.50 | 4 | 4.50 | 70.00c |

## Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

**CHROMIUM NICKEL STEEL**

| Type | Bars | Plates | Sheets | H. R. 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 |
| 308 | 29.00 | 34.00 | 41.00 | 28.50 | 35.00 |
| 309 | 36.00 | 40.00 | 47.00 | 37.00 | 47.00 |
| 310 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 311 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 312 | 36.00 | 40.00 | 49.00 | ..... | ..... |
| *316 | 40.00 | 44.00 | 48.00 | 40.00 | 48.00 |
| *317 | 50.00 | 54.00 | 58.00 | 50.00 | 58.00 |
| †321 | 29.00 | 34.00 | 41.00 | 29.25 | 38.00 |
| †347 | 33.00 | 38.00 | 45.00 | 33.00 | 42.00 |
| 431 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |

**STRAIGHT CHROMIUM STEEL**

| | | | | | |
|---|---|---|---|---|---|
| 403 | 21.50 | 24.50 | 29.50 | 21.25 | 27.00 |
| **410 | 18.50 | 21.50 | 26.50 | 17.00 | 22.00 |
| 416 | 19.00 | 22.00 | 27.00 | 18.25 | 23.50 |
| ††420 | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 430 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| ‡‡430F | 19.50 | 22.50 | 29.50 | 18.75 | 24.50 |
| 442 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 446 | 27.50 | 30.50 | 36.50 | 35.00 | 52.00 |
| 501 | 8.00 | 12.00 | 15.75 | 12.00 | 17.00 |
| 502 | 9.00 | 13.00 | 16.75 | 13.00 | 18.00 |

**STAINLESS CLAD STEEL (20%)**

| | | | | | |
|---|---|---|---|---|---|
| 304 | ..... | §§18.00 | 19.00 | ..... | ..... |

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

**Basing Point Prices** are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

**Extras** mean additions or deductions from base prices in effect April 16, 1941.

**Delivered prices** applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

**Domestic Ceiling prices** are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

**Seconds,** maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wusters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

**Export ceiling prices** may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

## Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

**Carriage and Machine**

| | |
|---|---|
| ½ x 6 and smaller | 65½ off |
| Do., ⅝ and ¾ x 6-in. and shorter | 63½ off |
| Do., ⅞ to 1 x 6-in. and shorter | 61 off |
| 1⅛ and larger, all lengths | 59 off |
| All diameters, over 6-in. long | 59 off |
| Tire bolts | 50 off |
| Step bolts | 56 off |
| Plow bolts | 65 off |

**Stove Bolts**

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

**Nuts**

| | U.S.S. | S.A.E. |
|---|---|---|
| Semifinished hex. | | |
| ⅜-inch and less | 62 | 64 |
| ½-inch | 59 | 60 |
| 1⅛-1⅜-inch | 57 | 58 |
| 1⅝ and larger | 56 | |

**Hexagon Cap Screws**

| | |
|---|---|
| Upset 1-in., smaller | 64 off |
| Milled 1-in., smaller | 60 off |

**Square Head Set Screws**

| | |
|---|---|
| Upset, 1-in., smaller | 71 off |
| Headless, ¼-in., larger | 60 off |
| No. 10, smaller | 70 off |

## Piling

| | |
|---|---|
| Pittsburgh, Chicago, Buffalo | 2.40c |

## Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

| | |
|---|---|
| Structural | 3.75c |
| ⅞-inch and under | 65-5 off |
| Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. | $2.75-3.00 off |

## Metallurgical Coke

Price Per Net Ton

**Beehive Ovens**

| | |
|---|---|
| Connellsville, furnace | *$6.00 |
| Connellsville, foundry | 7.00- 7.50 |
| Connellsville prem. fdry. | 7.25- 7.60 |
| New River, foundry | 8.00- 8.25 |
| Wise county, foundry | 7.50 |
| Wise county, furnace | 6.50 |

**By-Product Foundry**

| | |
|---|---|
| Kearny, N. J., ovens | 12.15 |
| Chicago, outside delivered | 11.50 |
| Chicago, delivered | 12.25 |
| Terre Haute, delivered | 12.00 |
| Milwaukee, ovens | 12.25 |
| New England, delivered | 13.75 |
| St. Louis, delivered | †12.25 |
| Birmingham, ovens | 8.50 |
| Indianapolis, delivered | 12.00 |
| Cincinnati, delivered | 11.75 |
| Cleveland, delivered | 12.20 |
| Buffalo, delivered | 12.50 |
| Detroit, delivered | 12.25 |
| Philadelphia, delivered | 12.38 |

*Operators of hand-drawn ovens using trucked coal may charge $6.50, effective Aug. 12, 1942. †$12.75 from other than Ala., Mo., Tenn.

## Coke By-Products

| | |
|---|---|
| Spot, gal., freight allowed east of Omaha | |
| Pure and 90% benzol | 15.00c |
| Toluol, two degree | 28.00c |
| Solvent naphtha | 27.00c |
| Industrial xylol | 27.00c |
| Per lb. f.o.b. works | |
| Phenol (car lots, returnable drums) | 12.50c |
| Do. less than car lots | 13.25c |
| Do. tank cars | 11.50c |
| Eastern Plants, per lb. | |
| Naphthalene flakes, balls, bbls., to jobbers | 8.00c |
| Per ton, bulk, f.o.b. port | |
| Sulphate of ammonia | $29.20 |

## Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

| | No. 2 Foundry | Basic | Bessemer | Malleable |
|---|---|---|---|---|
| **Bethlehem, Pa., base** | $25.00 | $24.50 | $26.00 | $25.50 |
| Newark, N. J., del. | 26.62 | 26.12 | 27.62 | 27.12 |
| Brooklyn, N. Y., del. | 27.65 | ..... | ..... | 28.15 |
| **Birdsboro, Pa., del.** | 25.00 | 24.50 | 26.00 | 25.50 |
| **Birmingham, base** | †20.38 | †19.00 | ..... | ..... |
| Baltimore, del. | 25.67 | ..... | ..... | ..... |
| Boston, del. | 25.12 | ..... | ..... | ..... |
| Chicago, del. | ‡24.47 | ..... | ..... | ..... |
| Cincinnati, del. | 24.30 | 22.92 | ..... | ..... |
| Cleveland, del. | 24.12 | 23.24 | ..... | ..... |
| Newark, N. J., del. | 26.24 | ..... | ..... | ..... |
| Philadelphia, del. | 25.51 | 25.01 | ..... | ..... |
| St. Louis, del. | ‡24.12 | 23.24 | ..... | ..... |
| **Buffalo, base** | 24.00 | 23.00 | 25.00 | 24.50 |
| Boston, del. | 25.50 | 25.00 | 26.50 | 26.00 |
| Rochester, del. | 25.53 | ..... | 26.53 | 26.03 |
| Syracuse, del. | 26.08 | ..... | 27.08 | 26.58 |
| **Chicago, base** | 24.00 | 23.50 | 24.50 | 24.00 |
| Milwaukee, del. | 25.17 | 24.67 | 25.67 | 25.17 |
| Muskegon, Mich., del. | 27.38 | ..... | ..... | 27.38 |
| **Cleveland, base** | 24.00 | 23.50 | 24.50 | 24.00 |
| Akron, Canton, O., del. | 25.47 | 24.97 | 25.97 | 25.47 |
| **Detroit, base** | 24.00 | 23.50 | 24.50 | 24.00 |
| Saginaw, Mich., del. | 26.45 | 25.95 | 26.95 | 26.45 |
| **Duluth, base** | 24.50 | 24.00 | 25.00 | 24.50 |
| St. Paul, del. | 26.76 | 26.26 | 27.26 | 26.76 |
| **Erie, Pa., base** | 24.00 | 23.50 | 25.00 | 24.50 |
| **Everett, Mass., base** | 25.00 | 24.50 | 26.00 | 25.50 |
| Boston | 25.50 | 25.00 | 26.50 | 26.00 |
| **Granite City, Ill., base** | 24.00 | 23.50 | 24.50 | 24.00 |
| St. Louis, del. | 24.50 | 24.00 | ..... | 24.50 |
| **Hamilton, O., base** | 24.00 | 23.50 | ..... | 24.00 |
| Cincinnati, del. | 24.68 | 24.68 | ..... | 25.35 |
| **Neville Island, Pa., base** | 24.00 | 23.50 | 24.50 | 24.00 |
| §Pittsburgh, del., No. & So. sides | 24.69 | 24.19 | 25.19 | 24.69 |
| **Provo, Utah, base** | 22.00 | ..... | ..... | ..... |
| **Sharpsville, Pa., base** | 24.00 | 23.50 | 24.50 | 24.00 |
| **Sparrows Point, Md., base** | 25.00 | 24.50 | ..... | ..... |
| Baltimore, del. | 26.05 | ..... | ..... | ..... |
| **Steelton, Pa., base** | ..... | 24.50 | ..... | 25.50 |
| **Swedeland, Pa., base** | 25.00 | 24.50 | 26.00 | 25.50 |
| Philadelphia, del. | 25.89 | 25.39 | ..... | 26.39 |
| **Toledo, O., base** | 24.00 | 23.50 | 24.50 | 24.00 |
| Mansfield, O., del. | 26.06 | 25.56 | 26.56 | 26.06 |
| **Youngstown, O., base** | 24.00 | 23.50 | 24.50 | 24.00 |

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

**High Silicon, Silvery**

| | | | |
|---|---|---|---|
| 6.00-6.50 per cent (base) | $29.50 | | |
| 6.51-7.00 | $30.50 | 9.01- 9.50 | $35.50 |
| 7.01-7.50 | 31.50 | 9.51-10.00 | 36.50 |
| 7.51-8.00 | 32.50 | 10.01-10.50 | 37.50 |
| 8.01-8.50 | 33.50 | 10.51-11.00 | 38.50 |
| 8.51-9.00 | 34.50 | 11.01-11.50 | 39.50 |

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

**Bessemer Ferrosilicon**

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

**Charcoal Pig Iron**

Northern

| | |
|---|---|
| Lake Superior Furn. | $28.00 |
| Chicago, del. | 31.54 |

**Southern**

| | |
|---|---|
| Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. | $28.50 |
| Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. | 33.00 |

**Gray Forge**

| | |
|---|---|
| Neville Island, Pa. | $23.50 |
| Valley, base | 23.50 |

**Low Phosphorus**

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

**Switching Charges:** Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

**Silicon Differentials:** Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

**Phosphorous Differential:** Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

**Manganese Differentials:** Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

**Ceiling prices** are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

**Exceptions to Ceiling Prices:** Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

**Refractories**

## Refractories

Per 1000 f.o.b. Works, Net Prices

| | |
|---|---|
| **Fire Clay Brick** | |
| Super Quality | |
| Pa., Mo., Ky. | $64.60 |
| First Quality | |
| Pa., Ill., Md., Mo., Ky. | 51.30 |
| Alabama, Georgia | 51.30 |
| New Jersey | 56.00 |
| Ohio | 43.00 |
| Second Quality | |
| Pa., Ill., Md., Mo., Ky. | 46.55 |
| Alabama, Georgia | 38.00 |
| New Jersey | 49.00 |
| Ohio | 36.00 |
| **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 | |

## Fluorspar

| | |
|---|---|
| Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail | $25.00-28.00 |
| Do., barge | 25.00-28.00 |
| No. 2 lump | 25.00-28.00 |

(Prices effective Nov. 23, 1942)

## Ferroalloy Prices

**Ferromanganese:** 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

**Spiegeleisen:** 19-21%, carlots per gross ton, Palmerton, Pa. $36.

**Electrolytic manganese:** 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

**Chromium Metal:** Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

**Ferrocolumbium:** 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

**Ferrochrome:** 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

| | Car loads | Ton lots | Less ton | Less 200 lbs. |
|---|---|---|---|---|
| 2% C. | 19.50c | 20.25c | 20.75c | 21.00c |
| 1% C. | 20.50c | 21.25c | 21.75c | 22.00c |
| 0.20% C. | 21.50c | 22.25c | 22.75c | 23.00c |
| 0.10% C. | 22.50c | 23.25c | 23.75c | 24.00c |

Spot is ¼c higher

**Chromium briquets:** Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

**Ferromolybdenum:** 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

**Calcium Molybdate (Molyte):** 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

**Molybdic Oxide Briquets:** 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

**Molybdenum Oxide:** 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

**Molybdenum Powder:** 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

**Ferrophosphorus:** 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

**Ferrophosphorus:** 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

**Ferrosilicon:** Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

| | Carloads | Ton lots |
|---|---|---|
| 50% | $ 74.50 | $ 87.00 |
| Unitage | 1.50 | 1.75 |
| 75% | 135.00 | 151.00 |
| Unitage | 1.80 | 2.00 |
| 85% | 170.00 | 188.00 |
| Unitage | 2.00 | 2.20 |
| 90-95% | 10.25c | 11.25c |

Spot prices ¼-cent higher.

**Silicon Metal:** Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

**Silicon Metal:** Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

**Silicon Briquets:** Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

**Silicomanganese:** Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

**Silico-manganese Briquets:** Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

**Ferrotungsten:** Carlots, per lb. contained tungsten, $1.90.

**Tungsten Metal Powder:** 98-99%, per lb. any quantity $2.55-2.65.

**Ferrotitanium:** 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

**Ferrotitanium:** 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

**High-Carbon Ferrotitanium:** 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

**Ferrovanadium:** 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

**Vanadium Pentoxide:** Technical grade, 88-92 per cent $V_2O_5$; contracts, any quantity, $1.10 per pound $V_2O_5$ contained; spot 5 cents per pound higher.

**Zirconium Alloys:** 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

**Zirconium alloy:** 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

**Alsifer:** (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

**Simanal:** (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials, As of April 16, 1941*

| | Soft Bars | Hot-Rolled Strip Bands | Hot-Rolled Strip 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 | 4.68 | 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 | .... | 4.04 | .... | .... |
| 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 |
| Washington, D. C. | 3.95 | 4.10 | 4.45 | 3.80 | 3.80 | 5.35 | 3.60 | .... | .... | .... | 4.03 | .... | .... |
| 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 | 4.37 | 4.92 | 3.45 | 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 | 3.38 | 4.23 | 4.98 | 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 |
| Indianapolis | 3.60 | 3.75 | 3.75 | 3.70 | 3.70 | 5.30 | 3.45 | .... | 5.01 | .... | 3.97 | .... | .... |
| Chattanooga* | 3.80 | 4.00 | 4.00 | 3.85 | 3.85 | 5.80 | 3.75 | .... | 4.50 | .... | 4.39 | .... | .... |
| Memphis | 3.90 | 4.10 | 4.10 | 3.95 | 3.95 | 5.71 | 3.85 | .... | 5.25 | .... | 4.31 | .... | .... |
| 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 | .... | 5.25 | 5.00 | 4.60 | .... | .... |
| Houston, Tex. | 3.75 | 4.30 | 4.30 | 4.05 | 4.05 | 5.50 | 4.00 | .... | 5.25 | .... | 6.90 | .... | .... |
| Seattle | 4.20 | 4.25 | 5.45 | 4.75 | 4.45 | 6.50 | 4.65 | 7.60 | 5.70 | .... | 5.75 | .... | .... |
| Los Angeles | 4.35 | 4.90 | 6.70 | 4.90 | 4.60 | 7.15 | 4.95 | 7.15 | 5.95 | .... | 6.10 | 10.55 | 9.55 |
| San Francisco | 3.95 | 4.50 | 6.25 | 4.65 | 4.35 | 6.35 | 4.55 | 6.40 | 6.10 | .... | 6.80 | 10.80 | 9.80 |

*Not named in OPA price order.

| | 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 | .... | .. | .... | . |
| Buffalo | 3.55 | 7.35 | 5.65 | 5.40 | 7.50 |
| Pittsburgh | 3.40 | 7.45 | 5.75 | 5.50 | 7.60 |
| Cleveland | 3.30 | 7.55 | 5.85 | 5.85 | 7.70 |
| Detroit | 3.48 | 7.67 | 5.97 | 5.72 | 7.19 |
| Cincinnati | 3.65 | 7.69 | 5.99 | 5.74 | 7.84 |
| Chicago | 3.70 | 7.35 | 5.65 | 5.40 | 7.50 |
| Twin Cities | 3.95 | 7.70 | 6.00 | 6.09 | 8.19 |
| Milwaukee | 3.83 | 7.33 | 5.88 | 5.63 | 7.73 |
| St. Louis | 3.84 | 7.72 | 6.02 | 5.77 | 7.87 |
| Seattle | 6.25 | . | 8.00 | 7.85 | 8.65 |
| Los Angeles | 4.60 | 9.55 | 8.55 | 8.40 | 8.80 |
| San Francisco | 5.45 | 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 Birmingham, 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, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 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; 1 to 99, Los Angeles; 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.

## 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 | 13.00 |

**Foreign Ore**

*Cents per unit, c.i.f. Atlantic ports*

| | |
|---|---|
| Manganiferous ore, 45-55% Fe., 6-10% Mang. | Nom. |
| N. African low phos. | Nom. |
| Spanish, No. African basic, 50 to 60% | Nom. |
| Brazil iron ore, 68-69% f.o.b. Rio de Janeiro | 7.50-8.00c |

**Tungsten Ore**

| | |
|---|---|
| Chinese wolframite, per short ton unit, duty paid | $24.00 |

**Chrome Ore**

(Equivalent OPA schedules):

*Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.*

*(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)*

| | |
|---|---|
| Indian and African | |
| 48% 2.8:1 | 41.00 |
| 48% 3:1 | 43.50 |
| 48% no ratio | 31.00 |
| South African (Transvaal) | |
| 44% no ratio | 27.40 |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 50% no ratio | 32.80 |
| Brazilian—nominal | |
| 44% 2.5:1 lump | 33.65 |
| 48% 3:1 lump | 43.50 |
| Rhodesian | |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 48% 3:1 lump | 43.50 |
| Domestic (f.o.b. Columbus, Mont.) | |
| 48% 3:1 | 43.50 |
| less $7 freight allowance | |

**Manganese Ore**

*Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)*

| | |
|---|---|
| Brazilian, 48% | 73.8c |
| Brazilian, 46% | 71.8c |
| Caucasian, 51% | 75.3c |
| Caucasian, 50% | 74.8c |
| Chilean, 48% | 73.8c |
| Indian, 50% | 74.8c |
| Indian, 48% | 73.8c |
| South African, 48% | 73.8c |
| South African, 46% | 71.8c |
| (Duty Free) | |
| Cuban, 51% | 86.5c |
| Cuban, 48% | 85.0c |
| Cuban, 45% | 82.0c |
| Philippine, 50% | 85.0c |
| Domestic, 48%, f.o.b. mines | 96.0c |

**Molybdenum**

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

## NATIONAL EMERGENCY STEELS (Hot Rolled)

*Extras for Alloy Content*

| Designation | Chemical Composition Limits, Per Cent — Carbon | Mn. | Si. | Cr. | Ni. | Mo. | Basic open-hearth Bars per 100 lb. | Basic open-hearth Billets per G T | Electric furnace Bars per 100 lb. | Electric furnace Billets per G T |
|---|---|---|---|---|---|---|---|---|---|---|
| NE 1330 | .28-.33 | 1.60-1.90 | .20-.35 | ..... | ..... | ..... | $ .10 | $2.00 | ... | ..... |
| NE 8020 | .18-.23 | 1.00-1.30 | .20-.35 | ..... | ..... | .10-.20 | .45 | 9.00 | $.95 | $19.00 |
| NE 8339 | .35-.42 | 1.30-1.60 | .20-.35 | ..... | ..... | .20-.30 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8442 | .40-.45 | 1.30-1.60 | .20-.35 | ..... | ..... | .30-.40 | .90 | 18.00 | 1.40 | 28.00 |
| NE 8613 | .12-.17 | .70- .90 | .20-.35 | .40-.60 | .40-.60 | .15-.25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8715 | .13-.18 | .70- .90 | .20-.35 | .40-.60 | .40-.60 | .20-.30 | .80 | 16.00 | 1.30 | 26.00 |
| NE 8949 | .45-.50 | 1.00-1.30 | .20-.35 | .40-.60 | .40-.60 | .30-.40 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9255 | .50-.60 | .75-1.00 | 1.80-2.20 | ..... | ..... | ..... | .40 | 8.00 | ... | ..... |
| NE 9262 | .55-.65 | .75-1.00 | 1.80-2.20 | .20-.40 | ..... | ..... | .65 | 13.00 | ... | ..... |
| NE 9415 | .13-.18 | .80-1.10 | .40-.60 | .20-.40 | .20-.40 | .08-.15 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9442 | .40-.45 | 1.00-1.30 | .40-.60 | .20-.40 | .20-.40 | .08-.15 | .85 | 17.00 | 1.35 | 27.00 |
| NE 9537 | .35-.40 | 1.20-1.50 | .40-.60 | .40-.60 | .40-.60 | .15-.25 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9630 | .28-.33 | 1.20-1.50 | .40-.60 | .40-.60 | ..... | ..... | .80 | 16.00 | 1.30 | 26.00 |
| NE 9642 | .40-.45 | 1.30-1.60 | .40-.60 | .40-.60 | ..... | ..... | .85 | 17.00 | 1.35 | 27.00 |

Extras are in addition to a base price of 2.70c, per 100 lb., on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semifinished. No prices quoted on vanadium alloy.

# MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

## PRICES FOR OTHER THAN RAILROAD SCRAP

| | ELECTRIC FURNACE AND FOUNDRY GRADES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low Phos. Grades | | | | | | | | | |
| | OPEN HEARTH GRADES* | Machine Shop Turnings | BLAST FURNACE GRADES* | Billet, Bloom Forge Crops | Bar Crops and smaller; Punchings, Plate | Heavy Structural, Plate 3 ft. and less | Heavy Structural, Plate 2 ft. and less | Heavy Structural, Plate 1 ft. and less | Cut Auto Scrap 3 ft. and less | Cut Auto Scrap 2 ft. and less | Cut Auto Scrap 1 ft. and less | Alloy-Free Low Phos. & Sulphur Turnings | First Cut Heavy Axle & Forge Turnings | Electric Furnace Bundles |
| Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren | $20.00 | $16.00 | $16.00 | $25.00 | $22.50 | $21.00 | $21.50 | $22.00 | $20.00 | $20.50 | $21.00 | $18.00 | $19.50 | $21.00 |
| Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville | 18.75 | 14.75 | 14.75 | 23.75 | 21.25 | 19.75 | 20.25 | 20.75 | 18.75 | 19.25 | 19.75 | 16.75 | 18.25 | 19.75 |
| Bethlehem | 18.25 | 14.25 | 14.25 | 23.25 | 20.75 | 19.25 | 19.75 | 20.25 | 18.25 | 18.75 | 19.25 | 16.25 | 17.75 | 19.25 |
| Buffalo | 19.25 | 15.25 | 15.25 | 24.25 | 21.75 | 20.25 | 20.75 | 21.25 | 19.25 | 19.75 | 20.25 | 17.25 | 18.75 | 20.25 |
| Cleveland, Middletown, Cincinnati, Portsmouth, Ashland | 19.50 | 15.50 | 15.50 | 24.50 | 22.00 | 20.50 | 21.00 | 21.50 | 19.50 | 20.00 | 20.50 | 17.50 | 19.00 | 20.50 |
| Detroit | 17.85 | 13.85 | 13.85 | 22.85 | 20.35 | 18.85 | 19.35 | 19.85 | 17.85 | 18.35 | 18.85 | 15.85 | 17.35 | 18.85 |
| Toledo | .. | 13.85 | 13.85 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Chicago | 18.75 | 14.75 | 14.75 | 23.75 | 21.25 | 19.75 | 20.25 | 20.75 | 18.75 | 19.25 | 19.75 | 16.75 | 18.25 | 19.75 |
| Kokomo | 18.25 | 14.25 | 14.25 | 23.25 | 20.75 | 19.25 | 19.75 | 20.25 | 18.25 | 18.75 | 19.25 | 16.25 | 17.75 | 19.25 |
| Duluth | 18.00 | 14.00 | 14.00 | 23.00 | 20.50 | 19.00 | 19.50 | 20.00 | 18.00 | 18.50 | 19.00 | 16.00 | 17.50 | 19.00 |
| St. Louis | 17.50 | 13.50 | 13.50 | 22.50 | 20.00 | 18.50 | 19.00 | 19.50 | 17.50 | 18.00 | 18.50 | 15.50 | 17.00 | 18.50 |
| Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif. | 17.00 | 13.00 | 13.00 | 22.00 | 19.50 | 18.00 | 18.50 | 19.00 | 17.00 | 17.50 | 18.00 | 15.00 | 16.50 | 18.00 |
| Minnequa, Colo. | 16.50 | 12.50 | 12.50 | 21.50 | 19.00 | 17.50 | 18.00 | 18.50 | 16.50 | 17.00 | 17.50 | 14.50 | 16.00 | 17.50 |
| Seattle | 14.50 | 10.50 | 10.50 | 19.50 | 17.00 | 15.50 | 16.00 | 16.50 | 14.50 | 15.00 | 15.50 | 12.50 | 14.00 | 15.50 |

## RAILROAD SCRAP

| | Heavy Melting Steel | Scrap Rails | Rails for Rolling | Scrap Rails 3 ft. and under | Scrap Rails 2 ft. and under | Scrap Rails 18 in. and under |
|---|---|---|---|---|---|---|
| Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton | $21.00 | $22.00 | $23.50 | $24.00 | $24.25 | $24.50 |
| Philadelphia, Wilmington, Sparrows Point | 19.75 | 20.75 | 22.25 | 22.75 | 23.00 | 23.25 |
| Cleveland, Cincinnati, Middletown, Ashland, Portsmouth | 20.50 | 21.50 | 23.00 | 23.50 | 23.75 | 24.00 |
| Chicago | 19.75 | 20.75 | 22.25 | 22.75 | 23.00 | 23.25 |
| Buffalo | 20.25 | 21.25 | 22.75 | 23.25 | 23.50 | 23.75 |
| Detroit | 18.85 | 19.85 | 21.35 | 21.85 | 22.10 | 22.35 |
| Kokomo | 19.25 | 20.25 | 21.75 | 22.25 | 22.50 | 22.75 |
| Duluth | 19.00 | 20.00 | 21.50 | 22.00 | 22.25 | 22.50 |
| Kansas City, Mo. | 17.00 | 18.00 | 19.50 | 20.00 | 20.25 | 20.50 |
| St. Louis | 18.50 | 19.50 | 21.00 | 21.50 | 21.75 | 22.00 |
| Birmingham | 18.00 | 19.00 | 20.50 | 21.00 | 21.25 | 21.50 |
| Los Angeles, San Francisco | 18.00 | 19.00 | 20.50 | 21.00 | 21.25 | 21.50 |
| Seattle | 15.50 | 16.50 | 18.00 | 18.50 | 18.75 | 19.00 |

## CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

| | 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 | 17.00 | 18.00 | 19.00 |
| Unstripped Motor Blocks | 17.50 | 18.50 | 19.50 |
| Heavy Breakable Cast | 15.50 | 16.50 | 17.50 |
| Charging Box Size Cast | 17.00 | 18.00 | 19.00 |
| Miscellaneous Malleable | 20.00 | 21.00 | 22.00 |

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. **Blast Furnace Grades** prices refer to mixed borings and turnings, shoveling turnings, and cast iron borings.

**A basing point** includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

**Inferior Grades:** Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

**Commissions:** No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price 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 sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

**Maximum Shipping Point Price:** Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

**Maximum Delivered Prices:** Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

**Unprepared Scrap:** Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less; material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap." Graveyard autos not considered unprepared scrap.

**Remote Scrap:** Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

## Sheets, Strip . . .

Sheet & Strip Prices, Page 134

Most sheet sellers have little tonnage for delivery against top ratings before the middle of February. This applies to galvanized as well as to hot and cold-rolled sheets, though one eastern mill has some galvanized tonnage available for late January shipment on ratings as low as AA-3.

Sheet buying has slackened and some improvement is noted in deliveries, though not marked. Distributors' stocks are in better balance, although some suppliers were late in shipping fourth quarter quotas, some tonnage included in directives being delivered in December. Orders for first quarter delivery are light, notably for cold-rolled, and most new buying is against scattered specified lots to meet new war requirements. Restricted building operations and limitations on their use have reduced requirements for galvanized.

## Plates . . .

Plate Prices, Page 135

While the year as a whole is off for most plate sellers, due to limitations on certain types of construction and on tank fabrication and to reshuffling of certain procedure under the allocation system, some sellers report a recent improvement. There has been a greater channeling of orders from smaller shipyards and an improvement in railroad maintenance and repair buying; also larger purchases by oil companies. Jobbers are taking in more plates than early in the fall.

In the export field, a Portuguese shipyard is reported requiring for 25,000 tons of plates and shapes, principally plates, although there is question if the government will permit this purchase. With Spain apparently manifesting a more friendly attitude toward the Axis than toward the United Nations and with the possibility always of Germany endeavoring to go through Spain to attack Gibraltar, it is believed by trade interests that shipment of such a tonnage to Portugal, next door to Spain, would not be considered wise.

## Rails, Cars . . .

Track Material Prices, Page 135

Orders are beginning to be released slowly against the program of 20,000 cars to be built for domestic lines in the first half of next year. Some trade interests estimated that fully 75 per cent of the cars approved by War Production Board will involve contracts frozen last spring.

One order approved by WPB recently for delivery in 1943 involves 1000 gondola cars for the Union Pacific, to be built by Pullman-Standard Car Mfg. Co., Chicago. This order was originally placed some time ago and then held up, pending a revision in specifications. Instead of all steel, these cars will now be of composite construction.

No new car orders for domestic lines were placed in November, for the second month in succession, according to a recent survey. Consequently total domestic freight car awards for the first 11 months aggregated 25,893 cars, against 113,093 in the corresponding period of 1941; 59,708 in the same 11 months of 1940; and 57,740 in the same period 1939. Further comparisons follow:

| | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|
| Jan. | 4,253 | 15,169 | 360 | 3 |
| Feb. | 11,725 | 5,508 | 1,147 | 2,259 |
| March | 4,080 | 8,074 | 3,104 | 800 |
| April | 2,125 | 14,645 | 2,077 | 3,095 |
| May | 822 | 18,630 | 2,010 | 2,051 |
| June | 0 | 32,749 | 7,475 | 1,324 |
| July | 1,025 | 6,459 | 5,846 | 110 |
| Aug. | 0 | 2,668 | 7,525 | 2,814 |
| Sept. | 1,863 | 4,470 | 9,735 | 23,000 |
| Oct. | 0 | 2,499 | 12,195 | 19,634 |
| Nov. | 0 | 2,222 | 8,234 | 2,650 |
| 10 mos. | 25,893 | 113,093 | 59,708 | 57,740 |
| Dec. | ..... | 8,406 | 7,181 | 35 |
| Total | ..... | 121,499 | 66,889 | 57,775 |

December will show some activity, for already the Monongahela Connecting has been given authority to build in its own shops sixty five 120-ton all steel gondolas and twenty 100-ton all steel hoppers. The Akron, Canton & Youngstown has also had authority to place what is believed to be a new order for fifty 40-ton steel frame box cars, the contract going to the Mather Stock Car Co., Chicago.

Ordered tentatively, subject to WPB approval, are 100 seventy-ton composite gondolas and 25 seventy-ton composite flats for the Norfolk & Western. Pressed Steel Car Co., Pittsburgh, is scheduled to build the gondolas and the Greenville Steel Car Co., Greenville, Pa., the flats.

Several inquiries are pending, the

latest including 200 seventy-ton flat cars for the Denver & Rio Grande Western and 75 small capacity box cars for the Colombian National Railways, Colombia, S. A.

Several locomotive orders have been placed, subject to approval by WPB. The Atchison, Topeka & Santa Fe has thus tentatively placed twenty 4-8-4 freight locomotives with the Baldwin Locomotive Works, Eddystone, Pa.

Also pending Washington approval are two 1000-horsepower diesel-electric engines for the Chicago, Milwaukee, St. Paul & Pacific, five 1000-horsepower Diesel-electric switch engines for the Lehigh Valley, eight 1000-horsepower diesel-electric switchers for the Western Pacific, and two 1000-horsepower diesel-electric switchers for the New York, Susquehanna & Western, all to American Locomotive Co., New York.

Definitely placed, with full WPB approval, are two 1000-horsepower diesel-electric switch engines for the Richmond, Fredericksburg & Potomac, awarded to the American Locomotive Co., and one 1000-horsepower diesel-electric switch engine for the Nevada Consolidated Copper Corp., to Baldwin Locomotive Works.

On certain locomotive orders placed recently the equipment had been practically built, with WPB having given approval for the construction. Thus quick delivery can sometimes be made to an approved buyer.

## Pipe . . .

Pipe Prices, Page 135

Merchant steel pipe deliveries to distributors under directives have generally been completed; replacements are for the most part confined to higher priorities on PD 83g. While some smaller jobbers were relieved by one or two car lot deliveries under directives, pipe inventories of larger distributors are not large and are unbalanced in sizes. Consumer demand is slower, as are direct shipments, with scattered tonnage lots going to service distributing depots. Cast pipe inquiry is light and deliveries are better on lower ratings.

## Structural Shapes . . .

Structural Shape Prices, Page 135

Demand for structural shapes continues to lag. Deliveries are available in six weeks on ratings down to AA-5. Award of a bridge for the Alaskan highway provided tonnage for Belmont Iron Works, Philadelphia, and Bethlehem Steel Co. Pending decision on priority no award has been made on a railroad bridge for the Pennsylvania at Washington, requiring 5000 tons, on which bids were opened Dec. 1.

## Pig Iron . . .

Pig Iron Prices, Page 136

Some merchant pig iron producers find demand is not as pressing as recently and the situation seems easier. This conclusion is reached after survey of revised PD69 forms filed for January allocations. Slight decline in requirements of smaller foundries, noted recently, seems to have spread to larger melters in some areas.

Review of requests filed for January deliveries indicates little tonnage will be left in the A-10 classification. Most melters filed requests in the upper ratings, from AAA down to AA-2x, which constitutes the top group in the revised form.

## Scrap . . .

Scrap Prices, Page 138

That the steel industry is in much more comfortable position in regard to scrap supply than for several months, which has been apparent for the past few weeks, is confirmed by a survey by the American Iron and Steel Institute. This agency finds steelmakers had in reserve Oct. 31 a total of 3,254,000 gross tons of scrap, which was about 1,400,000 tons more than they had April 1, but about 700,000 tons less than what might be called normal, the tonnage on hand Jan. 1, 1941. Since Nov. 1 deliveries have been sufficient to balance or perhaps exceed consumption and incoming scrap continues to arrive. Supply for approximately a month probably is on hand, on the average.

Cost of collection and preparation is coming to be a large factor in the situation as labor conditions become acute and this may have a deterrent effect in future.

Dealers in the Buffalo area failed to

bid on an accumulation of city scrap, claiming a bid that would allow them a profit would be so low as to cause criticism. They asserted labor was not available to transport it to yards or to prepare it there.

Chicago melters are increasing reserves slightly and steel production no longer depends on receipts. Some consumers are refusing an undue proportion of light scrap but this is not creating alarm. Supply is not yet sufficient to make the position secure for future months.

Sudden winter onset in the St. Louis area has slowed scrap handling. Melters there are well supplied for four to six weeks except in the case of two mills, which are close to the bottom of their reserves.

Some eastern mills are holding back shipments and some of their normal supply is being allocated to plants further west. A lot from Camden, N. J., recently was sent to Butler, Pa., and some scrap from northern New Jersey is said to have been sent as far west as Lorain, O. Such long shipments are expensive to the buyer and are held to a minimum.

## Warehouse . . .

Warehouse Prices, Page 137

That demand and supply on a larger assortment of hot-rolled steel products are in better balance with mills is indicated by improved replacement deliveries to warehouses. Cold-finished and alloys are tight, with demand heavy. However, slightly heavier deliveries of small diameter cold-finished rounds are noted in some cases. On the whole, alloys excepted, warehouses are taking in more steel; cold-finished and alloys will be the last to improve or become easier.

Demand for some products from warehouses has slackened, but smaller inquiry is confined to hot-rolled steel, notably structurals, while restrictions on use of galvanized sheets and light building activity has eased requirements.

Miscellaneous demand for nails, bolts, staples and other fastenings is heavy, particularly from the country. Quantities available is limited. Hoops and bands are in better supply but are being absorbed promptly by users. Heavy orders from country dealers for fencing and accessories from country dealers are largely unfilled.

For first quarter supplies to warehouses of extended ratings, PRP and scattered will be geared to the current system directives. Controlled Materials Plan will become fully effective in second quarter when all deliveries to jobbers will be under directives. Alloys and much cold-finished have been based largely on directives for some time, but under CMP total tonnages will be fixed after revisions, depending on prime contractors and war requirements in the respective areas, with definite schedules for deliveries each month.

## Bolts, Nuts, Rivets . . .

Bolt, Nut, Rivet Prices, Page 135

Eastern bolt and nut manufacturers continue to have difficulty getting delivery on larger size rounds, particularly sizes over 1¼ inch. While there have been some cancellations and curtailments of orders, due in part to the drastic cut in PRP quotas in the current quarter and to realignment of the country's war program, particularly as it applies to construction, most bolt and nut producers have substantial backlogs and could produce at a higher rate were steel supplies, in the larger diameters, more readily available.

## Tin Plate . . .

Tin Plate Prices, Page 135

Under the mill quota system, tin plate producers have been advised as to how much they can roll in January. There appears little doubt but that the tonnage will be much heavier than in the current month. In December tin plate production has been greatly restricted. Under the PRP for the fourth quarter, quotas when finally issued were much smaller than consumers had been given reason to believe they would be. In fact, they were advised to go ahead in the first month on a much larger than average basis for the quarter as a whole, as it later developed. Consequently, they had relatively little tonnage left for December.

Tin plate consumers generally have not as yet received their quotas under PRP for the first quarter and inasmuch as there is still no little confusion as to what type of plate they can use for some products and moreover, they still are not sure of what tonnage they are going to get in any event, there is little ordering

at the moment. However, tin plate production will undoubtedly be stepped up sharply after the turn of the year, so as to build up necessary stock, which normally are started in December or late November.

### Iron Ore . . .

Iron Ore Prices, Page 137

Movement of iron ore on the Great Lakes has reached its end, with the total above 92,000,000 gross tons. At 7 o'clock of the morning of Dec. 7 loadings at upper lake ports passed that season total with five or six additional cargoes to be loaded. Duluth-Superior harbor, greatest ore shipping port in the world, closed Monday noon, Dec. 7 and other ports ended their seasons slightly later.

Lake Superior Iron Ore Association has issued preliminary figure for the season's movement, subject to later revision, placing tonnage at 92,076,781 gross tons. The last cargo cleared the harbor at Marquette, Mich., Dec. 9.

### Canada . . .

Toronto, Ont.—Brisk demand prevails for practically all lines of steel. Orders from war consumers are pouring in, but there has been noticeable slackening in inquiries from civilian and non-essential users. It is now becoming apparent that civilian consumers of steel materials, are beginning to realize that no steel is available for their use, and the fact that some mills have been accepting their business on an if, as and when delivery basis, is no indication that they will receive delivery. In fact, producers have no option in this respect but on most lines of steel are under direct supervision of the steel controller and are shipping only against his orders. It is reported that mills are carrying thousands of tons of non-essential orders on their books and it is doubtful that any of these commitments can be taken care of for the duration. Demand for steel on war account is expanding much more rapidly than is production, despite the fact that Canadian mills are maintaining output at almost 99 per cent capacity.

Demand for plate and sheets is increasing with specially heavy call reported for quarter-inch plate. Shipbuilding continues to absorb most Canadian output of plate, as well as the greater part of imports. It is stated that Canada is endeavoring to increase deliveries of plate from the States for urgent war needs. Inquiries during the week include those from two or three base metal mines in Ontario and Quebec, and as these come under top priority rating no delay will be made in shipments. Plate and sheets also have brisk call from motor vehicle makers and the electrical industry.

### Steel in Europe . . .

London—(*By Radio*)—Demand for boiler plates is increasing in Great Britain and structural fabricating shops find all their facilities employed in production of assemblies for war work. Hematite pig iron is scarce and orders are increasing.

## Alleges Carnegie-Illinois Violated Scrap Regulations

OPA filed in federal district court in Chicago last Thursday petition asking that Carnegie-Illinois Steel Corp. be enjoined from "violating price control regulations in buying scrap in Chicago area." It charges the corporation since Feb. 21, 1942, has purchased above ceiling prices, has improperly diverted scrap from electric furnaces and has failed to keep accurate records."

John F. Manierre, regional OPA enforcement attorney, said the action is the first of its kind against a large steel company and the government hopes to halt upgrading by enjoining buyer as well as seller.

A company spokesman stated the complaint does not indicate particular violations, but since price ceilings were established every effort has been made to observe the spirit of the regulations, and to make them applicable to a practical procedure so vital to maintaining highest possible steel rate. "There has not been and never will be any deliberate violation of regulations in any Carnegie-Illinois plant," he said.

## Nonferrous Metal Prices

| Dec. | Copper: Electro, del. Conn. | Copper: Lake, del. Midwest | Copper: Casting, refinery | Straits Tin, New York Spot | Straits Tin, New York Futures |
|---|---|---|---|---|---|
| 1-10 | 12.00 | 12.12½ | 11.75 | 52.00 | 52.00 |

| Dec. | Lead N. Y. | Lead East St. L. | Zinc St. L. | Aluminum 99% | Antimony Amer. Spot, N.Y. | Nickel Cathodes |
|---|---|---|---|---|---|---|
| 1-10 | 6.50 | 6.35 | 8.25 | 15.00 | 14.50 | 35.00 |

*F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper*

**Sheets**

| | |
|---|---|
| Yellow brass (high) | 19.48 |
| Copper, hot rolled | 20.87 |
| Lead, cut to jobbers | 9.75 |
| Zinc, l.c.l. | 13.15 |

**Tubes**

| | |
|---|---|
| High yellow brass | 22.23 |
| Seamless copper | 21.37 |

**Rods**

| | |
|---|---|
| High yellow brass | 15.01 |
| Copper, hot rolled | 17.37 |

**Anodes**

| | |
|---|---|
| Copper, untrimmed | 18.12 |

**Wire**

| | |
|---|---|
| Yellow brass (high) | 19.73 |

**OLD METALS**

*Dealers' Buying Prices*
(In cents per pound, carlots)

**Copper**

| | |
|---|---|
| No. 1 heavy | 9.25-10.00 |
| Light | 7.25- 8.00 |

**Brass**

| | |
|---|---|
| No. 1 composition | 8.50- 9.00 |
| Yellow brass castings | 5.50- 6.00 |
| Auto radiators | 6.12½-6.62½ |
| Red brass, borings & turnings | 8.00- 8.50 |

**Zinc**

| | |
|---|---|
| Old | 4.75- 5.00 |
| New clippings | 6.00- 6.50 |

**Aluminum**

| | |
|---|---|
| Clippings | 9.75-10.25 |
| Cast | 8.75- 9.25 |
| Pistons | 8.50- 8.75 |
| Sheet | 8.75- 9.25 |

**Lead**

| | |
|---|---|
| Heavy | 4.75- 5.25 |
| Mixed babbitt | 5.35- 5.50 |
| Electrotype shells | 5.90- 5.50 |
| Stereotype, Linotype | 6.00- 6.75 |

**Tin and Alloys**

| | |
|---|---|
| Block tin pipe | 44.00-46.00 |
| No. 1 pewter | 32.00-36.00 |
| Solder joints | 7.75- 8.50 |

**SECONDARY METALS**

| | |
|---|---|
| Brass ingot, 85-5-5-5, l.c.l. | 12.50 |
| Standard No. 12 aluminum | 14.50 |

**MAGNESIUM**
(12 pound rod, 4 in. diam.)

| | |
|---|---|
| 99.8% ingot, carlots | 22.50 |
| 100 lb. to carlots | 24.50 |
| Extruded sticks, ¼ to 2 lb. | |
| Carlots | 32.00 |
| 100 lb. to carlots | 34.00 |

## Contractors Selected for East Leg of "Big Inch" Pipeline

Selection of 12 contractors for the job of constructing the 857-mile eastward extension of the Texas-East Coast War Emergency Pipeline were announced last week.

Full-scale operations are planned right through the winter. Completion of the Illinois-East Coast extension from Norris City, Ill., to the New York-Philadelphia refining areas is expected by midsummer.

The line will be constructed of 24-inch pipe as far as Phoenixville Junction, Pa., with two 20-inch branches extending from that point to Bayway-Bayonne, N. J., and to Philadelphia.

The twelve contractors receiving letters of intent are, in the order of their contract sections east from Norris City, Illinois: (Spreads, or work sections, numbered 1 through 8 are on the Texas-Illinois leg of the 24-inch line.)

Spread No. 9, Sheehan Construction Co., Tulsa, Okla.; 10, Ray Smith, El Dorado, Kans.; 11-12, Anderson Bros., Tulsa, Okla.; 13, C. S. Foreman, Kansas City, Mo.; 14-15-16, Bechtel & Dempsey, San Francisco, and Tulsa, Oklahoma; 17, William Bros., Tulsa, Okla.; 18, O. C. Whittaker Co., Ft. Worth, Tex.; 19, I. C. Little, Dallas, Tex.; 20-21-22, Oklahoma Contracting Co., Dallas, Tex.; 23, Midwestern Engineering & Construction Co., Tulsa, Okla.; 24, Jones & Brooks, Oklahoma City, Okla.; 25, Exeter Construction Co., Camp Hill, Pa.

## Manning Table

(*Concluded from Page 48*)

person in the nation should perform, as nearly as possible, the task for which he

is best equipped. The War Manpower Commission and the Selective Service System both recognize this principle."

It will take a few months to get the manning tables in operation. In the meantime, looming inductions may create situations in some plants which require immediate action. To offer a temporary solution in such cases, the Selective Service directors in each state now have the withdrawal and replacement schedule forms which are available to such employers upon request. These schedules will provide a basis for withdrawals and replacements pending completion of the manning tables and their distribution.

These schedules consist of a plant summary and a replacement list, normally made from data developed in preparation for the manning table. They are in two parts. The first part is made up of a survey of the personnel in the plant involved, arranged generally by job titles and Selective Service statuses. The second part is a replacement list upon which are listed by name the male employes who must be replaced so they can enter the armed forces.

The first step in preparing such a schedule is to obtain in respect to such male employe the following information: (1) job title, (2) date of birth, (3) local board number and address, (4) Selective Service order number and classification and (5) family relationships.

Next, the employer must list all of the jobs by plant, department and other operating unit. Opposite each job the employer will list under the following headings the total number of workers engaged: (1) Number of women, (2) Number of men not to be considered for replacement (Those with minor children, those physically unfit, those over 38 and under 18), and (3) Those to be considered for replacement (single men and married men without children).

The employer will then list by name the employes subject to induction whom he is prepared to replace. Those who are to be replaced in the first month will be listed first, followed by those in the second month, etc. Those men for whom deferment is to be requested for six months or more will be listed under "6 months to 12 months" and those for whom deferment is asked for a year will be listed last under "more than one year." These facts, which will provide an impersonal and impartial yardstick, will be considered in determining the order of listing:

1. Required period of training.
2. Previous and existing periods of deferment.
3. Availability for military service (single men will be listed ahead of married men).
4. Selective Service order numbers (those with the lowest order numbers usually will be listed first).

When a schedule has been thus prepared and approved by the state Selective Service director, it shall, unless revised, continue in operation for six months.

These schedules, once completed, will show to the employer and to the employe the order in which each individual concerned will be available for induction.

At the end of the six-month period the replacement schedule may be extended for another six-month period with the approval of the state director of Selective Service.

If, however, the employer has filed a replacement schedule which is not based upon a manning table, the regional WMC director may decide that the employer should be required to make out a manning table before submitting a new replacement schedule. In such a case the WMC regional director will notify the state Selective Service director of his belief at least 60 days in advance of the expiration of the schedule in effect. The state director will inform the employer of the WMC action. If the employer declines to prepare a manning table, the

state director may refuse to renew the employer's schedule.

In case the state director should feel the existing schedule should be renewed despite the WMC action, he will so notify the director of Selective Service who in turn will submit the matter to the chairman of the War Manpower Commission for a ruling.

The question of deferment on occupational grounds in each individual case will continue to rest with the local board and board of appeals. Local boards, however, will give serious consideration to the replacement time which has been determined under an accepted replacement schedule. The employe retains his right to appeal.

In cases where an employer does not fill out either a manning table or a replacement schedule, deferments and inductions will be ordered by the local Selective Service boards in the same manner as in the past.

## Wartime Conference

(*Concluded from Page 73*)

others are de-emphasized.

"A very large portion of manufacturing capacity either cut down or idle will be converted. In the ordnance department's mechanical time fuze program, released plant capacity has gone to the air forces. The ordnance department is your customer and the Army is our customer. We are directed by higher authority what to procure and in what quantities and within what time period. Due to the fluidity of war we are often directed to make more in less time or less in more time."

At a press conference conducted earlier in the day, General Campbell, who recently returned from conferences with our field commanders in England and North Africa, declared that American ordnance is the best it has ever been in the history of this country and is equal or superior to anything the Germans have. The M-4, or General Sherman, tank is being called the "answer to the tankman's prayer". This, plus the 105-millimeter self-propelled mount, was largely responsible, he said, for getting Rommel on the run.

General Campbell and also Brig. Gen. Thomas S. Hammond, chief of the Chicago Ordnance District, pointed out that because of the curtailment in the production of tanks, guns, shells, and other ordnance items, in line with the newly adopted emphasis, some plants will be obliged to scale down operations and lay off men, while they are being converted and otherwise being tooled up to turn out aircraft and naval products. At the same time, they made it clear that large plants will take the heaviest share in stop orders, and small plants the lightest.

Former Ambassador Grew told his audience that the United States has not in the past and does not now fully appreciate the power of Japan. While that nation over the past ten years prepared its resources for war, we were complacent, and to an extent we still remain complacent.

He asserted that we are engaged in fighting something infinitely more dangerous than a military machine. We are faced with a restless, devouring militarism which has grown to such proportions that nothing short of complete extermination of the system can remove its menace to free peoples. In mentioning some of our nation's past misjudgments, Mr. Grew said his purpose is to prevent in the future so self-centered a concept of our own freedom that we underestimate the enemy and overestimate our moral and physical security.

Sterling Morton, secretary, Morton Salt Co., Chicago, was installed as president of the Illinois Manufacturers' Association for his second term. Others assuming office were: H. G. Myers, Gardner-Denver Co., Quincy, Ill., first vice president; Howard Goodman, Goodman Mfg. Co., Chicago, second vice president; and E. F. Mansure, E. L. Mansure Co., Chicago, treasurer.

## Mirrors of Motordom

(*Concluded from Page 64*)

positioned on both sides of a horizontal conveyor line on which the work travels and on which it is securely locked during the cutting cycle.

The South Bend installation is unique in that it comprises three batteries of these machines, position of the work being changed before it enters succeeding batteries. The first battery automatically performs 35 operations; then the head is turned 90 degrees on the index plate to which it is bolted after being located accurately. The second battery runs through a cycle of 79 separate operations, following which the piece is turned upside down and fed into the third battery of machines which has 19 operations, the tools feeding through a large hole in the base of the index plate.

The complete machine is better than 175 feet long and has 50 operating stations. When in full operation it handles approximately 130 cylinder heads at a time. All told, the batteries have 162 tools, including 36 drills, 35 reamers, 15 mills, 30 taps and 46 special tools.

Essentially, the Flying Fortress engine comprises the two-piece crankcase, bolted together through internal flanges, to which are bolted nine alloy steel cylinder barrels through a total of 250 mounting stud holes. Cylinder heads are shrunk on the barrels, by heating the heads to 600 degrees and screwing them on while hot. Bushings are fitted into the heads by immersing them in an alcohol solution at 10 degrees below zero temperature and sliding them in place while cold. Pistons are of forged aluminum alloy, finned on the inside to improve cooling and buffed to a mirror finish all over. Inner surfaces of the cylinder barrels are nitrided, action of the nitriding gas being localized by electrotinning the entire barrel and then grinding off the tin where the nitrided surface is desired.

Crankshaft, an alloy steel forging machined, heat treated and ground to a mirror finish, carries integral dynamic balancers on each counterweight, an ingenious Wright development which provides vibration dampening without increasing weight of the engine. Main bearing journal also is nitrided.

Weighing 1315 pounds, dry, the engine is built up from some 8000 separate parts, or roughly 3300 piece parts. After initial assembly, it is given a test run for four hours under varying speed conditions, including 90 minutes at 95 per cent rated speed; then follows the usual teardown and inspection, followed by reassembly and the "red" test run for another four hours.

### Sealed for Shipment

It is interesting to observe the precautions in sealing an engine for shipment. Small vials of silica gel, with perforated ends, are placed in spark plug holes, oil lines and other points where air might seep to the engine interior. This gel is blue in color when dry and as it absorbs moisture it turns pink. A humidity chart is placed in each engine package to indicate the danger point in color of the gel. Cloth bags of silica gel are scattered over the top of the engine as it rests flat before boxing. A pliofilm envelope ($9 apiece incidentally) is drawn over the engine and it is lowered into a wooden crate and sealed for shipment. The pliofilm envelopes and bags containing silica gel are returned once the engine is uncrated for service and they can be dried out and used over.

This, briefly, is a hasty review of some of the highlights of this great plant. Naturally a complete description cannot be presented in this limited space. There are about 1100 machine tools in operation, more being delivered. Lighting is supplied by 6000 fluorescent fixtures, walls being entirely windowless. The floor of the plant is built up of 1½-inch strips of hard maple about 14 inches in length, with tongue-and-groove joints.

# NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

## SUB-CONTRACT OPPORTUNITIES

**Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.**

**Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:**

**Keefer-59-1:** Pennsylvania manufacturer seeks subcontracting facilities for end cap, two inches long, 1⅜-inches diameter. Made from steel, WDX 1020, 112, 1314, 1315, or 1335 cold-drawn. Internal threading operation. Quantity, 50,000 to 100,000 pieces monthly. Prime contractor to furnish materials. Equipment, multispindle automatic screw machines. Prints at Philadelphia office.

**Keefer-59-2:** Pennsylvania manufacturer desires subcontracting facilities for adapter, length ½-inch, diameter 2⅛-inch. Made from cold or hot-rolled steel WD 1115. Internal threading operation. Quantity, 1000 per day. Equipment, multi-spindle automatic screw machine. Prints at Philadelphia office.

**Roystuart-63-1:** New Jersey corporation requires 600,000 pins at 60,000 per month. Equipment required, centerless grinder, abrasive cutoff wheel, cadmium plating. Tolerance, .005. Dimensions, .106 O.D. x .340 length. Material, steel, SAE 1035. Material can be furnished by prime or subcontractor.

**Roystuart-63-2:** New Jersey corporation requires 300,000 plugs at 30,000 per month. Equipment required, four-spindle automatic screw machine and hand screw machine, spindle size 1¾-inch; bench-type drill press; cadmium plating. Tolerance, .005. Threads NC and NS, No. 2. Dimensions, 1.650 O.D. x 2.10 length. Material, steel, SAE 1112. Material by either prime or subcontractor.

**Roystuart-63-3:** New Jersey corporation requires 300,000 sealing collars, at 30,000 monthly. Equipment, single-spindle ⅝-inch automatic screw machine, bench-type drill press, cadmium plating. Tolerances, plus or minus .010. Threads, ⅜-inch-16 NC-2-LH-INT. Overall dimensions, ⅝-inch O.D. x .200 width. Material can be furnished either by prime or subcontractor.

**Roystuart-63-4:** New Jersey corporation requires 300,000 arming screws at 30,000 monthly. Equipment, ⅜-inch single-spindle automatic screw machine, cadmium plating. Tolerance, .005 threads, ⅜-inch-16NC-2-LH-EXT. Overall dimensions, .375 O.D. x 3.30 length. Material SAE 1112 steel, furnished either by prime or subcontractor.

**Roystuart-63-5:** New Jersey corporation requires 300,000 arming vanes at 30,000 per month. Equipment, 20-ton punch press, ¾-inch spindle; automatic or hand screw machine; drill press and tapping machine; arc welder, ⅛-inch rod. Tolerance, .005. Threads NC 2. Overall dimensions, 3⅛-inch O.D. x 1½-inch high. Material furnished by prime or subcontractor.

**Roystuart-63-6:** New Jersey corporation requires 300,000 striker sleeves at 30,000 per month. Equipment, automatic and hand screw machines, 1-inch spindle; bench-type drill press; cadmium plating. Tolerance, .002. Overall dimensions, .895 O.D. x .80 length. Material SAE 1112 steel furnished by prime or subcontractor.

**Roystuart-63-7:** New Jersey corporation requires 300,000 fuse bodies at 30,000 per month. Equipment, 2¼-inch six-spindle automatic screw machine; No. 2 chucking turret lathe or hand screw machine; drill press; tapping machine. Tolerance, .005. Threads, No. 2 fit. Overall dimensions, 2.25 O.D. x 4.15 length. Material, SAE 1112 steel furnished by prime or subcontractor.

**Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:**

**Job No. 3054:** Breech block. WD No. 4640 steel, which is furnished on AA1 priority. Equipment, shaper or mill, vertical mill, sensitive drill. Order is for 20 per day.

**Job No. 3055:** Housing. WD No. 4640 steel, which is furnished on AA1 priority. Equipment, shaper or mill, horizontal boring mill or turret lathe, sensitive drill, tapper, H.D. drill, slotter. Order is for 20 per day.

**Jobs No. 3354 to 3364:** Automatic screw machine capacity required for 100,000 each of eleven parts, of duralumin, copper silicon and cold-drawn steel. Other equipment, marking machine. Priority, AA1.

**Job No. 3455:** Spur gear shaft. Material, A16754 steel, which is furnished. Equipment, hand screw machine; horizontal mill, two operations; hobber; external and centerless grinder. Order is for 5000 on AA1 priority.

**Job No. 3456:** Disc driven ("C" motor clutch) Material, X1020, X1314 or X1315 steel, which is furnished, 1⅛-inch O.D. Equipment, hand screw machine, lathe with $\frac{5}{16}$-inch collet; normalize; lathe; copper plate; hobber; heat treating; centerless grinder. Order is for 10,000 on AA1 priority.

**Job No. 3457:** Shaft (driven "D" clutch). SAE x 1020, x 1314 or x 1315 steel, which is furnished, 1¾-inch O.D. Equipment, hand screw machine; lathe with $\frac{5}{16}$-inch collet; normalize; copper plate; hobber; heat treating; external grinder. Order is for 10,000 on AA1 priority.

**Job No. 3460:** Takeoff retractable hook mechanism. SAE No. 1035 steel, which is furnished, ⅝-inch O.D. Equipment, hand screw machine, ½-inch collet; mill, three operations; centerless grinder; cadmium plate. Order is for 2500 on AA1 priority.

**Job No. 3461:** Jack screw. Material, A16775-J steel, ⅜-inch O.D., which is furnished. Equipment, hand screw machine, two operations; sensitive drill; lead screw threader; nitride. Order is for 25,000 on AA1 priority.

**Job No. 3605:** Tee. (flared tube with pipe thread on side). Aluminum alloy or steel. Equipment, hand screw machine, three operations. Order is for 6888 of which 1000 are scheduled for immediate delivery. Priority is AA1.

**Job No. 3609:** Machining operations only on carrier for stationary gear. WD No. 1015 cold-rolled steel stampings are furnished on A-1-a priority. Equipment, H.D. drill. Order is for 1,000,000 on schedule of 20,000 per day. Sample and prints at Detroit office.

**Job No. 3615:** Machining operations only on upper bearing. Bronze material is furnished on AA1 priority. Equipment, turret lathe; sensitive drill; tapper; mill; thread hobber. Order is for 500 per month, delivery to start as soon as possible.

**Job No. 3606:** Adapter, flow divider (flaps). Material, 1¼-inch hex x $\frac{5}{8}$-inch aluminum alloy. Equipment, screw machine; H.D. drill; tapper; anodize. Order is for 10,000 of which 500 is required at once. Priority is AA1.

**Job No. 3566:** Bevel housing, upper half. ASTM 47-33 castings. Equipment, planer or shaper; H.D. drills, 14 holes; sensitive drill, seven holes; tapper, seven holes; mill; boring mill. Machining operations only. Castings and forgings are furnished. Quantities 300 to 800, depending on production facilities.

**Job No. 3567:** Sprocket hub. SAE No. 4640 steel forging. Equipment, vertical boring mill or 24-inch turret lathe, two operations; hobber, 18-inch; sensitive drill; mill; tapper, external threader. Jobs No. 3566 and 3567 are typical of seven jobs by contractor seeking subcontracting facilities for machining operations only, all materials furnished.

**Job No. 2939:** Lower rear idler bevel gear. AMS 6250 steel. Equipment, hand screw machine, 1⅜-inch O.D.; H.D. drill; key seater; copper plate; bevel gear generator; heat treat; bevel gear tapping; gear tester; internal grinder. This job is typical of some 40 jobs on AA1 priority, quantities high on some jobs. Production requirements start now and run to Oct. 1, 1943.

**Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:**

**SC-29:** Gear cutting machine work. Six sizes. Diametral pitches, 20, 32 and 48 standard, 48/60 stub. Teeth, 8, 12, 16, 64 and 70. Material, special steel, equivalent of SAE 4615, supplied by prime contractor. Quantity, 1500 to 10,000 at 150 to 1600 per week. Also from same prime contractor 50,000 steel jack screws, ⅜-inch diameter by 7 inches long. Weekly requirements 5000. Reference 1-a-370.

**SC-30:** Automatic screw machine work for a series of machines having $\frac{1}{32}$ to ¾-inch diameter bar capacity (B & S machine preferred), also hand screw machines for second operation. About 100 items involved. Material, mostly brass, some aluminum, not furnished by prime contractor. Tools for B & S machine furnished by prime contractor. Only those concerns able to handle a considerable portion of this work will be considered. Reference 1-a-374.

**Chicago office, Contract Distribution Branch of WPB, 20 North Wacker Drive, is seeking contractors for the following:**

**Display No. 318:** Centerwise screw. Material, cold-rolled steel, furnished by prime at cost. Prime will consider one or more sources to produce. Prime will furnish first set of tools to get started. Production, 10,000 to 80,000 daily. Dimensions, 3 x 16 x 2 inches. Equipment, $\frac{7}{16}$-inch bar capacity six-spindle Gridley automatic screw machine. Tolerance, .002. Prime contractor, AC Spark plug Division, General Motors Corp., Flint, Mich., phone 3-0067, attention A. S. Fuhrman.

**Display No. 70:** Front plate. Material, die casting furnished by prime, who also will furnish fixtures, gages and tools. Prime requests No. 3 W & S turret lathe. Quantity, 20,000. Dimensions 2½ x 3½ inches. Equipment, 1½-inch bar capacity turret lathe; No. 1 vertical milling machine or vertical

profiler hand miller. Tolerance, .002. Prime contractor, Bell & Howell Co., 1801 Larchmont, Chicago; telephone, Bittersweet 6510; attention C. S. Davis.

Display No. 190: Body elevating screw shafts. Material, WDX 1335 cold-drawn steel, furnished by prime contractor, who also will furnish fixtures, gages and tools. Quantity, 4500 each of three items at 250 each item per week. Thread, special Acme type, 2½ threads per inch. Equipment includes 1⅓-inch bar capacity universal turret lathe; 1⅛-inch collet capacity cone head engine lathe, 10 x 30 inches; ½ x 20-inch capacity deep drilling machine; thread miller disc cutter 24-inch centers; cylindrical grinder 22-inch centers. Prime contractor Pullman-Standard Car Mfg. Co., P.O. Box 31, Hammond, Ind., attention B. H. Bradley.

## STRUCTURAL SHAPES . . .

### SHAPE CONTRACTS PLACED

200 tons, ammunition dump, McAllister, Okla., for United States Navy, to Robberson Steel Co., Oklahoma City, Okla.; Brown-Bellows, contractor.

200 tons, stringer assemblies, new plant of Republic Steel Corp., Chicago, to Mississippi Valley Structural Steel Corp., Decatur, Ill.; James Stewart Corp., Chicago, contractor.

### SHAPE CONTRACTS PENDING

5000 tons, bridge for Pennsylvania railroad at Washington; bids opened Dec. 1, award delayed by determination of priority.

5000 tons, bridge for Pennsylvania railroad at Washington; bids opened Dec. 1, award delayed by determination of priority.

## PLATES . . .

### PLATE CONTRACTS PLACED

700 tons, kiln sections for Vulcan Iron Works, Wilkes-Barre, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

## RAILS, CARS . . .

### CAR ORDERS PLACED

Akron, Canton & Youngstown, 50 forty-ton steel frame box cars, to Mather Stock Car Co., Chicago; WPB approval granted.

Monongahela Connecting, sixty-five 120-ton all steel gondola cars and twenty 100-ton all steel hopper cars, to own shops; authority granted by WPB.

Norfolk & Western, 100 seventy-ton composite gondolas to Pressed Steel Car Co., Pittsburgh, and 25 seventy-ton composite flat cars, to Greenville Steel Car Co., Greenville, Pa., subject to WPB approval.

Union Pacific, 1000 fifty-ton composite gondolas, to Pullman-Standard Car Mfg. Co., Chicago; this is a revision of a previous order calling for all steel construction; order approved by WPB.

### CAR ORDERS PENDING

Colombian National Railways, Colombia, S.A., 75 small capacity box cars, bids asked.

Denver & Rio Grande Western, 200 seventy-ton flat cars, bids asked.

### LOCOMOTIVES PLACED

Atchison, Topeka & Santa Fe, twenty 4-8-4 freight locomotives, to Baldwin Locomotive Works, Eddystone, Pa., subject to approval of WPB.

Chicago, Milwaukee, St. Paul & Pacific, two 1000-horsepower Diesel-electric switch engines, to American Locomotive Co., New York, subject to WPB approval.

Lehigh Valley, five 1000-horsepower Diesel-electric switchers to American Locomotive Co., New York, subject to WPB approval.

Nevada Consolidated Copper Corp., one 1000-horsepower diesel-electric switcher, to Baldwin Locomotive Works, Eddystone, Pa., authority granted by WPB.

New York Susquehanna & Western, two 1000-horsepower Diesel-electric locomotives, to American Locomotive Co., New York, subject to WPB approval.

Richmond, Fredericksburg & Potomac, two 1000-horsepower Diesel-electric switchers, to American Locomotive Co., New York, authority granted by WPB.

Western Pacific, eight 1000-horsepower Diesel-electric switchers, to American Locomotive Co., New York, subject to WPB approval.

### LOCOMOTIVES PENDING

Central of Georgia, eight 4-8-4 freight locomotives, contemplated.

Nashville, Chattanooga & St. Louis, seven to ten 4-8-4 freight locomotives, contemplated.

### BUSES BOOKED

A.c.f. Motors Co., New York: Seventeen 37-passenger for Pennsylvania Greyhound Lines, Cleveland; nine 37-passenger for Illinois Greyhound Lines Inc., Cleveland.



# CONSTRUCTION AND ENTERPRISE

## OHIO

ASHTABULA, O.—National Carbide Corp., E. C. Ackerman, vice president, 60 East Forty-second street, New York, is starting work on calcium carbide plant near here on State road. Project is financed by Defense Plant Corp. Rust Engineering Corp., Clark building, Pittsburgh, is contractor. (Noted Aug. 10).

CANTON, O.—Union Metal Mfg. Co., 1432 Maple, will soon start construction of building which will add about 550 square feet of space.

CINCINNATI—Cincinnati Milling Machine Co. will construct a core-sand treating and reclaiming building, for which plans have been prepared by Rapp & Meacham, architects. Austin Co. has general contract.

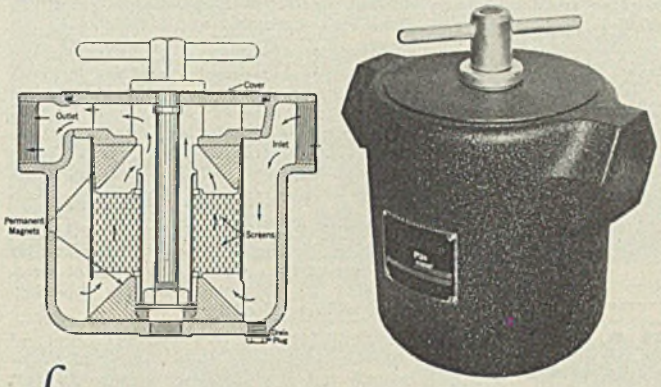
CLEVELAND—Frank Stockton Engineering Co., 11325 Union avenue, plans machine shop in building to be built for the firm and leased from a contractor.

CLEVELAND—Efficient Tool & Die Co., 9301 Elizabeth avenue, is going ahead with addition of 9600 square feet to shop at 9315 Nelson avenue. Frank Libuda is president.

CLEVELAND—Bissett Steel Co., George Bissett, president and treasurer, will soon start expansion of office and warehouse space. Demshar Builders Inc., 874 East 140th street, contractor.

CLEVELAND—Dracco Corp., successor to Dust Recovery & Collection Co., is adding

# Good-by Chips!




LONG distance phone from mid-west manufacturer to our plant in New York City:

*"Hello—we are drawing steel cartridge cases and having trouble with fine chips in the lubricant. Will Frantz FerroFilter help us?"*

*"We believe so."*

*"Well—send us two for trial."*

One week later . . . *"Send us sixty-five FerroFilters as soon as you possibly can—high priority."*

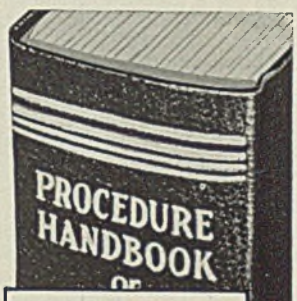
FerroFilters by magnetically removing fine chips provide clean coolant for all machining operations on steel. Essential in deep drilling, broaching, and tapping. They prolong tool life, protect machines and improve finish.

**Illustrated bulletin lists types, sizes and prices. May we mail you a copy?**

**S. G. FRANTZ CO., INC.**
161 GRAND STREET, NEW YORK, N. Y.

---

# NEW BOOK on ARC WELDING




**New Edition** "Procedure Handbook of Arc Welding." Bigger than ever. Wider in scope. Latest information on all phases of arc welding—the ace process of war production and key to progress and increased earning power in post-war era.

**Authoritative.** Recognized the world over as the "bible" on arc welding design and practice. Many thousands in use by welders, designers, engineers and shop managers. Standard text in hundreds of schools and colleges.

**IN 9 CHAPTERS:**

***1308 pages***
***1810 illustrations***

I. Welding Methods & Equipment
II. Technique of Welding
III. Procedures, Speeds & Costs
IV. Weld Metal & Methods of Testing
V. Weldability of Metals
VI. Machine Design
VII. Structural Design
VIII. Applications
IX. Reference data

Size 6" x 9" x 1¾"

***A $5.00 Value for only $1.50 post-paid***
($2.00 outside U. S.)

**Order your copy today**

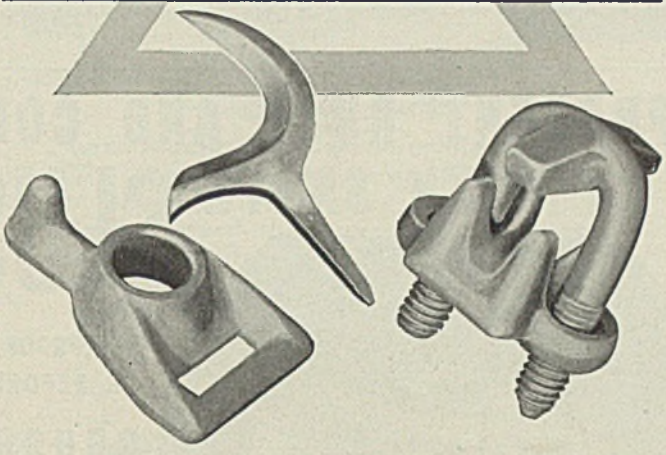
***Mail order and check to***

**STEEL**

**1213 West Third St.** **Cleveland, Ohio**

---

# Specify FORGINGS by PHOENIX



FORGINGS BY PHOENIX *insure extra strength.*
Controlled grain flow and proper structure and fiber formation at points of greatest shock and strain insure high fatigue resistance, resulting in long life and dependable preformance.

FORGINGS BY PHOENIX *conserve metal.*
Maximum strength is obtained with lighter sectional thickness than required in a casting, making possible a considerable reduction of dead weight.

FORGINGS BY PHOENIX *require minimum machining time.*
They are forged to shape in closed dies so that there is no bulk of excess metal to remove.

FORGINGS BY PHOENIX *reduce rejects.*
Freedom from concealed defects and flaws is an important characteristic that is responsible for a material reduction in the number of parts rejected.

FORGINGS BY PHOENIX *can be held to close tolerances.*
Duplicating in every detail the die in which they are formed, Forgings by Phoenix can be depended upon to meet the most rigid specifications.

All over the country, more and more manufacturers are specifying Forgings by Phoenix. Our engineers will gladly consult with you and give you the benefit of their years of experience in this highly specialized work. Write us — today. There's no obligation.

**PHOENIX MANUFACTURING COMPANY**
Catasauqua, Pa.
*Phoenix Products Mean Quality*

to factory space with a $15,000 extension of building at 4063 East 116th street. George A. Gieseler is president.

NILES, O.—Niles Steel Products Co. has been authorized to erect a $35,000 addition to its factory. New furnaces will be installed.

TIFFIN, O.—Plant of Tiffin Art Metal Co., recently destroyed by fire, is being rebuilt. The plant produces steel bomb casings.

YOUNGSTOWN, O.—Dyson Metal Mfg. Co. will be chartered to manufacture various kinds of machinery, etc. Attorney Clyde Dyson, Mahoning Bank building, is agent.

### CONNECTICUT

BRIDGEPORT, CONN.—Aluminum Co. of America, 2190 Post road, Fairfield, is completing plans for factory on Atlantic street here. C. G. MacFarquhar, 2190 Post road, Fairfield, engineer.

GLENBROOK, CONN.—Peabody Engineering Corp., 39 Maple avenue, plans addition on Maple avenue costing $40,000.

### NEW YORK

BUFFALO—G.L.F. Mills Inc., Chamber of Commerce building, plans mill addition on Ganson street, costing over $40,000.

### NEW JERSEY

EAST RUTHERFORD, N. J.—Becton Dickinson Co., Cornelia street, plans one-story manufacturing building addition. Estimated cost $40,000.

NEWARK, N. J.—M. W. Kellogg Co., foot of Danforth avenue, Jersey City, N. J., has let contract for one-story factory to Lawrence C. Roberts Inc., 1 East Forty-second street, New York. Estimated cost $40,000.

NEWARK, N. J.—Menner Packing Co., 25 Wall street, has awarded contract for one-story factory addition to P. Jantelle Co., 78 Stuyvesant avenue, Irvington, N. J. Fred G. Nobbe, 1630 Springfield avenue, Maplewood, N. J., architect.

### PENNSYLVANIA

AMBRIDGE, PA.—National Supply Co., Grant building, Pittsburgh, has completed plans for improvements to manufacturing plant here. Hoffman & Crumpton, Century building, Pittsburgh, architects.

BRIDGEVILLE, PA. — Vanadium Corp. of America, Bridgeville, is completing plans for manufacturing plant facilities here to cost approximately $750,000. Rust Engineering Co., Clark building, Pittsburgh, general contractor.

CORRY, PA.—Rohim Mfg. Co. Inc. plans expenditure of $40,000 for plant. J. R. Dunniho, chief engineer.

ERIE, PA.—National Foundry Co., Erie, is completing plans for factory building at 1521 Raspberry street here to cost approximately $200,000. Sessinghaus & Ostergaard Inc., 1115 Peach street, Erie, general contractor. Meyers & Johnson, Commerce building, Erie, architects.

LANGELOTH, PA.—Climax Molybdenum Co., 500 Fifth avenue, New York, plans factory additions here, on which subcontracts have been awarded. Rust Engineering Co., Clark building, Pittsburgh, general contractor.

PHILADELPHIA—F. C. Castelli & Co., F. and Erie streets, will soon let contract for manufacturing building and office. Davis & Dunlap, 1717 Sansom street, architects.

### MICHIGAN

DETROIT—Rotary Electric Steel Co., 21400 Moand road, will spend approximately $150,000 for plant addition. Giffels & Vallet, 1000 Marquette building, engineers.

DETROIT—Briggs Mfg. Co., Vernon highway has let contract for plant addition to W. E. Wood Co., 4549 Humboldt avenue. Estimated cost $100,000.

### ILLINOIS

CHICAGO—Patch Foundry Inc., 815 West Van Buren street, has been incorporated to engage in general foundry and machine shop business, by H. L. Clink, J. J. Cuthbertson, and A. Loewenberg. Correspondent: Gurman & Eberle, 111 South LaSalle street.

CHICAGO—Mastercraft Machine Products Inc., 134 North LaSalle street, has been incorporated by C. Wuehrmann, H. Hirsch, and B. Lerman, to buy, sell and manufacture all kinds of products and machines. Correspondent: Samuel Wexler, 134 North La Salle street.

### INDIANA

INDIANAPOLIS — Glidden Co., Berea road and Madison avenue, Cleveland, is remodeling former plant of American Hominy Co. here and also constructing soy bean oil process plant. Estimated cost $250,000.

### MARYLAND

BALTIMORE—F. G. Schenuit Rubber Co., 3901-51 Clipper road will erect two-story addition. Kubitz & Koenig, engineers, Emerson Tower building.

BALTIMORE — United Engineers & Constructors Inc., 1401 Arch street, Philadelphia, has contract at $40,000 for generator building at 1900 Chesapeake avenue; $18,000 for compressor and filling room, $10,000 for service building, and $7000 generator room

at 3430 Fairfield road, for Defense Plant Corp.

### TENNESSEE

MEMPHIS, TENN.—William Haughey, 208 West Georgia avenue, is altering manufacturing buildings. Cost estimated at $40,000.

### ARKANSAS

GUION, ARK.—Silica Products Co. is rebuilding dry kiln and loading chute. Estimated cost $50,000.

### WISCONSIN

DELAVAN, WIS.—Sta-Rite Products Inc. has awarded contract for plant addition, consisting of five bays to Steinar Haugen, Orfordville, Wis. Grassold & Johnson, 734 North Jefferson street, Milwaukee, architects.

MILWAUKEE—Defense Plant Corp. has authorized erection of tin shredding plant here to cost about $100,000. H. K. Ferguson Co., Cleveland, is contractor.

MILWAUKEE—Industrial company has let contract for six bays, unit C of factory, scrap and sand bins to Edward Steigerwald & Sons Inc., 5310 West State street, Milwaukee.

MILWAUKEE—International Harvester Co., 1714 West Bruce street, has let contract for plant to Gebhard-Berghammer Inc., 5420 West State street. A. J. Coon, care of owner, engineer.

### TEXAS

HOUSTON, TEX.—Andy Ness Construction Co., 200 Portwood street, Houston, is low bidder for addition to plant at Bringhurst and Gillespie streets for Texas Electric Steel Casting Co.

### CALIFORNIA

BURBANK, CALIF.—Pacific Airmotive Corp., 217 South First street, has let contract for addition to its plant.

LOS ANGELES—Baker Oil Tool Co. is erecting an addition to its plant at 2959 East Slauson avenue.

LOS ANGELES—Construction of a $1,500,000 detinning plant here has been authorized by Defense Plant Corp., to be operated by Los Angeles Tin Corp., a subsidiary of Los Angeles By-Products Corp. H. K. Ferguson Co., Cleveland, is contractor.

SAN DIEGO, CALIF.—Ryan Aeronautical Co. has awarded contract for assembly building and two-story office building, to cost $450,000. The company is also having plans prepared for sub-assembly building.

SAUSALITO, CALIF.—Marinship Corp. has plans for erection of machine shop addition.

### CANADA

VANCOUVER, B. C.—Aqua Copper Co. Ltd., 736 Granville street, plans mining plant and auxiliary buildings near here to cost about $50,000.

COLLINGWOOD, ONT.—Collingwood Shipyards Ltd., J. S. Leitch, manager, has plans for plant addition and installation of equipment to cost about $120,000.

GALT, ONT.—Canadian General Rubber Co. Ltd., 52 Middleton street, has called bids for plant addition to cost about $40,000.

LONDON, ONT.—Dennisteel Corp. Ltd., 22 Dundas street, has plans and will call bids for plant addition here to cost about $25,000 with equipment.

NIAGARA FALLS, ONT.—Lionite Abrasives Ltd., Stamford, has plans and will call bids soon for plant addition here to cost about $10,000.

OAKVILLE, ONT.—Barringham Rubber Co. Ltd., Reynolds street north, will build plant to cost, with equipment, about $150,000. Plans call for installation of solvent recovery plant for recovery of keystone and plant for recovery of gasoline.

RENFREW, ONT.—Renfrew Machinery Co. Ltd. has given contract to M. J. Sulpher & Son, 150 Lisgar street, for plant addition estimated to cost about $10,000 with equipment.

HULL, QUE.—A. N. Sincennes, 131 St. Joseph boulevard, has plans and will let contracts soon for construction of plant addition to cost about $20,000.

MONTREAL, QUE.—Walls Chemical Canadian Corp. Ltd. will let contracts soon for plant addition at 340 St. Patrick street, Ville La Salle, to cost about $20,000 with equipment.

MONTREAL, QUE.—Canadian Power Boat Co. Ltd., 4000 St. Patrick street, L. D. Palmer, general manager, will let contracts immediately for plant addition to cost about $70,000 with equipment.

MONTREAL, QUE.—Montreal Dry Dock Co. Ltd., 1151 Mill street, has begun preliminary work on plant addition estimated to cost $30,000 with equipment. Alphonse Gratton, Reg., 3440 Shuter street, has general contract.

QUEBEC, QUE.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has given general contract to Francois Jobin Inc., 88 St. Louis road, for addition to R.C.O.C. workshop at St. Malo, to cost about $70,000.

SHERBROOKE, QUE.—Superheater Co. Ltd., Drummond street, G. S. Thompson, manager, will start work immediately on plant addition here to cost about $12,000. Mold drying ovens will be installed.

# USED and REBUILT EQUIPMENT
## MATERIALS

### LATHE
25/27½"x26' (20' centers) LeBlond Heavy Duty, 3-step cone DBG. with self-contained motor drive 3/60/220, including chuck. Rebuilt ready for immediate shipment. Photo on request.
*Fob Cleveland, Ohio*

### AUTOMATICS
1½" Cleveland, single spindle Model "B", double slide, milling slide & cam cutter. Ser. No. 30382. Slightly used. Fob Pittsburgh, Pa.

3—No. 34 New Britain, chucking machines with motors 3/60/220. Rebuilt. Fob Pittsburgh, Pa.
*Immediate Shipment*

### GRINDER
Internal Worcester, MD, similar to 70 Heald.

### PIPE MACHINE
2" Landis, single head with dies & c/s.
*Fob Pittsburgh, Pa.*

**GALBREATH MACHINERY CO.**
306 Empire Building Pittsburgh, Pa.

---

# RAILS
## AND ACCESSORIES

RELAYING RAILS — Super-quality machine-reconditioned—not ordinary Relayers.
NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates, and all other Track Accessories.

Although our tonnages are not as large as heretofore, most sizes are usually available from warehouse stocks.
Every effort made to take care of emergency requirements. *Phone, Write or Wire . . .*

**L. B. FOSTER COMPANY, Inc.**
PITTSBURGH NEW YORK CHICAGO

---


**PRESSURE BLOWERS**

(3) Buffalo Forge 1200 cfm. @ 11 oz. 7 x 7 outlet, 9½ inlet, with 7½ HP, 220 volt 3 ph., 60 cycle, 1750 RPM motors.

**CENTRIFUGAL COMPRESSORS**

400 CFM. 1802 Spencer Turbo Compressor. 1250 cfm. @ 3¼ lbs. Gen. Elec. with 30 HP. 220/440 volt, 3 phase 60 cycle 3600 RPM motor.

450 Cfm. @ 2 lb. Gen. Elec. with 6.2 HP. 220 volt 3 phase 60 cycle 3600 RPM motor.

**THE MOTOR REPAIR & MANUFACTURING CO.**
1558 Hamilton Ave. Cleveland, Ohio

---

## STEEL DOORS
COMPLETE WITH FRAMES
USED BUT EXCELLENT CONDITION
Size 3'6" x 9'6"

**GREAT ATLANTIC**
3354 Atlantic Ave., Brooklyn, N. Y.
Phone: Applegate 7-7300

---

## HYDRAULIC PUMPS
STEAM AND MOTOR-DRIVEN
ALL SIZES AND TYPES
Address Box 490
STEEL, Penton Bldg., Cleveland.

---

## WANTED
STEEL BUILDINGS
With or Without Crane
RUNWAYS AND CRANES
STEEL TANKS
Of All Kinds
PIPE AND TUBES

*Can Make Immediate Inspection*

**JOS. GREENSPON'S SON PIPE CORP.**
National Stock Yards
(St. Clair Co.) Illinois

---

**FOR SALE**
**250 LB. INDUCTION FURNACE**
COMPLETE WITH
M. G. SET, CONDENSORS
AND ALL AUXILIARY EQUIPMENT.
Box 479, Knoxville, Tenn.

---

*More for Your Dollar!*

**IRON & STEEL PRODUCTS, INC.**
37 Years' Experience
13462 S. Brainard Ave., Chicago, Illinois
*"Anything* containing IRON or STEEL"
SELLERS — BUYERS — TRADERS

---

**FOR SALE**
**RAILROAD SCALES, CRANES, ETC.**
One—BUDA 80 ton railroad scale, 46 ft.; One—Fairbanks-Morse type E 150 ton railroad scale, 50 ft.; one 15 ton Brownhoist locomotive crane. Also several overhead electric travelling cranes; railroad steam locomotives; relaying rails; spikes and bolts. Write for complete information.
**SONKEN-GALAMBA CORP.**
108 N. 2d Street Kansas City, Kansas

---

## WANT TO PURCHASE
4 inch O.D. Boiler tubes; steel pipe of all sizes; Valves; Fittings; Industrial plants; Mills; railroads; trackage, etc.
Write, wire or phone
**SONKEN-GALAMBA CORP.**
108 N. 2d St. Kansas City, Kans.
*We buy and sell.* *Get our quotations.*

---

## —REBUILT—
**BLOWERS - FANS - EXHAUSTERS**

Connersville-Roots positive blowers.
Centrifugals for gas and oil burning.
Sand blast, grinder and dust exhausters.
Ventilating fans and roof ventilators.

**GENERAL BLOWER CO.**
404 North Peoria St. Chicago, Ill.

---

GEAR CUTTERS, Spur 30", 36" & 40", G & E
GEAR PLANERS, Bevel 36" & 54" Gleason, M.D.
GRINDER, Cyl. 18"x30"x96" Norton, M.D.
HAMMER, Steam Forging 1100 lb. N-B-P
HAMMER, STEAM Forging 2000 lb. Morgan
LATHE, Geared Head 43"x23' N-B-P, M.D.
STRAIGHTENER, 12-roll Kane & Roach, M.D.
STRAIGHTENER, Wire Shuster, cap. 5/8"

**LANG MACHINERY COMPANY**
28th Street & A. V. R. R., Pittsburgh, Pa.

---

# EQUIPMENT WANTED

. . . by a great many concerns in the defense industries. If you have surplus machinery in your plant, an advertisement in this section will help you dispose of it quickly. . . . Write STEEL, Penton Building, Cleveland.


# CLASSIFIED

## Employment Service

SALARIED POSITIONS—$2,500 to $25,000. This advertising service of 33 years' recognized standing negotiates for positions of calibre indicated. Procedure individualized to your personal requirements. Retaining fee protected by refund provision. Identity covered. If salary has been $2,500 or more send for details. R. W. Bixby, Inc., 110 Delward Bldg., Buffalo, N. Y.

### CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, minimum 50 words, 5.00, each additional word .10; all capitals, minimum 50 words, 6.50, each additional word .13; all capitals leaded, minimum 50 words 7.50, each additional word .15. "Positions Wanted," set solid, minimum 25 words 1.25, each additional word .05; all capitals, minimum 25 words 1.75, each additional word .07; all capitals, leaded, minimum 25 words 2.50, each additional word .10. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge.

Displayed classified rates on request.

Address your copy and instructions to STEEL, Penton Bldg., Cleveland.

## Help Wanted

WANTED: FOUNDRYMAN TO ACT AS SUperintendent or foreman, experienced in Gray Iron. Give references, education and training. Good opportunity for advancement for the right man. Reply Box 806, STEEL, Penton Bldg., Cleveland.

WANTED—TWO MEN, AGES 25 TO 40, with either engineering, metallurgical, or gray iron foundry sales experience. Give full particulars in reply. Address Box 810, STEEL, Penton Bldg., Cleveland.

WANTED: CONSTRUCTION SUPERINTENDent and Engineers experienced in blast furnace construction. Write Austin Bridge Company, Daingerfield, Texas.

## Positions Wanted

STRUCTURAL AND PLATE FABRICATING shop superintendent desires to make a change. Thoroughly experienced and draft exempt. References. Address Box 813, STEEL, Penton Bldg., Cleveland.

## Help Wanted

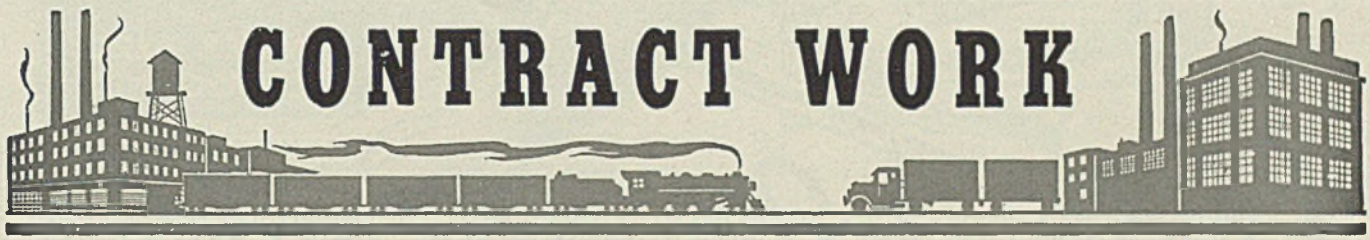
**WANTED**

CHEMISTS FOR BOTH SUPERVISORY AND ROUTINE ANALYTICAL WORK in control laboratory of leading aircraft engine manufacturer in East. Applications sought from both men and women but not from persons employed in war production. Reply Box 797, STEEL, Penton Bldg., Cleveland.

WANTED: GENERAL SUPERINTENDENT FOR medium size drop forging plant east of Pittsburgh. Must be familiar with drop hammers and die production. Give full particulars, experience, and salary expected. Answer Box 814, STEEL, Penton Bldg., Cleveland.

INDUSTRIAL SERVICE ENGINEER FAMILiar with foundry and metal cleaning equipment, to assist established supplier in Detroit area, servicing Michigan and Northern Ohio. Address replies to Box 808, STEEL, Penton Bldg., Cleveland.

WANTED — BLAST FURNACE CHEMIST — State Age and Experience. Reply Box 811, STEEL, Penton Bldg., Cleveland.



# CONTRACT WORK

## Castings

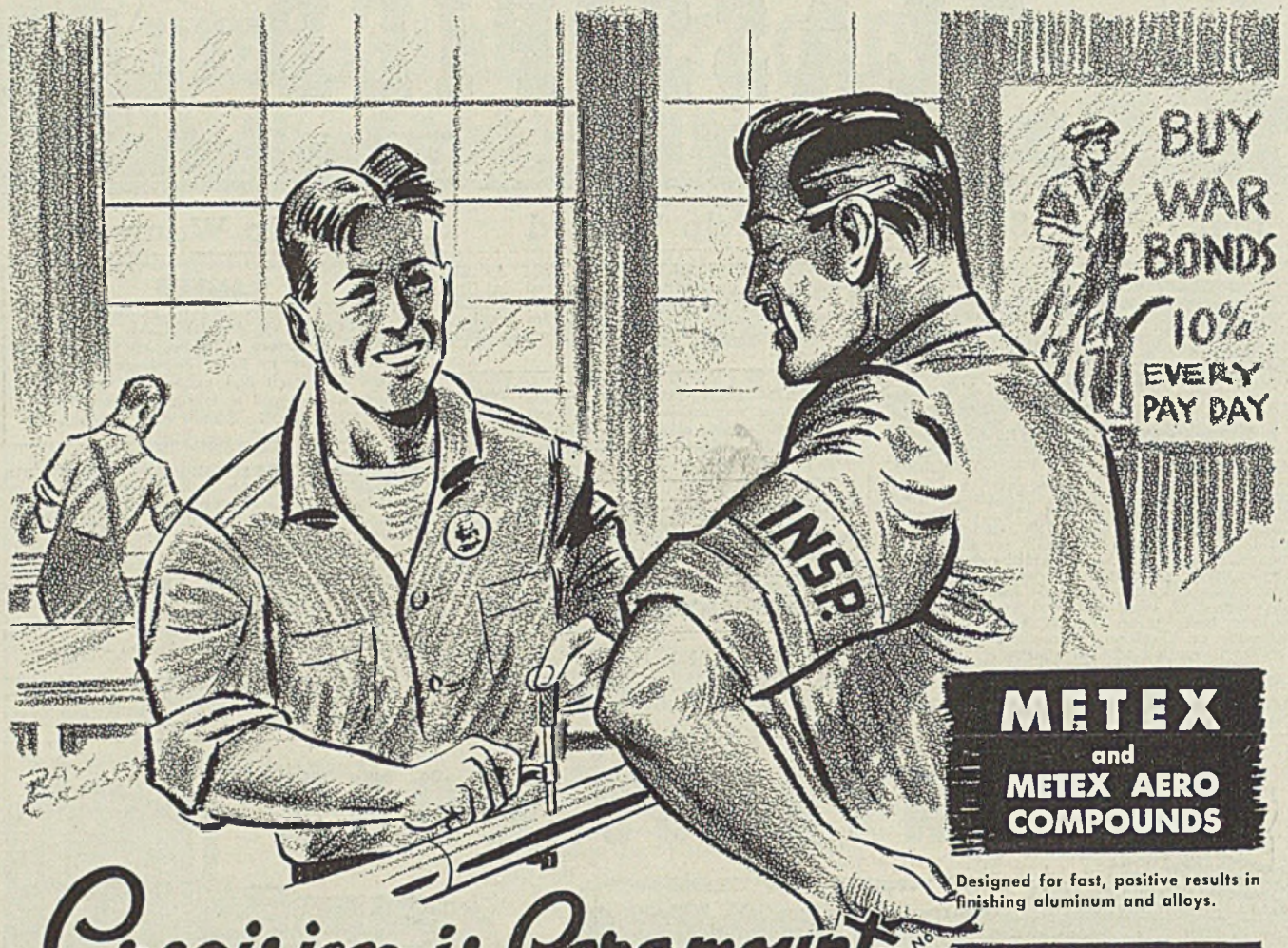
KING FOUNDRIES, INC., NORTH WALES, Pa. Grey Iron and Semi Steel Castings, also alloyed with Nickel, Chrome, and Molybdenum. Wood, Iron, Brass, and Aluminum Pattern work.

Send your inquiries for
**SPECIAL ENGINEERING WORK**
to the
**A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.**
designers and builders of wire and ribbon stock forming machines.
*We also solicit your bids for cam milling*

**KIRK & BLUM**
**WELDED MACHINE BASES, PEDESTALS and FRAMES**
**LATHE PANS**
**GEAR and BELT GUARDS**
*Pressed Steel Louver Panels and Cover Plates*
**THE KIRK & BLUM MFG. CO.**
2822 Spring Grove Ave., Cincinnati, Ohio

*New Opportunities* in contract work are rapidly developing, due to increasing government orders, and large production backlogs. Why not take advantage of this situation? The "Contract Work" columns of STEEL will carry your qualifications to concerns now letting contract work. Write today for rates.

*Advertise* IN STEEL . . . The "Used and Rebuilt Equipment" section is the weekly meeting place for buyers and sellers of good used or surplus machinery and supplies. Displayed classified rates are moderate. Send your instructions today to STEEL, Penton Building, Cleveland.




# Precision is Paramount In Cleaning Metals, Too!!

**METEX and METEX AERO COMPOUNDS**

Designed for fast, positive results in finishing aluminum and alloys.

**SOLVTEX and SOLVMAX DETERGENTS**

Emulsion cleaners for use in tank, spray and rotary washers.

**ANODEX COMPOUND AND PROCESS FOR STEEL**

Approved as the fastest, most positive electrolytic method of cleaning ferrous metals.

***SPEED* is only of secondary importance in victory production, *"PRECISION IS PARAMOUNT"* and to win this war we must employ both . . . cleaning methods must be used that have been especially conceived in answer to today's intense, concentrated effort.**

Yesterday's saying of "haste makes waste" is no longer true for MacDermid Chemicals and Compounds, formulated in answer to today's demands, have been proven in production lines and tested in firing lines — inspected and approved — found to be faster in performance, more positive in precision and saving of time, labor and man power. *Let us help you determine the fastest, most precise, process, chemical or compound for your particular problem!*

## For Further Details Write Us - Service Free

SALES AND SERVICE
from
COAST TO COAST
New York Cleveland Los Angeles
Chicago Detroit St. Louis
Newark Philadelphia
Toronto, Canada

**MAC DERMID**
INCORPORATED
**WATERBURY, CONNECTICUT**

# ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.



(Continued on next page

# ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.