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# STEEL

ESTABLISHED 1882

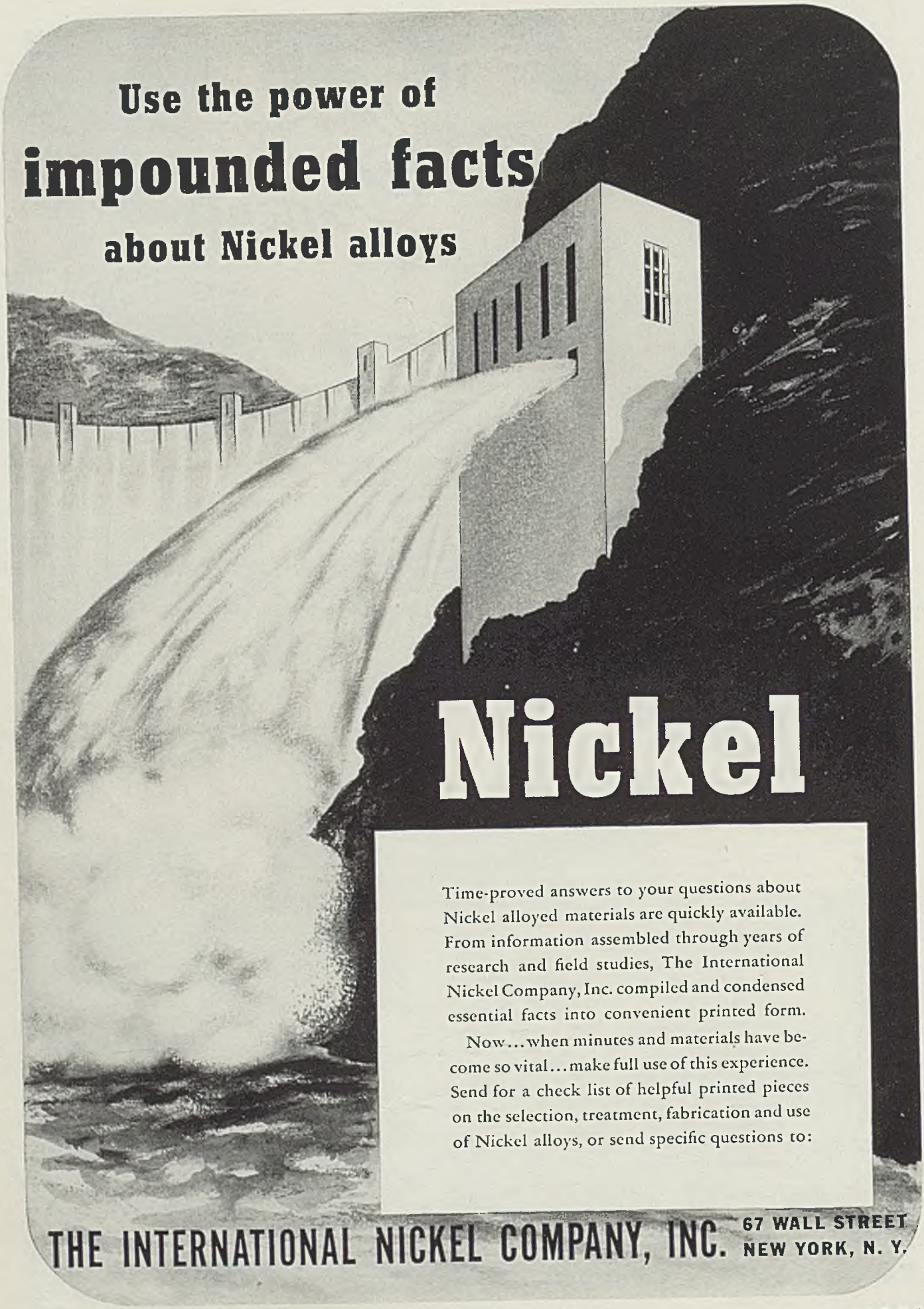
## Contents




**Volume 108—No. 15** **April 14, 1941**




**PRODUCTION • PROCESSING • DISTRIBUTION • USE**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# HIGHLIGHTING THIS ISSUE OF STEEL

■ LAST WEEK a prominent independent steelmaker increased wages 10 cents per hour, retroactive to April 1. With the trend thus definitely to higher wage levels, a widely asked question is: What effect will this have on steel prices? Leading steelmakers **(p. 23)** last week conferred with President Roosevelt but what developed did not become known; what may be expected in connection with steel prices has not yet been revealed. It appears a sound conclusion, however, that a general increase of 10 cents an hour would be bound to bring higher steel prices sooner or later. . . . In the meantime **(p. 101)** higher extras are causing consumers to pay higher prices for some steel products.

• • •

**Steel Orders For Next Year**

While some 1942 business was accepted last week by certain mills—but without really definite delivery promises, the volume of new orders has receded, a welcome change for the steel industry. Despite the tight situation consumers in general get sufficient steel to keep production lines going and only in rare instances has there been any slowing down. Wide use of substitutes, as chromium-molybdenum steel for nickel steel, or porcelain enameled sheets for aluminum or stainless sheets, is preventing shutdowns that otherwise would occur. . . . Practically the entire Great Lakes ore fleet **(p. 25)** was in operation by the week-end, marking the earliest opening of navigation in 40 years.

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**Scrap Rules Liberalized**

Events at Washington last week: A general priority system **(p. 32)** was applied to nickel-bearing steels; restrictions on steel scrap prices were liberalized somewhat; another large-scale expansion of the heavy steel forging industry **(p. 24)** is in store, details to be decided April 15; several changes were made in OPM **(p. 118)** and several key men were added to its staff; headed by Leon Henderson, the new Office of Price Administration and Civilian Supply **(p. 23)** is intended to prevent unwarranted price increases on consumer goods; a price ceiling **(p. 34)** soon may be fixed on lead; allowances are being made to prevent hardships imposed by the maximum prices on zinc scrap and secondary zinc.

• • •

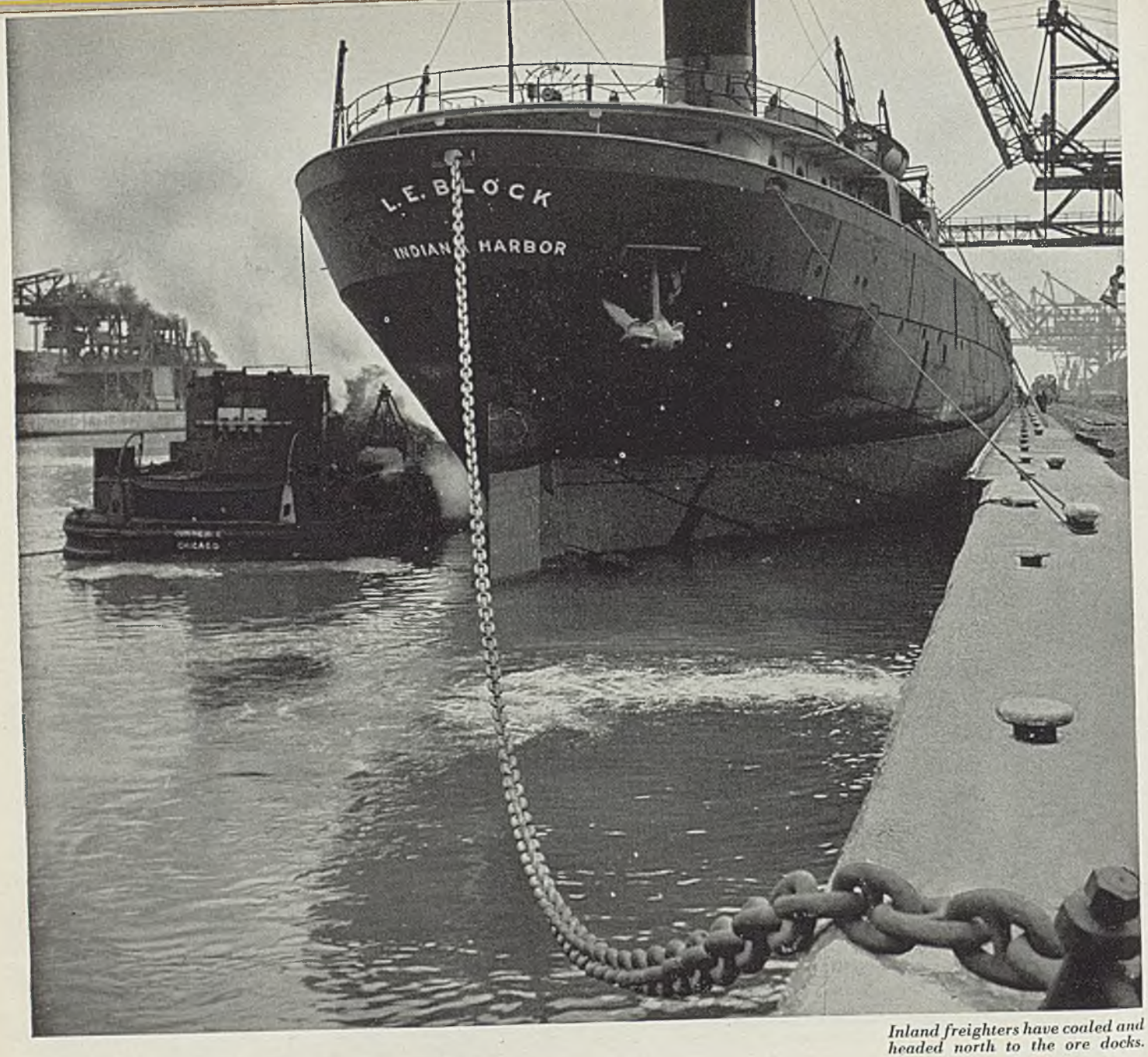
**Metal Spraying New Shafts**

While metal spraying has won universal acceptance as a shaft and piston rod reconditioning method, it has been almost completely overlooked by manufacturers of original equipment. W. C. Reid **(p. 52)** declares this process warrants much more consideration as a production tool than it has received and he lists potential applications. . . . This year's annual conference of the Open-Hearth Steel and Blast Furnace and Raw Material Committees of the American Institute of Mining and Metallurgical Engineers, to be held **(p. 92)** in Chicago, April 23-25, will be devoted to national defense problems. . . . Meritorious features are claimed **(p. 94)** for a new floating type roll brander.

• • •

**Radiant-Tube Strip Annealer**

C. Mott **(p. 61)** describes design and construction methods to prevent distortion in assembly, to obtain accurate alignment and to assure a light, rigid machine. . . . Fuel economy, ease of manipulation and greater output **(p. 66)** feature a new radiant-tube strip annealing furnace recently installed by Superior Steel Corp. . . . A power screwdriver with a special pickup device **(p. 81)** eliminates time-wasting hand operations; its use has increased assembly speeds three to nine times. . . . This week's article by Prof. Arthur F. Macconochie **(p. 54)** is on tooling. . . . European blast furnace practice with low-grade iron ores **(p. 72)**, in view of recent trends, is of interest here.




*Inland freighters have coaled and headed north to the ore docks.*

# Inland Freighters Start the 1941 Season

The Inland fleet of Great Lakes freighters is pushing its way through ice in the Straits of Mackinac, and in Whitefish Bay on Lake Superior. This is the start of the 1941 shipping season, when enormous quantities of selected raw materials, from Inland's own sources of supply, will be brought to the Inland mills on the southern shore of Lake Michigan.

After a winter of careful and thorough preparation, the Inland fleet is ready for the strenuous season ahead.

Before ice again blocks the passages in the Upper Great Lakes, Inland freighters will have brought record tonnages of raw materials to the Inland docks. Huge stores of ore, coal and limestone will be needed for the year ahead, when all production records will be broken.

With assured adequate supplies of raw materials, brought from its own mines and quarries in its own freighters, Inland will be prepared to do its full part in meeting the national emergency.

# INLAND STEEL CO.

Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

# Steel Caught in "Squeeze Play" To Raise Wages, Keep Prices Down?

## *U. S. Steel Heads Talk with President . . . Ten Cents-an-Hour Increase Granted by National Steel Corp. . . . Mediation Board Successful in Settling First Strikes Certified*

■ CAN steel prices be maintained at present levels in the face of wage increases demanded, and in some cases granted? The government has intimated they must be. The industry wonders if they can be.

Steel producers since the beginning of the emergency repeatedly have declared their intention of holding prices at the then published levels, provided costs did not increase so sharply as to make such action impossible. They have kept their word.

But now comes the rising costs. Unionized labor has demanded, with the tacit support of the national administration, an increase of 10 cents an hour in minimum wage rates, equivalent to 16 per cent. Soft coal miners have asked and received a $1 per day increase, equivalent to 17 per cent. What adjustments are to be demanded for the higher-bracket wage earners has not yet been clarified, but it likely will be somewhere between a flat 10-cent and a 16 per cent increase.

How will these increases affect steelmaking costs?

To produce a ton of sheet steel requires 33 man-hours. Assuming the wage increase to be a flat 10 cents, this alone would increase the cost of making a ton of sheets $3.30. To produce a ton of pipe requires 37 man-hours; the flat wage increase here would be equal to $3.70 a ton. To produce a ton of shapes or plates takes 16 man-hours, and a ton of tin plate, 52 man-hours, the 10-cent advance raising costs on these items $1.60 and $5.20 respectively.

In 1940, the steel industry earned only $4.14 cents per net ton of *ingots* produced. In 1939, profit per ton of ingots averaged $2.54.

These calculations do not recognize the inevitable advance in coal costs to be occasioned by the miners' increased wages; nor do they include the increased labor costs caused by overtime work.

So to a government that has insisted on price ceilings for defense-essential materials, and has approved increases in the costs of producing these materials, is posed a problem. Steel prices now become another piece in the administration's jigsaw-puzzle commodity price policy.

### Laborer, Farmer Benefits

This policy has not yet been defined clearly but its pattern has been outlined. Briefly it has been: (1) To crack down on the prices of metals and other materials essential to war or defense by establishing maximum prices at which they may be sold; and (2) to bid for the support of the laborer and the farmer by establishing floors under wages and agricultural products.

Iron and steel scrap, zinc, and secondary aluminum now have price ceilings by government edict. Similar action has been threatened for several other metal and allied products.

On the other hand, the government now is in process of establishing minimum prices for farm products. Prices of hogs are to be guaranteed at not less than $9 per hundred pounds, according to present plans. This has been reflected in recent prices which are nearly 50 per cent ahead of those prevailing last December. Similar action will be taken in regard to other farm products.

Regardless of whether or not the floor under farm products prices is justified, the effect is to raise living costs, and start the inflationary spiral which the administration has professed to be trying to avoid.

To date, of course, living costs, as measured by reliable indexes, have increased very little since the outbreak of war in Europe. This would indicate little or no justification for labor's demand for sharp wage advances.

If prices are to remain constant, and wage and other production costs continue to rise, what then? Obviously the first result would be the disappearance of profits, then of working capital.

The steel industry's recent earnings, while at the highest rate since 1929, are not sufficient to absorb the added labor and other costs now in sight, and leave anything like a fair return to investors. For example, the 10 cents an hour advance on basic wages, now asked, would have increased 1940 steel payrolls by $154,000,000, assuming the increase were extended proportionately to all employes. Twenty-three leading producers, representing more than 90 per cent of ingot capacity, had net profits of only $258,000,000 last year.

In the case of the United States Steel Corp., the increase asked, if extended proportionately to all employes, would have added approxi-

mately $70,000,000 to the year's payroll. This would have reduced the corporation's profit to where there would have been barely enough to meet preferred stock dividend requirements. Common stockholders, in all likelihood, would have received nothing and very little would have been available for the surplus account.

If only a flat 10-cent per hour increase had been granted wage earners, the cost to the corporation would have approximated $50,000,000. Earnings would have been reduced to a point where the common shareholders could have received very little on their investment. And this in a year of high operations.

Such reduction in earnings would be equivalent to killing the goose that laid the golden eggs as far as the government is concerned. If corporate profits are low or nonexistent, where will the government obtain the tax revenues to finance its $40,000,000,000 war expenditure?

On the other hand, by encouraging higher wages, it risks the forcing of higher prices, which in common with other customers it may have to pay.

### National Steel Grants 10-Cent Wage Increase

Wage increase of 10 cents an hour, retroactive to April 1, was announced last week by National Steel Corp., Pittsburgh. The increase raises minimum wage rates to 72½ cents an hour, or 16 per cent over the 62½-cent rate that has prevailed since 1937.

Details of the adjustment to be made in the higher-wage brackets were not revealed.

Following National Steel's action several other companies announced similar increases. These included Vanadium-Alloys Co., Anchor Drawn Steel Co., and Latrobe Electric Steel Co., all of Latrobe, Pa.

### United States Steel Heads Confer with President

B. F. Fairless, president, and Irving S. Olds, chairman, United States Steel Corp., last week discussed future expansion of the steel industry and other matters with President Roosevelt at a conference arranged by the latter at the White House.

Price and labor problems and the possibility of war developments increasing demand for steel also were discussed.

Asked if defense contract adjustments were mentioned, the U. S. Steel executives pointed out that it was too early to consider such requests, until the effect of any changes in wage rates can be ascertained.

### Lukens Strikers Return, Promise "No Further Work Stoppages"

Machine shop employes of Lukens Steel Co., Coatesville, Pa., who went on strike April 7 for a 30-cent wage increase returned to work April 9 after company and a federal conciliator had ageed upon a plan whereby the wage demand could be negotiated. The agreement provided:

1. The machine shop employes would return to their jobs before any negotiations could be resumed.
2. Upon return of the men to work the company would continue negotiations on general and particular wage matters.
3. The company would go along with the steel industry generally on general wages and make any adjustments retroactive to April 1, and would do the same for particular wage adjustments.
4. The union agreed to have no further work stoppages during the life of its contract with Lukens and its subsidiaries.

### Allis-Chalmers Strike Cost 3,432,000 Defense Man-Hours

Employes, the company and the national defense program suffered heavy losses in the 76-day strike at Allis-Chalmers Mfg. Co., Milwaukee. Below are listed some of these losses, figured on a normal work week and wage basis, but not including overtime that would have been worked had the company not been struck. Strike was settled last week.

Man-hours lost—3,432,000, on normal 40-hour week.

Men affected—7800.

Wages lost—$4,970,000.

Total possible production hours lost—1824.

Defense work blocked, $45,000,000 directly. One-third of all contracts placed by the Army and Navy were indirectly hampered.

Relief costs to community for strikers—$50,000 a month.

Work held up—Turbines for 25 destroyers; turbines for new powder plant at Radford, Va.; transformers, generators and turbines for Bonneville, Shasta, Boulder and TVA dam and power projects; compressor units for Langley field; switch gear units for Wright field; pumps for Panama Canal defenses.

### Manufacturers Suggest Strike-Avoidance Plan

"Every avoidable interruption or obstruction of defense work is a calamity," National Association of Manufacturers declared last week through a statement by Thomas Roy Jones, president, American Type Founders, Elizabeth, N. J., and chairman of the association's committee on employment relations.

The manufacturers' group expressed basic opposition to enactment of any compulsory legislation to forbid strikes and lockouts in defense industries, but declared that

## New Army Tank Carries Formidable Armament

■ Twenty-five-ton medium tank undergoes tests and inspection at the Army's proving grounds at Aberdeen, Md. Tank carries a 75-millimeter field gun, a 37-millimeter antitank, antiaircraft gun mounted in a power-driven turret, and machine guns. NEA photo

"if voluntary means of settling disputes without stoppages in defense production are tried and fail and legislation then seems necessary, we believe such legislation should provide:

"1. That a majority of the employes of any unit in which a strike is intended must have, by properly safeguarded secret vote, indicated their desire to go out on strike.

"2. That the government may maintain appropriate actions in the courts of the United States to prevent or terminate any strike or lockout in violation of such act."

### Defense Mediation Board Settles First Six Strikes

First six strikes in defense industries certified to the recently-appointed Defense Mediation Board have been settled comparatively promptly. They were:

Allis-Chalmers Mfg. Co., Milwaukee, where work on $45,000 000 defense contracts had been held up for 11 weeks.

International Harvester Co., whose plants, holding various large armament orders had been harassed by jurisdictional and "sympathetic" stoppages.

Vanadium Corp. of America, Bridgeville, Pa., manufacturer of alloys essential to defense products and vitally-needed tools.

Universal Cyclops Steel Corp., Bridgeville, Pa., manufacturer of special steels.

Condenser Corp. of America, South Plainfield, N. J.

Snohomish Airport, Everett, Wash.

### Strikes Barred in Pacific Coast Shipbuilding Industry

Clarification of the labor situation was seen last Friday when Sidney Hillman, associate director general of OPM revealed at a press conference that an agreement had been worked out barring strikes in the entire shipbuilding industry on the Pacific Coast.

The agreement worked out by industry and organized labor provides for basic wage rates for skilled laborers, a standard schedule of hours for shift work with 10 per cent added for second shift, 15 per cent for third shift.

Mr. Hillman said he hoped that similar agreements could be worked out for other shipbuilding zones as well as for other defense industries.

Mr. Hillman also said at his press conference that the Priorities Division would act within 48 hours to release No. 12 aluminum scrap to die casters in nondefense industries. Previously, a conference had been held with Edward Cleyfitz, head of the die-casters union. It was denied that the die-casters had threatened to strike if metal were withheld.

# Establish New Price Regulation System Under Leon Henderson

■ BROADER control over prices was assumed by the government last week. By executive order, President Roosevelt established an Office of Price Administration and Civilian Supply designed to prevent profiteering and unwarranted price increases in consumer goods.

Leon Henderson, in charge of price stabilization section, National Defense Advisory Commission, will direct the new agency. NDAC price division and the consumer protection section, directed by Hariett Elliott, are combined and the staffs of both will work under Mr. Henderson's direction.

Mr. Henderson will have authority to enforce price controls promulgated by the new agency under several statutes cited in the executive order. As director, he will head a committee in the OPA composed of the secretaries of treasury and agriculture, federal loan administrator, chairman of the tariff commission, chairman of the federal trade commission, the director general and associate director general of the Office of Production Management, and such other members as may be appointed by the President.

The committee will "make findings and submit recommendations to the administrator in respect to the establishment of maximum prices, commissions, fees, charges and other elements of cost or price of commodities."

Mr. Henderson is authorized to appoint advisory committees to aid him. In addition to fixing prices, he will make surveys for OPM on the "amount, character and relative importance of materials and commodities needed for civilian use" and to represent the interests of civilians in any OPM actions which tend to reduce the amount of material available for that purpose.

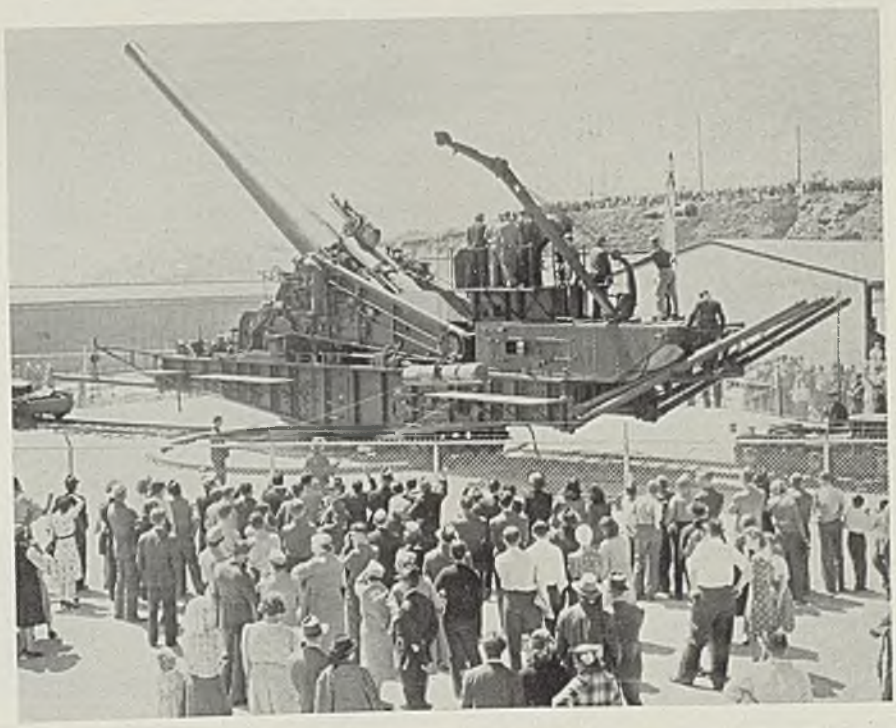
#### Threatens New Price Ceilings

An important function of the OPA will be to work out a program for "equitable distribution" of commodities among competing civilian industries after military orders have been filled.

Mr. Henderson last week threatened price ceilings to keep prices of several metals at "reasonable levels." On Friday he stated he sees no justification for current prices of cadmium and said unless they return quickly to a reasonable level he will take "drastic action."

Spiral of dealers' prices to 100

## This Spring, Fancy Turns to Big Guns



■ Ten thousand persons visited Ft. MacArthur's military reservation, Los Angeles, on April 5, "Army day." This 14-inch railroad gun was one of the main attractions. NEA photo

per cent above smelters' quotations, which also are up 12 to 15 per cent over a year ago, he said, was due to tight supply situation brought on by increasing use of cadmium as substitute for zinc and nickel. Henderson states he was informed by trade sources that cadmium production will increase appreciably in 1941 and that current output is running 25 per cent above last year.

For statements on other products, see page 34.

# Further Expansion of Facilities for Heavy Forgings in Prospect

*WASHINGTON*

■ ANOTHER large scale expansion of facilities for heavy steel forgings was in prospect last week following a meeting of defense officials and representatives of 18 fabricating companies.

Expansion will be government financed for the most part, Office of Production Management officials said. It probably will not be as great as the $40,000,000 construction program started last summer. The initial program was made inadequate by increasing demand for armaments and merchant vessels under the lease-lend program, it was said.

Steelmakers will meet here again April 15 to work out details of the new program which will be based on OPM suggestions. Attending last week's conference were spokesmen for the following companies:

Allis-Chalmers Mfg. Co., Milwaukee; American Forge Co., Berkeley, Calif.; American Locomotive Co., New York; Baldwin Locomotive Works, Standard Steel Works Division, Philadelphia; Bethlehem Steel Co., Bethlehem, Pa.; Camden Forge Co., Camden, N. J.; Carnegie-Illinois Steel Corp., Pittsburgh; Crucible Steel Co. of America, New York; Erie Forge & Steel Co., Erie, Pa.; A. Finkl & Sons Co., Chicago; Heppenstall Co., Pittsburgh; Isaacson Iron Works, Seattle; The Midvale Co., Nicetown, Philadelphia; Mesta Machine Co., Pittsburgh; National Forge & Ordnance Co., Irvine, Pa.; Pennsylvania Forge Corp., Philadelphia; Struthers-Wells Co., Titusville, Pa.; Pullman Standard Car Mfg. Co., Chicago.

Government bureaus represented were the Bureau of Ordnance, Bureau of Ships, Maritime Commission, Ordnance Department and OPM.

### Bulletin Describes Methods For Subcontracting Orders

*Farming Out Methods*, fifth in a series of farming out bulletins prepared by the Labor Division of the Office of Production Management, was issued last week. The series is designed to speed up defense production by describing practical methods by which idle machinery and idle skilled workers may be brought together, in cooperation with the program carried out by the Defense Contract Service.

New bulletin contains information for government purchasing agents, prime contractors, subcontractors, and community defense organizations, concerning successful farming out techniques now being practiced by various private companies, and the pooling of resources by local, regional and labor-management groups.

### Consolidate Commodities Divisions; Now Only Five

Metals and Minerals Division and Machinery Division of the Bureau of Foreign and Domestic Commerce, and all the other commodities divisions, have been abolished and in place of the 30 commodities divisions five new major divisions have been set up in the bureau. The divisions are: Research and Statistics, Industrial Economy, Regional Economy, International Economy and Commercial and Economic Information.

Walter A. Jannesen, formerly chief of the Metals and Minerals Division, has become an industrial consultant of the Bureau. Lewis M. Lind, formerly chief of the Machinery Division, has been appointed an industrial consultant, temporarily assigned to the Export Control Administration.

## Defense Corp. To Provide Machinery for Crucible

■ Crucible Steel Co. of America, New York, last week entered into an agreement with the Defense Plant Corp. for acquisition of additional machinery and equipment to be used in Crucible's Harrison, N. J., plant. Title to the equipment, to cost $1,500,000, will be retained by Defense Plant Corp. Facilities will be used for shell manufacture.

Lease agreement with Pullman Standard Car Mfg. Co., Chicago, providing for acquisition of land, building construction and purchases of machinery and equipment was also executed by the Defense Plant Corp. at the War Department's request. Total cost of additional facilities is not to exceed $1,108,901, with about $825,000 for land and buildings and $284,000 for equipment.

Title will be retained by the Defense Plant Corp., with Pullman Standard operating the plant under lease. Airplane parts will be manufactured.

Wellman Bronze & Aluminum Co., Cleveland, also entered into a lease agreement with the Defense Plant Corp. last week. Title to the expansions, costing about $194,221, will remain with the Defense Corp. Wellman company will operate the added facilities under a lease.

## Allegheny To Operate Government Alloy Plant

■ Defense Plant Corp., subsidiary of the Reconstruction Finance Corp., and Allegheny Ludlum Steel Corp., Pittsburgh, have entered into an agreement providing for the constructing and equipping of a plant at Dunkirk, N. Y., at a cost of $2,500,000. The government corporation will retain title to the facilities and property which will be leased to Allegheny Ludlum for operation. Plant will manufacture bullet core steel and other alloy steels.

To aid in conserving tungsten, Allegheny Ludlum lifted royalty restrictions on manufacture of tools from its DBL low-tungsten, high-speed tool steel.

DBL is a patented molybdenum high-speed steel containing less than one-third the amount of tungsten in ordinary 18-4-1 high-speed steels. High-speed steel is the chief market for this important defense metal.

## Woodward Iron Stacks Crippled by Explosion

■ Woodward Iron Co.'s three blast furnaces at Woodward, Ala., were crippled by a terrific explosion last Friday morning. Explosion, the cause of which President H. A. Berg said was undetermined, occurred in a large main which carried compressed air from the blowing room to the furnaces. Two of the stacks were damaged, one so badly as to be out indefinitely.

Twelve employes were reported injured, one fatally.

## Demand for Plastic Molding Presses Is Active

■ Heavy increase in demand for plastic molding presses has resulted from temporary scarcity of aluminum, zinc and magnesium, according to Nathan Lester, president, Lester Engineering Co., Cleveland, designer and builder of such equipment.

## Ore Fleet Out; Earliest Opening in Forty Years

■ Practically the entire Great Lakes iron ore fleet had been placed in service by last week-end, signalizing not only the earliest opening of the ore shipping season in 40 years but also one of the greatest mass starts in history.

In normal years a few vessels start out as soon as ice conditions permit, but many wait until May.

Meager stocks of iron ore at furnaces and lower lakes docks, coupled with record ore consumption, have prompted all fleet operators to commission the bulk of their carriers early as possible to transport 72,000,000 to 75,000,000 tons during the season.

First carriers entered Duluth harbor April 8. The W. G. MATHER of the Cleveland-Cliffs Iron Co. fleet was the first in, with the assistance of tugs. Four other Cleveland-Cliffs carriers entered later in the same day.

The Cleveland-Cliffs' MARQUETTE and JOLIET arrived at Escanaba, Mich., April 4 and docked in Cleveland loaded with ore April 9. They were unloaded quickly and started back up the lakes.

Appropriate ceremonies dramatized the early navigation opening at both upper and lower lake ports. Radio Station WGAR broadcast the arrival of the MARQUETTE at Cleveland with Announcer Sidney Andorn interviewing Capt. George Russell on ice conditions and other aspects of the early shipping season. The MARQUETTE had been stopped six times by ice on its trip. On arrival at Escanaba, the vessel was greeted with a band and the captain presented with a 50-pound case of smelt.

Ice conditions in the lower lakes were clearing rapidly during the latter part of the week, although still causing some difficulty in Lake Superior. Tugs, Coast Guard cutters and the carferry SAINTE MARIE were assisting vessels in trouble and in keeping the channels clear of obstructing ice.


■ Capt. George Russell of the MARQUETTE, first vessel to arrive at Cleveland with a cargo of iron ore, tells the world about ice and shipping conditions on the Great Lakes. At left is Sidney Andorn, radio station WGAR announcer who interviewed Captain Russell

## Electric Power Industry Well Prepared for Defense

■ Importance of the electric power industry in the national defense program was emphasized at the Midwest Power Conference in the Palmer House, Chicago, April 9-10, under sponsorship of the Illinois Institute of Technology and seven co-operating universities and colleges.

Maj. Charles W. Leihy, editor of *Electric Light and Power*, Chicago, stated that the industry is well prepared to meet the requirements of "the peacetime defense program." The national "power pool," he said, has an available capacity of more than 40,000,000 kilowatts, with an additional 7,000,000-kilowatt capacity under contract in new plants.

Roger B. McWhorter, chief engineer, Federal Power Commission, Washington, aserted that 10 kilowatt-hours of electric energy is used in the production of each pound of aluminum, and predicted that within the next 18 months the aluminum industry would be consuming energy at the rate of 8,250,000,000 kilowatt-hours annually, and that the time is not far distant when the industry's annual requirements will exceed 10 billion kilowatt-hours.

The speaker related that the Federal Power Commission is studying "advantages to be secured by interconnecting the transmission facilities of different utility systems in the same region, and operating the power systems in co-ordination so far as might be mutually advantageous, thus increasing the available power supply by reducing the reserve capacity which would otherwise be necessary, and assuring a more dependable power supply to each of the interconnected systems."

Describing the influence of the cost of power in the manufacture of aluminum, Mr. McWhorter said the metal is manufactured in the United States "only in those localities where an abundant and cheap supply of hydroelectric power is procurable.

"The power supply of every aluminum plant in the country comes from a hydro source," he continued, "and new aluminum plants now to be constructed will utilize hydro power exclusively. We may well wonder what the situation as to aluminum supply would be at this critical time had not cheap power been available in quantity during the development stage of this industry."

## U. S. Steel's Shipments In March a New Record

■ Shipments of finished steel products by the United States Steel Corp. in March totaled 1,720,366 net tons, the largest for any month in the Corporation's history. The previous record was 1,701,874 tons in May, 1929.

March shipments were 171,915 tons larger than in February and 788,461 tons greater than in March, 1940. For three months this year total shipments were 4,951,271 tons, compared with 3,088,753 tons in the corresponding quarter last year. Further comparisons follow:

(Inter-company shipments not included)
Net Tons

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

†Increase. *Decrease.

# February Exports Off 19 Per Cent; Imports One-Tenth of Those in 1940

■ IRON and steel exports, excluding scrap, in February totaled 525,862 gross tons, valued at $34,637,943, and 19 per cent lower in volume than the 653,798 tons exported in January, according to the Durable Materials Unit, Bureau of Foreign and Domestic Commerce. In February, 1940, exports totaled 436,585 tons, valued at $33 361,201.

Shipments to Europe decreased from 462,137 tons in January to 260,682 tons. Exports to every other continental area increased. Countries of North and Central America and the West Indies received 107,542 tons, compared with 92,165 tons in January; shipments to South America rose to 68,177 from 24,907 tons; the Far East took 55,359 tons, against 49,123 tons in January; Africa received 34,102 tons, compared with 25,436 tons in the preceding month.

Largest individual markets were the United Kingdom, with 248,447 tons, and Canada, 75,591 tons.

February imports increased slightly in quantity, although they were smaller in value. Total receipts were 646 tons, valued at $143,126, compared with 406 tons, valued at $157,284, in January. In February, 1940, imports were ten times as great in volume, 6467 tons.

Scrap exports in February rose to 74,378 gross tons, valued at $1,455,512, compared with 45,055 tons, valued at $902,535, in January.

## IRON AND STEEL FOREIGN TRADE STATISTICS

### UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

| Articles | Feb., 1941 | Feb., 1940 | Jan. through Feb., 1941 |
|---|---|---|---|
| Pig iron | 46,843 | 18,927 | 127,165 |
| Ferromanganese and spiegeleisen | 455 | 5,069 | 807 |
| *Ferrochrome | 1,449 | ..... | 4,140 |
| Other ferroalloys | 75 | 473 | 778 |
| Ingots, blooms, etc.: | | | |
| Not containing alloy | 114,652 | 65,794 | 316,535 |
| Alloy, incl. stainless | 40,568 | 1,277 | 95,759 |
| Steel bars, cold fin. | 10,010 | 4,937 | 30 779 |
| Bars, iron | 187 | 2,176 | 307 |
| Bars, concrete | 13,563 | 18,710 | 21,321 |
| Other steel bars: | | | |
| Not containing alloy | 26,617 | 24,293 | 40,011 |
| Stainless steel | 67 | 58 | 116 |
| Alloy, not stainless | 1,601 | 1,325 | 8,748 |
| Wire rods | 12,592 | 14,417 | 23,447 |
| Boiler plate | 6,451 | 911 | 11,710 |
| Other plates, not fab.: | | | |
| Not containing alloy | 32,451 | 35,001 | 76,297 |
| Stainless steel | 37 | 9 | 126 |
| Alloy, not stainless | 569 | 383 | 753 |
| Skelp iron or steel | 10,341 | 3,388 | 21,369 |
| Sheets, galv. iron | 2,754 | 889 | 3,002 |
| Sheets, galv. steel | 10,332 | 15,286 | 16,152 |
| Sheets, "black" steel: | | | |
| Not containing alloy | 33,943 | 38,142 | 70,209 |
| Stainless steel | 78 | 151 | 128 |
| Alloy, not stainless | 550 | 455 | 1,085 |
| Sheets, black iron | 588 | 2,977 | 1,700 |
| Strip steel, cold-rolled: | | | |
| Not containing alloy | 3,851 | 4,615 | 12,117 |
| Stainless steel | 39 | 36 | 98 |
| Alloy, not stainless | 98 | 12 | 112 |
| Strip steel, hot-rolled: | | | |
| Not containing alloy | 9,133 | 8,892 | 18,920 |
| Stainless steel | ..... | ..... | 4 |
| Alloy, not stainless | 32 | 4 | 41 |
| Tin plate, taggers' tin | 13,823 | 60,643 | 23,229 |
| Terneplate (incl. long ternes) | 737 | 399 | 1,435 |
| Tanks, except lined | 2,438 | 1,535 | 6,352 |
| Shapes, not fabricated | 34,012 | 13,008 | 71,764 |
| Shapes, fabricated | 5,326 | 6,706 | 9,788 |
| Plates, fabricated | 1,993 | 2,868 | 5,301 |
| Metal lath | 140 | 101 | 226 |
| Frames and sashes | 278 | 79 | 443 |
| Sheet piling | 1,865 | 13 | 2,326 |
| Rails, 60 lbs. | 17,861 | 10,104 | 30,039 |
| Rails, under 60 lbs. | 3,493 | 1,450 | 6,613 |
| Rails, relaying | 1,291 | 344 | 1,674 |
| Rail fastenings | 1,121 | 1,284 | 4,454 |
| Switches, frogs, crsgs. | 250 | 495 | 409 |
| Railroad spikes | 1,034 | 546 | 1,474 |
| R.R. bolts, nuts, etc. | 268 | 212 | 392 |
| Boiler tubes, seamless | 2,817 | 2,357 | 7,450 |
| Boiler tubes, welded | 246 | 81 | 295 |
| Pipe: | | | |
| Seamless casing and oil-line | 5,558 | 12,767 | 8,067 |
| Do., welded | 1,271 | 4,536 | 1,742 |
| Seamless black | 2,371 | 3,102 | 3,852 |
| Pipe fittings: | | | |
| Mall.-iron screwed | 302 | 516 | 844 |
| Cast-iron screwed | 89 | 161 | 166 |
| Pipe and fittings for: | | | |
| Cast-iron pressure | 2,377 | 7,097 | 4,267 |
| Cast-iron soil | 1,432 | 913 | 2,060 |
| Pipe, welded: | | | |
| Black steel | 3,314 | 4,514 | 5,872 |
| Black wrought-iron | 223 | 561 | 967 |
| Galvanized steel | 5,045 | 4,602 | 9,319 |
| Galv. wrought-iron | 681 | 565 | 1,110 |
| All other pipe, fittings | 841 | 1,210 | 7,772 |
| Wire: | | | |
| Plain iron or steel | 6,451 | 7,692 | 9,663 |
| Galvanized | 6,325 | 2,875 | 9,220 |
| Barbed | 3,698 | 1,736 | 5,667 |
| Woven-wire fencing | 469 | 278 | 635 |
| Woven-wire sc'n cloth: | | | |
| Insect | 85 | 33 | 172 |
| Other | 192 | 263 | 378 |
| Wire rope and cable | 1,118 | 705 | 2,760 |
| Wire strand | 242 | 208 | 374 |
| Electric welding rods | 522 | 277 | 1,200 |
| †Card clothing | ..... | 1 | ..... |
| Other wire | 908 | 1,981 | 2,043 |
| Wire nails | 3,686 | 4,275 | 5,473 |
| Horseshoe nails | 250 | 64 | 391 |
| Tacks | 100 | 71 | 176 |
| Other nails, staples | 574 | 239 | 791 |
| Ordinary bolts, machine screws | 2,734 | 1,185 | 6,111 |
| Castings: | | | |
| Gray-iron (incl. semisteel) | 912 | 329 | 1,410 |
| Malleable-iron | 319 | 151 | 685 |
| Steel, not alloy | 250 | 164 | 410 |
| Alloy steel, incl. stainless | 100 | 113 | 228 |
| Car wheels, tires, axles: | | | |
| Wheels and tires | 1,182 | 807 | 2,142 |
| Axles, no wheels | 45 | 157 | 110 |
| Axles, with wheels | 17 | 67 | 51 |
| Horseshoes and calks | 92 | 6 | 115 |
| Forgings, n.e.s.: | | | |
| Not containing alloy | 2,788 | 1,322 | 4,890 |
| Alloy, incl. stainless | 379 | 180 | 1,119 |
| Total | 525,852 | 436,585 | 1,179,660 |
| Scrap, iron and steel: | ..... | 232,800 | ..... |
| *No. 1 heavy melting | 14,867 | ..... | 29,488 |
| *No. 2 heavy melting | 30,124 | ..... | 46,114 |
| *Baled and bundled | 2,804 | ..... | 6,218 |
| *Cast and burnt | 9,335 | ..... | 11,765 |
| *Other | 15,535 | ..... | 22,548 |
| Scrap, tin plate | ..... | 419 | ..... |
| Tin plate circles, strips, cobbles, etc. | 464 | 454 | 1,210 |
| Waste-waste tin plate | 1,032 | 729 | 1,838 |
| Terneplate clippings and scrap | 216 | 314 | 252 |
| Total scrap | 74,378 | 234,716 | 119,433 |
| GRAND TOTAL | 600,240 | 671,301 | 1,299,093 |
| Iron ore | 380 | 1,027 | 572 |

*New class.
†Not separately classified after December 31, 1940.

### U. S. FOREIGN TRADE IN IRON AND STEEL, INCLUDING SCRAP

Gross Tons

| | 1941 | | 1940 | |
|---|---|---|---|---|
| | Exports | Imports | Exports | Imports |
| Jan. | 698,853 | 423 | 583,521 | 8,274 |
| Feb. | 600,240 | 796 | 671,301 | 6,740 |
| Mar. | ..... | ..... | 663,980 | 5,096 |
| April | ..... | ..... | 612,906 | 6,674 |
| May | ..... | ..... | 783,964 | 7,759 |
| June | ..... | ..... | 936,047 | 5,505 |
| July | ..... | ..... | 1,034,938 | 3,542 |
| Aug. | ..... | ..... | 1,402,075 | 2,105 |
| Sept. | ..... | ..... | 1,221,052 | 2,598 |
| Oct. | ..... | ..... | 1,105,510 | 3,966 |
| Nov. | ..... | ..... | 788,176 | 980 |
| Dec. | ..... | ..... | 805,158 | 4,064 |
| Tot. | ..... | ..... | 10,608,628 | 57,303 |

### ORIGIN OF FEBRUARY IMPORTS

Gross Tons

| | Iron ore | Manganese ore | Ferromanganese |
|---|---|---|---|
| Canada | 6,493 | ..... | ..... |
| Mexico | 698 | ..... | ..... |
| Cuba | 5,700 | 5,619 | ..... |
| Chile | 165,600 | ..... | ..... |
| Bolivia | ..... | 15 | ..... |
| Brazil | ..... | 4,608 | ..... |
| British India | ..... | 8,646 | ..... |
| Soviet Russia | ..... | 3,620 | ..... |
| South Africa | ..... | 2,909 | ..... |
| Gold Coast | ..... | 2,843 | ..... |
| Norway | ..... | ..... | 11 |
| Total | 178,491 | 28,260 | 11 |

| | Sheets, skelp and sawplate | Steel bars |
|---|---|---|
| Canada | 1 | 1 |
| United Kingdom | ..... | 13 |
| Sweden | ..... | 4 |
| Total | 1 | 18 |

### UNITED STATES IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons

| Articles | Feb., 1941 | Feb., 1940 | Jan. through Feb., 1941 |
|---|---|---|---|
| Pig iron | ..... | 2,032 | ..... |
| Sponge iron | ..... | 160 | 23 |
| Ferromanganese (1) | 11 | 1,595 | 11 |
| Spiegeleisen | ..... | 169 | ..... |
| Ferrochrome (2) | ..... | ..... | ..... |
| Ferrosilicon (3) | 49 | 40 | 90 |
| Other ferro-alloys (4) | ..... | 100 | ..... |
| Steel ingots, blooms, etc. | ..... | ..... | ..... |
| Billets, solid or hollow | ..... | 22 | ..... |
| Concrete reinforc. bars | ..... | ..... | ..... |
| Hollow bar, drill steel | 5 | 196 | 19 |
| Bars, solid or hollow | 18 | 148 | 37 |
| Iron slabs | ..... | ..... | ..... |
| Iron bars | ..... | 39 | ..... |
| Wire rods | 21 | 499 | 21 |
| Boiler and other plate (including skelp) | 3 | 1 | 4 |
| Sheets, skelp, saw plate | 1 | 20 | 2 |
| Die blocks, blanks, etc. | ..... | 6 | ..... |
| Tin plate, taggers' tin and terneplate | 1 | 11 | 22 |
| Structural shapes | ..... | 83 | ..... |
| Sashes and frames | 24 | ..... | 43 |
| Sheet piling | ..... | ..... | ..... |
| Rails and track material | 19 | 186 | 19 |
| Cast-iron pipe, fittings | ..... | 119 | ..... |
| Mall. iron pipe fittings | ..... | ..... | ..... |
| Welded pipe | ..... | ..... | ..... |
| Other pipe | 339 | 193 | 341 |
| Cotton ties | ..... | ..... | ..... |
| Other hoops and bands | ..... | 52 | ..... |
| Barbed wire | ..... | ..... | ..... |
| Round iron, steel wire | 21 | 120 | 24 |
| Teleg., telephone wire | ..... | ..... | ..... |
| Flat wire, steel strips | 103 | 237 | 287 |
| Wire rope and strand | 6 | 82 | 40 |
| Other wire | ..... | ..... | 1 |
| Nails, tacks, staples | ..... | 7 | 4 |
| Bolts, nuts and rivets | 2 | 19 | 4 |
| Horse and mule shoes | ..... | ..... | ..... |
| Castings and forgings | 23 | 31 | 60 |
| Total | 646 | 6,467 | 1,052 |
| Iron and steel scrap | 150 | 273 | 167 |
| GRAND TOTAL | 796 | 6,740 | 1,219 |

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

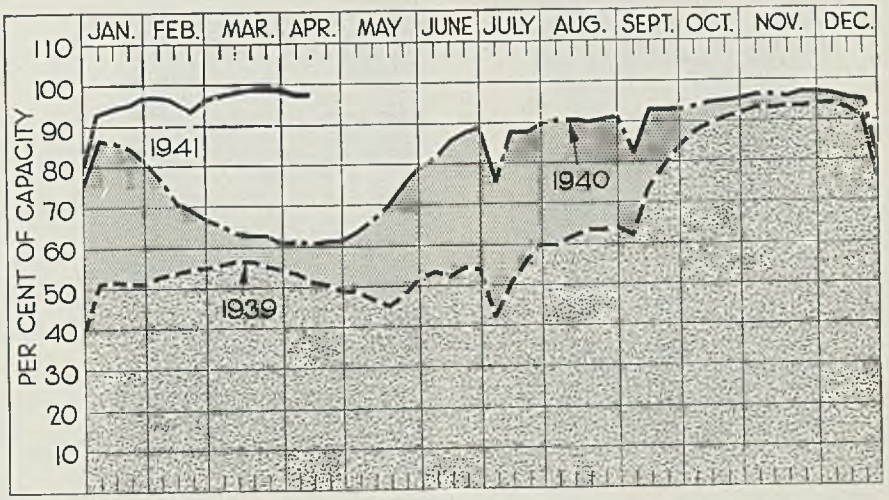
## March Ingot Output at 100 Per Cent of Capacity

■ Operating at the equivalent of 100 per cent of rated capacity, the steel industry in March produced 7,146,372 net tons of steel, a new high record, the American Iron and Steel Institute reports.

March output was 14 per cent above 6,250,413 tons produced in the short month of February and 42 per cent greater than 4,390,090 tons made in March, 1940. First quarter production this year reached a new peak of 20,339,869 tons, an average of 98 per cent of capacity. This was almost 40 per cent above first quarter, 1940, when production was 14,685,960 tons.

Operations at 100 per cent of rated capacity, such as took place during March, do not represent a production ceiling for the industry, says the Institute. The rated capacity is the sum total of maximum output attained in recent years by each furnace in the industry, less a deduction of about 11 per cent for shut-downs and repairs.

In practice, the steel industry could, by reducing the length of its shut-downs, lift output as much as 2.5 per cent above rated capacity in a year, and for shorter periods it could probably operate at an even higher rate.




# PRODUCTION . . . . Steady

■ STEELWORKS operations last week continued at 98 per cent. Three districts made small gains, two declined and seven were unchanged. A year ago the rate was 61 per cent; two years ago it was 51½ per cent.

**Birmingham, Ala.**—Steady at 90 per cent, with 21 open hearths in production.

**Youngstown, O.**—Production held at 97 per cent last week, with outlook for this week the same or possibly one point higher. The coal strike has prevented relighting relined stack of Struthers Iron & Steel Co., which used Connellsville coke, and may force banking Sharon Steel Corp. blast furnace, which would cut steel output at Lowellville, O., plant.

**St. Louis**—Held at 98 per cent.

**Cincinnati**—Gained ½-point, due to slight shift in equipment.

**Pittsburgh**—Operations continued at 102 per cent.

**Wheeling**—Averaged 88 per cent, but this week will drop 4 points.

**New England**—Receded 2 points to 90 per cent, due to minor open-hearth repairs at one plant.

**Central eastern seaboard** — Remained at 96 per cent with little further increase indicated.

**Detroit**—Solely because of suspension of Ford operations the rate dropped 13 points further, to 61 per cent, lowest figure since July, 1939.

**Buffalo**—Gained 2 points to 90½ per cent.

**Chicago**—Some shifts in productive equipment were made but the rate remained at 101½ per cent.

**Cleveland**—Completion of furnace repairs increased the rate 2½ points to 98½ per cent.

## Steel Ingot Statistics

| | Estimated Production—All Companies | | | | | | | | Calculated weekly | Number |
|---|---|---|---|---|---|---|---|---|---|---|
| | —Open Hearth— | | —Bessemer— | | —Electric— | | —Total— | | produc- | of |
| | Net tons | Per cent of capacity | Net tons | Per cent of capacity | Net tons | Per cent of capacity | Net tons | Per cent of capacity | tion, all companies Net tons | weeks in month |
| **Based on Reports by Companies which in 1939 made 98.26% of the Open Hearth, 100% of the Bessemer and 34.39% of the Electric Ingot and Steel for Castings.** | | | | | | | | | | |
| 1941 | | | | | | | | | | |
| Jan. | 6,282,713 | 99.2 | 451,637 | 76.0 | 208,734 | 95.0 | 6,943,084 | 97.1 | 1,567,288 | 4.43 |
| Feb. | 5,683,104 | 99.3 | 378,330 | 70.5 | 188,979 | 95.2 | 6,250,413 | 96.8 | 1,562,603 | 4.00 |
| March | 6,473,116 | 102.2 | 460,169 | 77.4 | 213,087 | 97.0 | 7,146,372 | 100.0 | 1,613,177 | 4.43 |
| 1st Quar. | 18,438,933 | 100.3 | 1,290,136 | 74.8 | 610,800 | 95.8 | 20,339,869 | 98.0 | 1,581,638 | 12.86 |
| **Based on Reports by Companies which in 1939 made 98.06% of the Open Hearth, 100% of the Bessemer and 78.15% of the Electric Ingot and Steel for Castings.** | | | | | | | | | | |
| 1940 | | | | | | | | | | |
| Jan. | 5,371,390 | 86.0 | 285,714 | 56.1 | 111,625 | 70.0 | 5,768,729 | 83.4 | 1,302,196 | 4.43 |
| Feb. | 4,219,991 | 72.3 | 205,527 | 43.2 | 101,623 | 68.2 | 4,527,141 | 70.0 | 1,093,512 | 4.14 |
| Mar. | 4,090,224 | 65.5 | 191,559 | 37.6 | 108,307 | 67.9 | 4,390,090 | 63.5 | 990,991 | 4.43 |
| 1st Quar. | 13,681,605 | 74.6 | 682,800 | 45.7 | 321,555 | 68.7 | 14,685,960 | 72.4 | 1,129,689 | 13.00 |
| April | 3,818,656 | 63.1 | 176,335 | 35.8 | 105,731 | 68.4 | 4,100,722 | 61.2 | 955,879 | 4.29 |
| May | 4,596,561 | 73.6 | 258,709 | 50.8 | 111,763 | 70.1 | 4,967,033 | 71.8 | 1,121,226 | 4.43 |
| June | 5,236,691 | 86.6 | 305,115 | 61.9 | 117,919 | 76.3 | 5,659,725 | 84.5 | 1,319,283 | 4.29 |
| 2nd Quar. | 13,651,908 | 74.4 | 740,159 | 49.5 | 335,413 | 71.6 | 14,727,480 | 72.5 | 1,132,012 | 13.01 |
| 1st half | 27,333,513 | 74.5 | 1,422,959 | 47.6 | 656,968 | 70.1 | 29,413,440 | 72.4 | 1,130,851 | 26.01 |
| July | 5,284,406 | 84.8 | 322,567 | 63.5 | 120,512 | 75.7 | 5,727,485 | 83.0 | 1,295,811 | 4.42 |
| Aug. | 5,686,755 | 91.0 | 369,770 | 72.6 | 130,761 | 82.0 | 6,187,286 | 89.5 | 1,396,679 | 4.43 |
| Sept. | 5,550,642 | 92.0 | 365,289 | 74.2 | 141,010 | 91.5 | 6,056,941 | 90.7 | 1,415,173 | 4.28 |
| 3rd Quar. | 16,521,803 | 89.2 | 1,057,626 | 70.1 | 392,283 | 83.0 | 17,971,712 | 87.7 | 1,368,752 | 13.13 |
| 9 mos. | 43,855,316 | 79.5 | 2,480,585 | 55.1 | 1,049,251 | 74.4 | 47,385,152 | 77.6 | 1,210,658 | 39.14 |
| Oct. | 6,076,701 | 97.3 | 408,317 | 80.2 | 158,957 | 99.6 | 6,643,975 | 96.1 | 1,499,769 | 4.43 |
| Nov. | 5,888,547 | 97.3 | 420,448 | 85.3 | 161,248 | 104.4 | 6,470,243 | 96.6 | 1,508,215 | 4.29 |
| Dec. | 5,924,325 | 95.1 | 399,434 | 78.6 | 170,090 | 106.9 | 6,493,849 | 94.1 | 1,469,197 | 4.42 |
| 4th Quar. | 17,889,573 | 96.5 | 1,228,199 | 81.3 | 490,295 | 103.6 | 19,608,067 | 95.6 | 1,492,243 | 13.14 |
| Total | 61,744,889 | 83.8 | 3,708,784 | 61.7 | 1,539,546 | 81.8 | 66,993,219 | 82.1 | 1,281,431 | 52.28 |

The percentages of capacity for 1940 are calculated on weekly capacities of 1,410,130 net tons open hearth, 114,956 net tons Bessemer and 36,011 net tons electric ingots and steel for castings, total 1,561,097 net tons; based on annual capacities as of Dec. 31, 1939 as follows: Open hearth 73,721,592 net tons. Bessemer 6,009,920 net tons, electric 1,882,630 net tons.

The percentages of capacity for 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.

## District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

| | Week ended Apr. 12 | Change | Same week 1940 | 1939 |
|---|---|---|---|---|
| Pittsburgh | 102 | None | 53 | 45 |
| Chicago | 101.5 | None | 59 | 53.5 |
| Eastern Pa. | 96 | None | 57 | 40 |
| Youngstown | 97 | None | 42 | 43 |
| Wheeling | 88 | None | 73 | 65 |
| Cleveland | 98.5 | + 2.5 | 65 | 39.5 |
| Buffalo | 90.5 | + 2 | 44 | 44.5 |
| Birmingham | 90 | None | 81 | 60 |
| New England | 90 | — 2 | 55 | 35 |
| Cincinnati | 94 | + .5 | 56 | 51 |
| St. Louis | 98 | None | 45 | 44.5 |
| Detroit | 61 | —13 | 77 | 59 |
| Average | 98 | None | 61 | 51.5 |

# MEN of

R. S. Marthens

F. R. Henderer

A. E. Day

W. H. Pritchard

A. M. Wolf

**R. S. MARTHENS,** formerly manager, Gearing Division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed staff assistant to the manager, Canton Ordnance Division. The Canton plant, now under construction, will be owned by the government and operated by Westinghouse.

♦

**A. E. Day** has been elected vice president and sales manager, National Roll & Foundry Co., Avonmore, Pa. He formerly was associated with Mesta Machine Co., Pittsburgh, 22 years, in sales and operating capacities.

♦

**W. H. Pritchard,** associated with Kearney & Trecker Corp., Milwaukee, five years, in various capacities in the cost and sales departments, has been promoted to assistant purchasing agent.

♦

**William A. Streich** has been elected secretary-treasurer, Superior Steel Corp., Pittsburgh. He succeeds the late N. K. Schaller.

♦

**Robert L. Clause** has been made president, Pittsburgh Plate Glass Co., Pittsburgh. He succeeds **H. S. Wherrett,** who has become vice chairman of the board.

♦

**A. M. Wolf** has been transferred from Detroit district to the St. Louis office of Cutler-Hammer Inc., Milwaukee. A graduate electrical engineer from Armour Institute of Technology, Mr. Wolf was employed by the Public Service Co. of Northern Illinois in the substation construction department before joining Cutler-Hammer.

♦

**Frederic Rhodes Henderer,** associated with Carnegie-Illinois Steel Corp., Pittsburgh, six years, and since October, 1940, chief of training, has been appointed chief of safety. He began his association with subsidiaries of United States Steel Corp. as a civil engineer with Illinois Steel Co. in 1915, and subsequently was employed in engineering capacities with Commonwealth Edison, Western Foundation and Illinois Brick Co. He became director of training for the sheet and tin division of Carnegie-Illinois in April, 1935.

**Russell J. Greenley** succeeds Mr. Henderer as chief of training. The past five years he has been professor of industrial education at Purdue University.

**William Whigham Jr.** has been named chief of wage and salary administration of Carnegie-Illinois. He had been supervisor of organization planning since January, 1938. He began his career with subsidiaries of the corporation at the Clairton By-Product Coke works of the former Carnegie Steel Co. in March, 1919.

♦

**James P. Gillies** has joined Chicago Pneumatic Tool Co., New York, and will assist in general sales activities.

♦

**Alvan T. Simonds,** chairman of the board, Simonds Saw & Steel Co., Fitchburg, Mass., has been named president and general manager, succeeding the late G. K. Simonds. **G. K. Simonds Jr.** is assistant general manager.

♦

**W. Alexander McCune Jr.** has been appointed field engineer, Philadelphia territory, for the abrasive division of Norton Co., Worcester, Mass. Mr. McCune formerly was associated with the laboratories and sales engineering department at Worcester.

♦

**H. H. Zollar** has been appointed manager of sales, Shenango-Penn Mold Co., Dover, O. **Clarence R. Hayes,** who has represented the company in the Cleveland sales district several years, has been placed in charge of Pittsburgh sales, with

# INDUSTRY

Dr. H. A. H. Pray

B. J. Brugge

headquarters in the Henry W. Oliver building, Pittsburgh.

♦

**John L. Taylor** has become personnel and labor relations supervisor, Briggs & Stratton Corp., Milwaukee. He was for a number of years line coach of the football squad of Marquette university, Milwaukee.

♦

**Paul Lyon,** identified with the tin plate sales division of Wheeling Steel Corp., Wheeling, W. Va., several years, has been appointed assistant manager, galvanized sheet and roofing sales division. **William L. Latta** is manager of that division.

**D. L. Irvine,** heretofore associated with Wheeling Steel's Chicago district office in a sales capacity, has been transferred to Wheeling as assistant manager, tin plate sales division. **I. J. Koehnline** has also been appointed assistant manager, tin plate sales division. **R. F. Sentner** is manager of that division.

♦

**Morris M. Rose** has been appointed general traffic manager, Milcor Steel Co., Milwaukee. He succeeds **L. R. Conger,** who has retired after heading Milcor's traffic department the past 25 years. Mr. Rose will be assisted by **H. J. Hufler,** who will act as traffic manager for Milcor's eastern district.

♦

**C. R. Terry** has been appointed assistant to **Herman H. Lind,** district manager, Defense Contract Service, Fourth Federal Reserve district, Cleveland. Mr. Terry is on leave of absence as sales manager, Hydro-Power Systems Inc., division of Hydraulic Press Mfg. Co., Mount Gilead, O.

♦

**Robert H. Ahlers,** general plant manager, Pontiac Motor Division, General Motors Corp., Pontiac, Mich., has been named head of all national defense work at the plant, to be started soon for the Navy department. **Buell Starr,** assistant superintendent of the motor plant of Pontiac, becomes defense plant superintendent. Manufacture of shells is to be started in a plant formerly occupied by the old Oakland Motor Co., now owned by Pontiac.

♦

**Dr. H. A. H. Pray** has been named head of a new division of electrochemical research, Battelle Memorial Institute, Columbus, O. Dr. Pray has been a member of the Battelle staff since 1934, and is a member, American Chemical Society, Electrochemical Society, and American Electroplaters' Society.

♦

**L. B. Keplinger,** associated with the Rheem Mfg. Co., New York, since 1940, as assistant to the president, has also been elected vice president and a director. **Clifford V. Coons,** heretofore manager of the Houston, Tex., plant of the company, has been transferred to New York as sales manager, container division.

♦

**John W. Perry Jr.,** has been elected vice president, Grede Foundries Inc., Milwaukee. He has been general sales manager of the company and its subsidiary, Milwaukee Steel Foundry Co. He will continue in charge of sales for the foundries, including the Liberty Foundry, Wauwatosa, Wis., and Spring City Foundry, Waukesha, Wis., both operated by the Grede company.

♦

**Wilbur Handey,** chief tool designer, Fellows Gear Shaper Co., Springfield, Vt., has been elected chairman of a new chapter of American Society of Tool Engineers representing the Springfield-Windsor, Vt., and Claremont, N. H., industrial districts. **Milan Jennings,** tool engineer, Jones & Lamson Machine Co., Springfield, Vt., is secretary. Other newly organized chapters of the socity include:

Seattle: Chairman, **W. C. Fields,** chief preliminary tool designer, Boeing Aircraft Corp., Seattle; secretary, **Richard J. McCafferty,** machine tool designer, Boeing Aircraft Corp.

New Haven, Conn.: Chairman, **Henry J. Bellemore,** chief inspector, High Standard Mfg. Co., New Haven; secretary, **A. H. Hitchcock,** tool designer, Gilbert & Barker Mfg. Co.

♦

**B. J. Brugge** has been named welding consultant and engineer at Washington for Lincoln Electric Co., Cleveland. He will be engaged in consulting work having to do with the application of arc welding in the national defense program, and will be associated with T. A. Canty Inc., Lincoln representative in Baltimore.

♦

**R. M. Beutel** was elected secretary and a director, Paterson-Leitch Co., Cleveland, at the twenty-seventh annual meeting of stockholders April 8. He has been associated with the company 15 years. **William J. Burkhardt,** formerly with King Bridge Co., was elected assistant treasurer. All other officers and directors were re-elected. Company's operations include many contracts for defense work. It will furnish more than 14,000 tons of steel for the Ravenna, O., project.

♦

**Roy E. Greenwood** has been appointed assistant Pacific coast manager of American Chain & Cable Co. Inc., with headquarters in San Francisco. Associated with the company over ten years, he has been district sales manager in the Chicago territory of American Chain Division since February, 1939.

**E. J. Flood** will succeed Mr. Greenwood as district sales manager, Chicago territory of American Chain division, and will continue as district sales manager in that territory for Page Steel & Wire Division.

# Activities of Steel Users, Makers

■ AMERICAN Nickel Alloy Mfg. Corp. has been organized as a subsidiary of Anglo-American Metal & Ferro Alloy Corp., to manufacture nickel alloys and allied products. The parent company has moved from 200 Broadway to 50 Church street, New York, and the new company also will be located at that address. Alfred J. Brunebaum is president of both firms.

♦

Willis Mfg. Co. Inc., Galesburg, Ill., will change its corporate name to Willis Steel Corp., effective April 25.

♦

Drake Equipment & Engineering Co., Muskegon, Mich., successor to Service Machine Works, is occupying new quarters and will engage in general engineering work.

♦

Cleveland Duplex Machinery Co., Penton building, Cleveland, has been appointed sales agent for the complete line of Upton electric salt bath furnaces in the Cleveland area by the Upton Electric Furnace Co., Detroit.

♦

Chromium Corp. of America, Chicago, has completed construction of a one-story addition to its plant, which adds 6250 square feet and raises total area to 34,000 square feet. Cost of new equipment which ultimately may be installed will approximate $50,000. Company is operating 24 hours a day, seven days a week, and is engaged in considerable defense work.

♦

F. J. Stokes Machine Co., Philadelphia, has completed a new brick and concrete building at its Tabor road plant, increasing floor space more than 50 per cent. The entire plant is now operating 20 hours a day, six days a week, making defense equipment.

♦

Buda Co., Harvey, Ill., has opened an office and display room at 1469 Church street, Washington, under direction of Col. H. H. Frost, vice president, with G. C. Humphreys as manager of engineering, and E. C. Asher as office manager.

♦

Midwest Machine & Mfg. Co., Muskegon, Mich., recently organized to manufacture machine tools, has leased the former Panyard Piston Ring Co. building in Muskegon for five years. Operations will start within a month with between 50 and 60 employes.

♦

E. M. Weymer Co. Inc., Chicago, maker of ornamental iron work, has started production in its recently completed $20,000 plant addition. The company is engaged at present in national defense work, with orders from the government as well as aircraft manufacturers.

♦

Union Asbestos & Rubber Co., Cicero, Ill., has completed erection of a new plant in Paterson, N. J., which will specialize in sectional insulation for temperatures up to 1200 degrees Fahr. for pipe up to 36 inches in diameter, with thicknesses up to 5 per cent, and blocks and sheets up to 36 x 36 x 5 inches. Capacity of the new plant is double that of the Cicero plant.

♦

International Register Co., Chicago, has purchased a new plant which will more than double present floor space. Considerable new machinery has been ordered.

♦

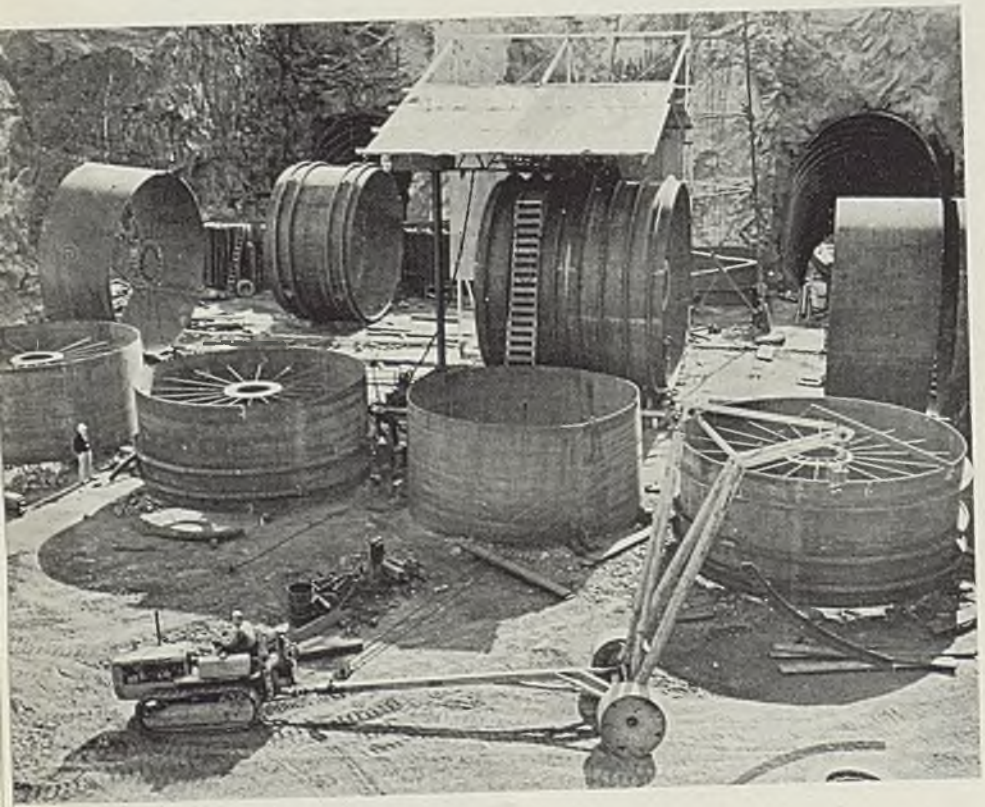
Theo. Kupfer Foundry & Machine Co., Madison, Wis., has moved its plant and offices from East Mifflin street to new quarters at 149 Waubesa street.

♦

New York offices of Lukens Steel Co., Coatesville, Pa., and subsidiaries, By-Products Steel Corp., and Lukenweld Inc., have been moved to 50 Church street, from 405 Lexington avenue.

♦

J. H. Keeney & Co., 2001 South Calumet street, Chicago, maker of coin-operated games, recently acquired a building at 6630 South Ashland avenue and is transferring operations to that location. About $60,000 has been invested in the expansion.



## Tractor and Crane Maneuver 45-Ton Rings

■ Forty-five ton steel plate rings to form tunnels leading to powerhouse at Parker dam, California, are maneuvered into position for assembly by welding with a Caterpillar tractor and LeTourneau crane. Rings are 22 feet in outside diameter and 20 feet high. Radial spokes which are shown in several are used to hold the rings in circular shape while welding and are removed after the reinforcing ribs are welded to the outside of rings, which later will be welded together to form long lengths of pipe. Fabrication is by Chicago Bridge & Iron Co., Chicago

# MEETINGS

### Gearmakers Announce Program For Annual Meeting in May

■ A TENTATIVE program for the American Gear Manufacturers Association's twenty-fifth annual meeting at The Homestead, Hot Springs, Va., May 5-7, has been issued. In the opening session, Monday, Dr. N. E. Woldman, Eclipse Aviation Corp., will speak on "Machinability of Alloy Gear Steels." In the evening, E. L. Shaner, editor-in-chief, STEEL, Cleveland, will speak on "Procurement of Materials for National Defense."

Following an address Tuesday morning on "Analytical Determination of the Form Factor in the Beam Formula for a Tooth", by M. Maletz, Kearney & Trecker Corp., technical committees will meet.

Paul Wooton, chief of McGraw Hill Publishing Co.'s Washington editorial staff, will speak at the annual dinner Tuesday evening. J. L. Buehler, Indiana Gear Works, is scheduled for an address on "Problems of Aircraft Gear Manufacture", Wednesday morning.

### Industrial Advertising Problems To Be Discussed

National Industrial Advertisers Association's second annual midwestern conference sponsored by the Chicago, St. Louis, Indianapolis and Milwaukee chapters will be held in Hotel Sherman, Chicago, April 18.

Keynote speaker in the morning session will be E. L. Shaner, editor-in-chief, STEEL, Cleveland. Richard P. Dodds, advertising manager, Truscon Steel Co., and president of N. I. A. A., will speak on "Fundamentals of Advertising That Will Pay Big Dividends."

Afternoon sessions will be devoted to the following subjects: "Six Minimum Qualifications for Media To Reduce Waste in Space Buying," "Selling Advertising to the Sales Force So They Will Use It," "Sales Promotion and Advertising After Defense," "How Do You Know When You Have Enough Advertising—Too Much—Too Little?"

### Pittsburgh Section of Wire Group To Meet April 17

Wire Association extends an invitation to all interested in production and fabrication of wire to attend the Pittsburgh regional meeting, William Penn hotel, Pittsburgh, April 17. At an informal dinner preceding the technical session, Lt. Col. S. B. Ritchie, director of laboratory, Watertown Arsenal, Watertown, Mass., will speak on "Military Inspection of Material." Following the dinner papers and discussions will be presented on military and naval inspection of material and cold heading materials. The meeting is sponsored by the Pittsburgh Steel Co.

### Testing Society Will Meet In Chicago, June 23-27

Forty-fourth annual meeting of the American Society for Testing Materials will be held in the Palmer House, Chicago, June 23-27. In addition to the technical sessions, there will be the sixth exhibit of testing apparatus and related equipment, the 1941 photographic exhibit and competition, a smoker and golf tournament.

### Cleveland Welding Section Plans Spring Conference

Spring conference of the Cleveland section, American Welding Society, will be held in Hotel Statler, May 9. The following addresses are on the program: "New Developments in Oxyacetylene Welding" by A. N. Kugler, applied engineering department, Air Reduction Sales Co.; "Heat and Mechanical Stresses in Welding", by W. G. Theisinger, director of welding and research, Lukens Steel Co.; "Can It Be Spot Welded?", by R. T. Gillette, welding engineer, General Electric Co.; and, "Welding from the Manufacturer's Viewpoint," by Elmer E. Isgren, superintendent, LeTourneau Inc.

### Machine Tool Dealers To Convene in Washington

The spring convention of the Associated Machine Tool Dealers of America will be held in Mayflower hotel, Washington, April 28. Program is now being formulated.

## March Gear Sales Increase 10 Per Cent

■ Sales of industrial gears in March were 152.6 per cent above the month last year and 10 per cent higher than in February. In the first quarter this year, total sales were 129 per cent greater than in the corresponding period in 1940, according to the American Gear Manufacturers Association, Wilkinsburg, Pa.

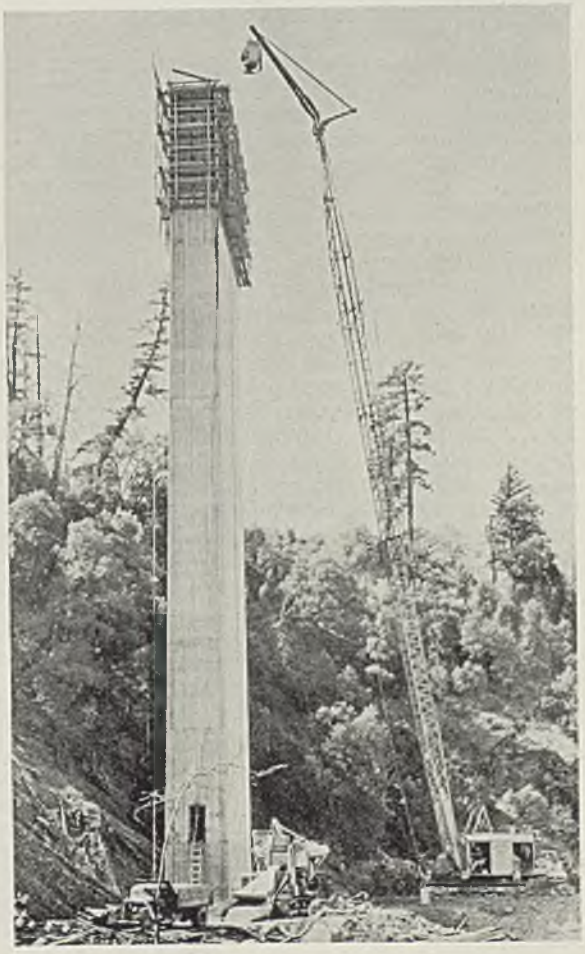
Comparative index figure of sales in March was 288, against 114 in the month in 1940. In February, index figure was 262, and in January, 259. The index is based on 1928 as 100.

Compilation as set forth, the association explains, applies only to industrial gears. Automotive gears or gears used in high-speed turbine drives are not included.

✦

## Crawler Has 140-Foot Boom

■ Crawler crane, equipped with 140-foot boom and 20-foot hammerhead, is working on a Southern Pacific railroad relocation job near Redding, Calif. Concrete and bucket weighs approximately 5000 pounds. Crane also handled 5-ton frames used in constructing the tower. It was built by Lima Locomotive Works Inc., Lima, O., and is owned by United Concrete Pipe Co., Los Angeles



# Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

***Price Stabilization Commission extends scrap contract delivery deadline to May 10. Further extension declared available in contingencies . . . OPM places nickel-bearing steel under general priorities control . . . Index value of new orders in February up 38 points from preceding month . . . Henderson says price ceiling on lead may soon be necessary***

*WASHINGTON*

■ TIME limit for completion of delivery of scrap iron and steel under contracts in effect prior to April 3 has been extended from April 10 to May 10 by the Price Stabilization Division, National Defense Advisory Commission. Amendment extending the deadline was adopted last week by Leon Henderson.

Original regulations provided that any person who bought and took possession of scrap before April 3 at prices above the ceiling established by the government and who had contracted before April 3 to sell said scrap at a price above the ceiling would have until April 10 to complete deliveries.

The amendment extends date for completion of these contracts to May 10, and provides two exceptions to the rule that the dealer must have taken physical possession of the scrap before April 3. They are: (1) If the scrap originated from demolition operations begun but not completed before April 3; or, (2) if the scrap was purchased before April 3 and accumulated at point of shipment but not delivered because of lack of transportation.

Amendment provides that if in either of these contingencies the dealer cannot get possession of the scrap in time to complete his contract by May 10, he may apply to the Price Stabilization Division for further time extension.

### Fuller Named Head of Materials Branch, Production Division

Appointment of Samuel Richard Fuller Jr. as chief of the Materials Branch, Division of Production, OPM, has been announced by John D. Biggers, director of the Production Division.

Mr. Fuller replaces W. A. Harriman, who is now on duty in London as a special representative of the President.

Mr. Fuller, who is president of the North American Rayon Corp. and of the American Bemberg Corp., joined the defense organization on Feb. 20 as chairman of the Production Planning Board.

Alex E. Walker, president, National Supply Co., Pittsburgh, has been appointed co-ordinator for Defense Contract Service in the Pittsburgh area. Clifford Wright, retired, will be co-ordinator in the Cincinnati area.

### General Priority System Applied in Nickel Steel

General priority system for producers and warehouse distributors of nickel-bearing steel was adopted late last week by the Office of Production Management.

Controls announced by E. R. Stettinius Jr., priorities division head, were more intricate than those on any other priority item. They were different for producers and distributors because of the industry's nature.

Needs for nickel-steel will be graded in order of importance from A to B-8. Producers' customers who fall into classes from B-4 to B-8 may receive only certain percentages of their average monthly shipments in 1940 for corresponding purposes.

Defense orders, including British, will take preference rating of A-10 or higher. Producers will be allowed to ship to all classes of customers from those in A class to B-8. Warehouse distributors, however, may not fill orders below B-3 until further notice. This is to conserve supplies for defense.

Producers, beginning in May, will be permitted to ship to distributors only in quantities which average monthly shipments in January, February, March and April. Inventories held by customers of producers and distributors will be limited to a 30-day supply, Mr. Stettinius ruled. Producers, according to the new set-up, cannot engage in toll fabrication or process nickel-steel for customers without permission from the priorities division.

Products now under general priority control: Nickel; nickel-bearing steels; aluminum; magnesium; ferrotungsten, tungsten powder and tungsten metal compounds; neoprene (synthetic rubber); and machine tools.

### February Inventories Index Down 1.5 Points From January

During February index of the value of iron and steel inventories was 127, compared with 128.5 in January, and 111.8 in February of last year, taking Dec. 31, 1938 at 100, according to the Industry Survey of the Department of Commerce.

Index of the value of new orders received by iron and steel manufacturers for February, taking January 1939 at 100, was 294 compared with 256 in January and 81 in February of last year.

February index of value of iron and steel shipments was 198 compared with 190 in January and 133 in February of last year, taking January 1939 at 100.

Unfilled orders of iron and steel mills increased in February from January 18 per cent, with a similar increase in January from December 1939, and with an increase in February this year over the same month of last year of 84 per cent.

The response of American in-


# Speed Nut System

Faster emergency production requires *faster assembly* methods to meet the problems we face in a troubled world. That's why more assembly engineers are adopting the SPEED NUT System.

SPEED NUTS always replace two or more parts, reduce weight of fastenings over 60% and more than double average assembly speed with ease. The SPEED NUT is the only one piece fastening device that affords a *double spring tension lock*. And what is equally important, SPEED NUTS also cut average net assembly costs 50%.

Over a billion in use—over 700 shapes and sizes. Samples and engineering data will be mailed you promptly on receipt of your engineering details.

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Manufacturers of Patented SPEED NUTS

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario. IN ENGLAND: Simmonds Aerocessories, Ltd., London. IN FRANCE: Aerocessoires Simmonds, S. A., Paris.

dustry to the accelerated demands of the defense program was particularly encouraging in February. With increased industrial output the crux of the problem facing the country, manufacturing plants responded with increased production. The increase actually exceeded the usual rise from January when output already was at a record high. This was reflected in shipment totals, which increased sharply to the highest daily average rate yet attained.

Industry survey data indicate that the recent sharp upward movement in inventories had tapered off to a fractional increase in February. During the half year ending in January, the index advanced at an average rate of 2 points a month. The changing character of the inventory movement is well illustrated by the figures for recent months—the index rising 2.8 points in December, 1.5 points in January, and only 0.6 points in February.

This adds significance to the 10 point jump in the daily average shipment index for February since it indicates that the goods moved into distribution and consumption channels in contrast to the situation in previous months when shipment totals were partially bolstered by intra-manufacturer deliveries of semi-finished goods. Both the durable and nondurable goods industries contributed to the February advance in the shipment rate with the latter group partially stimulated by seasonal factors.

New orders placed with manufacturers continued upward in February to a new record high. Increased orders for durable goods were largely responsible for the advance, with bookings by manufacturers of iron and steel products and electrical and other machinery being particularly heavy. The enormous volume of new business booked again expanded backlogs in the durable goods lines despite the increased delivery rate.

## Price Ceiling on Lead May Be Necessary, Says Henderson

A declaration that it may soon be necessary to establish a price ceiling on lead has been issued by Leon Henderson, commissioner of price stabilization, National Defense Advisory Commission.

Leading producers report an unexpected large increase in demand, and there are indications, Mr. Henderson said, that this excessive demand is due in great part to unnecessary large forward buying and stocking up. Domestic production, plus available supplies of foreign lead from Mexico, Canada, Australia, and South America, is adequate to meet real consumption at current levels, he asserted.

In view of this situation, Mr. Henderson said he has requested the leading producers to refrain from further increases in the price, which has advanced from 5.50 cents per pound to 5.85 per pound since Feb. 10. Both the price stabilization division and the raw materials branch of the Office of Production Management are studying the market situation.

## "Nickel Scrap Away Out of Line with Primary Nickel"

The government will fix ceiling prices on nickel scrap and nickel alloy scrap unless the price of those commodities is brought into line with the price of primary nickel, Mr. Henderson announced last week.

Prices of nickel scrap and nickel alloy scrap, he said, are "away out of line" compared with the 35 cents per pound of primary nickel.

"We have received reports that nickel scrap is being sold up to one dollar a pound," Mr. Henderson said. "Such ridiculous prices are completely unwarranted and have caused speculation and hoarding. They do not alleviate the shortage of nickel; on the contrary, they merely aggravate an already difficult problem. Only a stabilized market can best serve the interests of our national defense program.

"We intend to correct this situation in accordance with our general program of adjusting the prices of secondary materials in line with the prices of primary materials. To this end we have already established maximum prices for second-hand machine tools, aluminum scrap, secondary aluminum ingot, zinc scrap materials and secondary slab zinc."

Mr. Henderson urged all persons engaged in the industry to co-operate to the utmost extent by bringing the prices of nickel scrap and nickel alloy scrap into line, and he asked holders of the scrap to release their stocks.

"We must get stocks of scrap into the hands of consumers as quickly as possible," he said, "in order to contribute properly to the defense program."

## Clarifies Regulations on Scrap and Secondary Zinc

Mr. Henderson called attention to the fact that Price Schedule No. 3, which establishes maximum prices for zinc scrap materials and secondary slab zinc, permits persons complaining of hardships or inequity in the operation of the schedule to apply to the division for exception.

He explained that the schedule became effective March 31, regardless of existing contracts. However, the schedule permitted deliveries of secondary slab zinc to be made at prices higher than the established maximum prices up to and including April 3.

It appears, however, that some dealers in zinc scrap materials were caught on March 31 with stocks of materials, acquired at prices higher than the established maximum prices, and ready for shipment under a firm commitment made prior to March 31, for the sale of such materials at such higher prices.

"To avoid loss in the disposition of such stocks of zinc scrap materials," he stated, "we are prepared to permit such firm commitments to be carried out. The conditions under which permission will be granted should be carefully noted."

In the first place, the dealer must have a firm commitment made prior to March 31, for the sale of zinc scrap materials at prices higher than the established maximum prices. Secondly, the dealer must have had on hand on March 31 or under firm purchase commitments made prior to March 31, quantities of zinc scrap materials sufficient to meet such commitments, and acquired at prices higher than the established maximum prices."

However, Mr. Henderson cautioned, firm purchase commitments for scrap will be the basis for exemption only if the scrap was already acquired by the seller by March 31 for delivery to the dealer.

"We have also been informed," he continued, "that some distillers and remelters had on hand on March 31, 1941, quantities of scrap zinc materials which they acquired at prices higher than the established maximum prices to meet firm commitments, made prior to March 31, for the sale of secondary slab zinc. These distillers and remelters were unable to complete deliveries of the secondary slab zinc made from such zinc scrap materials before April 4.

"To avoid loss in the disposition of such inventories of zinc scrap materials we are ready to permit such commitments to be carried out. The same criteria for exception will be followed in the case of producers of secondary slab zinc as will be followed in the case of dealers in scrap materials."

Furthermore, Mr. Henderson stated, if a distiller or remelter secures permission to sell secondary slab zinc at prices higher than the established maximum prices, and its purchaser is a dealer, the dealer will in turn be permitted to deliver the zinc at higher prices to meet a firm commitment for the sale of the zinc made prior to March 31.

Dealers in secondary slab zinc may also apply for exception if on March 31 they held stocks of secondary slab zinc acquired at prices higher than the established maximum prices for delivery under a firm commitment, made prior to March 31, for the sale of secondary slab zinc at higher prices.

# Technical Committee To Advise OPM On Defense Metals and Minerals

■ OFFICE of Production Management last week announced the formation of a committee appointed by the National Academy of Sciences and the National Research Council to advise OPM on technical matters relating to metals and minerals. Committee will be known as the Advisory Committee on Metals and Minerals and is subdivided into four groups, as follows: Ferrous Minerals and Ferroalloys; Metals Conservation and Substitution; Tin Smelting and Reclamation; Nonmetallic Minerals.

The committee will take over the activities of the various separate technical committees that have been advising the National Defense Advisory Commission and OPM. Clyde Williams, director of the Battelle Memorial Institute, Columbus, O., will be general chairman of the committee.

Committee will make investigations for OPM on technological aspects of the various metals and minerals important to national defense. Nonmetallic Minerals group still is in the process of formation. Personnel of the other three groups:

**FERROUS MINERALS AND FERROALLOYS**

**Dr. Gilbert E. Seil,** chairman, director of research, E. J. Lavino Co., Norristown, Pa.

**Dr. A. C. Fieldner,** secretary, chief, technologic branch, United States Bureau of Mines, Washington.

**Ralph Bowman,** Republic Steel Corp., Cleveland.

**Dr. Frederick G. Cottrell,** 3904 Ingomar street, N. W., Washington.

**James Critchett,** vice president, Union Carbide & Carbon Research Laboratories, 30 East Forty-second street, New York.

**Dr. John V. N. Dorr,** president, The Dorr Co., 570 Lexington avenue, New York.

**Dr. Charles H. Herty Jr.,** metallurgist, Bethlehem Steel Co., Bethlehem, Pa.

**Dr. Donnel F. Hewett,** principal geologist, United States Geological Survey, Washington.

**Dr. John Johnston,** director of research, United States Steel Corp., Kearny, N. J.

**Enoch Perkins,** Mutual Chemical Co. of America, 270 Madison avenue, New York.

**METALS CONSERVATION AND SUBSTITUTION**

**Dr. Zay Jeffries,** chairman, lamp department, General Electric Co., Nela Park, Cleveland.

**William H. Eiseman,** secretary, American Society for Metals, 7301 Euclid avenue, Cleveland.

**Robert S. Archer,** chief metallurgist, Chicago district, Republic Steel Corp., Chicago.

**E. W. Bennett,** vice president, Dow Chemical Co., Midland, Mich.

**Alfred L. Boegehold,** head, metallurgical department, General Motors Research Corp., Detroit.

**S. K. Colby,** vice president, Aluminum Co. of America, Gulf building, Pittsburgh.

**Dr. H. W. Gillett,** Battelle Memorial Institute, 505 King avenue, Columbus, O.

**W. C. Hamilton,** research director, American Steel Foundries, Indiana Harbor, East Chicago, Ind.

**Dr. Charles H. Herty Jr.,** metallurgist, Bethlehem Steel Co., Bethlehem, Pa.

**Dr. John Johnston,** director of research, United States Steel Corp., Kearny, N. J.

**H. S. Rawdon,** Bureau of Standards, Washington.

**Dr. A. B. Kinzel,** chief metallurgist, Union Carbide & Carbon Research Laboratories, 30 East Forty-second street, New York.

**Dr. Robert F. Mehl,** Carnegie Institute of Technology, Pittsburgh.

**Dr. Paul D. Merica,** vice president, International Nickel Co., 67 Wall street, New York.

**W. M. Peirce,** chief, research division, New Jersey Zinc Co., Palmerton, Pa.

**Albert J. Phillips,** superintendent research department, American Smelting & Refining Co., Barber, N. J.

**William B. Price,** chief chemist and metallurgist, Scovill Mfg. Co., Waterbury, Conn.

**Lieut. Col. S. B. Ritchie,** Ordnance Department, Watertown Arsenal, Watertown, Mass.

**Walter C. Smith,** Cerro de Pasco Copper Corp., 44 Wall street, New York.

**Jerome Strauss,** vice president, Vanadium Corp. of America, 420 Lexington avenue, New York.

**W. P. Woodside,** vice president, Climax Molybdenum Corp., 14410 Woodrow Wilson avenue, Detroit.

**TIN SMELTING AND RECLAMATION**

**F. W. Willard,** chairman, president, Nassau Smelting & Refining Co., 170 Fulton street, New York.

**P. M. Ambrose,** secretary, metallurgical division, Bureau of Mines, Washington.

**Prof. W. K. Lewis,** Massachusetts Institute of Technology, Cambridge, Mass.

**M. F. McConnell,** Carnegie-Illinois Steel Corp., Pittsburgh.

**Walter C. Smith,** metallurgist, Cerro de Pasco Copper Corp., 44 Wall street, New York.

**Dr. John F. Thompson,** vice president, International Nickel Co., 67 Wall street, New York.

# Government, Industry Spokesmen Differ on Adequacy of Tin Supplies

*CHICAGO*

■ INDUSTRY and government appear to disagree over available tin supplies, judging by supposedly authoritative views expressed at the eleventh annual Packaging Conference and Exposition, in Stevens hotel, last week, under sponsorship of the American Management Association.

In the industry it is understood America today has 15 months' supply of tin on hand, while the government warns against relying too heavily on tin in coming months.

Tin stocks are large enough to last more than a year despite an increase in production of hot-dipped tin plate and the apprehension caused by the possible effect of the war on tin imports from the Far East, declared Dr. R. W. Pilcher, research department, American Can Co., Maywood, Ill., speaking at a symposium on "How Does the Defense Program Affect Packaging?" The United States imported 120,000 long tons of tin last year while consuming only 85,000 tons, he said, and now has about 10,000 long tons in reserve, with 1941 consumption estimated at 70,000 to 75,000 tons.

Dr. Pilcher doubts that spread of war to the East Indies would prevent all shipments, and asserted tin reclamation possibilities "have hardly been scratched." Furthermore, he stated, Bolivian tin, while it is harder to smelt, "can be produced in a degree of purity adequate for high-grade tin plate."

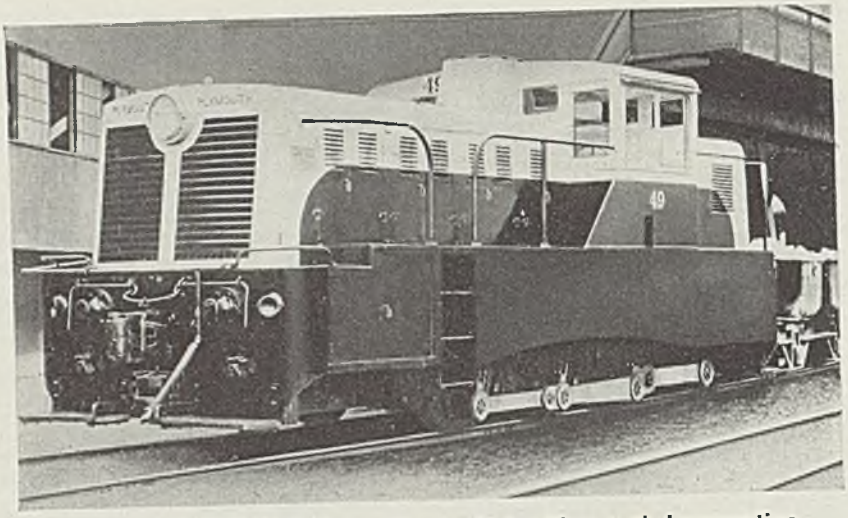
From the opposing viewpoint, Erwin Vogelsang, consultant on tin and lead, Office of Production Management, Washington, admitted the country is importing more tin to anticipate trouble in procuring it from Malaya and other foreign sources, but warned that the OPM is not encouraging increased use of tin or its employment as a substitute for other metals. Although the present supply is large, he asserted that imports from Asia easily could be cut off completely.

Mr. Vogelsang contended large scale reclaiming of tin will prove uneconomical because of the cost in moving tin to reclamation plants, and said not more than 15,000 tons a year could be reclaimed. Dr. Pilcher, on the other hand, pointed out two plants already are in operation and that plants "could be established all over the country."

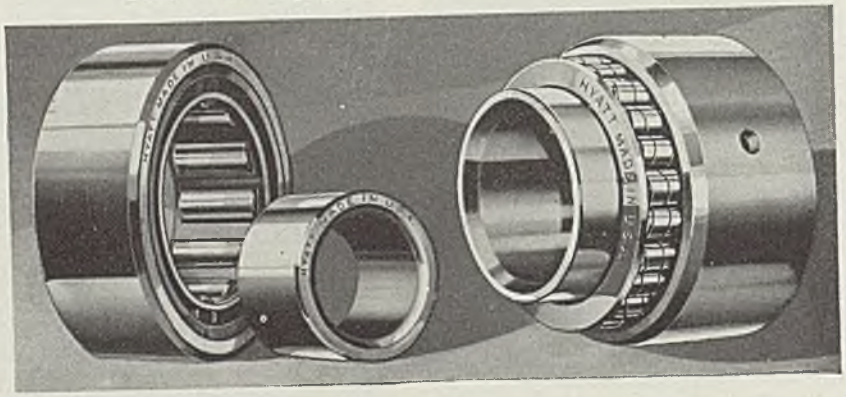
Asked if the OPM, which is seeking to conserve aluminum as well as tin, wished the packaging industry to substitute tin foil, which is a tin and lead alloy, for aluminum foil, Mr. Vogelsang declared the defense agency would prefer use of a different material altogether, and suggested lead foil.

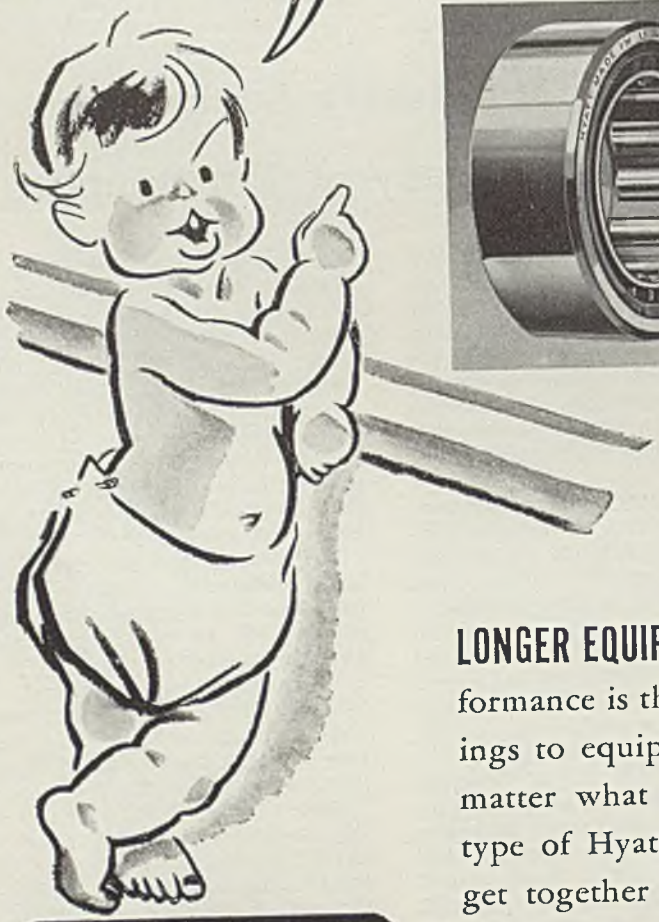
A tin can with four compartments was one of several novel developments shown in a "packaging of the future" display. The "Quadrican," on which patents are pending, will contain four different foods in separated compartments, enabling the housewife to heat liquids and solids at once simply by immersing the can in hot water. The can also offers the possibility of adaptation for pharmaceutical preparations.

THEY BUILD HYATTS IN TO KEEP WEAR OUT



PLYMOUTH LOCOMOTIVES...built by Plymouth Locomotive Works, Division of the Fate-Root-Heath Company, Plymouth, Ohio...are equipped with Hyatt Roller Bearings.





## KEEP THEM YOUNG WITH HYATTS

**LONGER EQUIPMENT LIFE,** and carefree bearing performance is the contribution of Hyatt Roller Bearings to equipment into which they are built. No matter what the application, there is a size and type of Hyatt Roller Bearing for the job. Let us get together on design for your new equipment or change-overs. Tell us when and where. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey, Chicago, Pittsburgh, Detroit and San Francisco.

**HYATT**

**ROLLER BEARINGS**

**QUIET**

# Mirrors of MOTORDOM

By A. H. ALLEN
Detroit Editor, STEEL

***Labor board election among 85,000 Ford workmen seen likely following resumption of plant operations. Wages and future status of company's "service" department will be chief issues in bargaining conferences. Only alternative for company appears to be recognition of new industrial era . . . Chrysler buying for 500,000 cars on 1942 model program.***

*DETROIT*

■ COMPLETE tieup of the Ford industrial empire, extending the length and breadth of the country, preempted the news spotlight in motordom last week. Cost in terms of wages and hours lost, never to be retrieved, was mounting daily. At the Rouge plant alone, each day lost ticked off another $650,000 in wages. Some 250 suppliers were compelled to stop shipments to Dearborn, although their instructions did not call for cessation of fabricating. Obviously these suppliers could not let finished parts and material choke up their own plants, so in many cases manufacturing operations were suspended and forces laid off.

Certain other motor makers sought to take advantage of the situation by requesting suppliers to transfer equipment hitherto busy on Ford work to their own needs, but for the most part this procedure was complicated and the requests could not be met readily.

Late last week it appeared a settlement of the dispute was being worked out, substantially as follows: Men would return to work pending arrangements for a NLRB election (within the next six weeks) to determine bargaining representatives. Ford would supply payroll lists to determine eligibility for voting, the possibility being hinted that everyone on the payroll as of Jan. 1 would be eligible.

Voters would have three choices—UAW-CIO, AFL or neither. Best guesses around Detroit on the outcome of such a vote, covering 85,000 employes, line up this way: For the UAW-CIO—40,000; for the AFL—15,000; neither—30,000. This of course would mean a victory for the CIO and would entail immediate start of negotiations for a contract. If the Ford management should refuse to bargain at once, a resumption of the strike would seem certain.

### Two Major Issues

Bargaining issues will simmer down to two major points—wages and future status of Ford "service" department. As far as wages are concerned, the time appears ripe for a typical Ford announcement of some startling innovation in payments to workmen, the only drawback being that such a move would be hailed by the UAW as its own achievement. Ford officials claim that because so high a percentage of workmen is in the common labor class, by virtue of the fact Ford makes a good share of its own base materials such as steel, glass and rubber, the average wage rate for the plant is somewhat below those prevailing in Chrysler and GM plants today. It cannot be denied that Henry Ford pioneered high wages for automobile workmen, but at the same time it is probably true now that certain classes of skilled help receive higher hourly rates in Chrysler and GM divisions than comparable workmen at Ford.

The Ford "service" department is coming to be one of the chief bones of contention in the argument. The company claims that this group of highly efficient guards and police under Harry H. Bennett is used solely to maintain law and order in the plant. The union claims that the men constitute in effect a secret police, spying on labor and running the entire plant with an iron fist. Somewhere between these two viewpoints lies the truth. No one save possibly Mr. Bennett and a few assistants seems to know how many men are employed in the service department, or to what extent the department lines up regular production workmen as "undercover" agents.

There seems to be general agreement, at least among persons dealing with Ford, that this department is the kingpin in control of many phases of plant operation, even extending into the purchasing department. It is doubtful if Mr. Ford himself knows how broad are the powers or how complete the penetration of Mr. Bennett's staff. For example, the other day, Mr. Bennett himself repeated conversation with Mr. Ford who said he did not know some workmen only had 15 minutes for lunch period, believing that most of them had one-half hour.

### Private Operation at Stake

In a nutshell, the argument simmers down to something like this: Here is the largest private industrial organization in the world. It is owned and operated by the Fords. Are they entitled to manage and operate the plant as they see fit? Or must they recognize that in the past 10 years a fairly complete social revolution has been effected and that the days of strictly "private" operation of a plant are over? Will they accede to the demand that all "service" department employes wear uniforms so they can be recognized anywhere? Will they, as many other industrial organizations have had to do, relinquish control over employes to outside union organizers?

Some day, perhaps, the story of Ford from 1903 to 1941 will be written. Many have tried to write it already but discretion usually has caused them to destroy their manuscripts. Over the years, many incidents have been embellished into

legends which would probably be bitterly denied by Ford officials, and the burden of proof might be difficult. Nevertheless, in private conversations, some of those fairly well up the Ford ladder can tell amazing tales concerning Ford operations. Most of these reports develop out of the fact that Ford officials have been successful in keeping a shroud of secrecy around their work. They do not participate in activities of technical societies to any great extent. There are no stockholders to whom detailed annual reports can be addressed. No one in the management group, except the Fords, holds a specific title. Mistakes, should they be made, can be buried quietly. When a new idea in processing or production is to be tried, it will be done the Ford way or not at all, whatever the cost. Many persons, even in high places, will agree to the characterization of Mr. Ford as a "benevolent despot."

Withal, however, he has been eminently successful, has created from scratch the most spectacular industrial empire known to the world, has endeared himself to many thousands of workmen and their families, and for at least 35 years has been the aloof sparkplug of the motor industry.

### Plan To Wind Up Assemblies Of 1941 Models in Ten Weeks

Last two weeks in June now seem destined as the changeover period for a number of the motor car companies. Chrysler divisions will "start to frame" about the first of June and are asking coverage for parts and materials for 500,000 units, first shipments of supplies to start the latter part of June. The eleventh and last Chevrolet materials buy is dated for May 26, and will be concluded a month after that, with assemblies of 1942 models starting shortly after July 1. Pontiac is understood to be planning an extra 10,000 cars beyond original schedules for 1941 models, and may borrow some steel earmarked for 1942 models to complete this run.

Report was heard last week from reliable sources to the effect motor companies have been assured by the OPM that supplies of aluminum will be available for pistons, leading to cancellation of plans for a change to cast iron. Where the aluminum is coming from is a moot question, for at the moment, in Detroit at least, practically all intake of aluminum scrap to smelters has stopped because of price ceilings established by the government.

The situation is particularly bad for aluminum die casters who last week informed customers they could not ship after Friday without sworn statements from buyers detailing inventories and orders placed. Preference ratings on aluminum further complicate the picture, and emphatic protests are being made at Washington over the regulation of secondary aluminum which, as pointed out here before, does not figure at all prominently in defense work since the latter requires almost without exception virgin aluminum.

## Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

| | 1939 | 1940 | 1941 |
|---|---|---|---|
| Jan. | 356,962 | 449,492 | 524,126 |
| Feb. | 317,520 | 422,225 | 509,233 |
| 2 mos. | 674,482 | 871,717 | 1,033,359 |
| March | 389,499 | 440,232 | ..... |
| April | 354,266 | 452,433 | ..... |
| May | 313,248 | 412,492 | ..... |
| June | 324,253 | 362,566 | ..... |
| July | 218,600 | 246,171 | ..... |
| Aug. | 103,343 | 89,866 | ..... |
| Sept. | 192,679 | 284,583 | ..... |
| Oct. | 324,689 | 514,374 | ..... |
| Nov. | 368,541 | 510,973 | ..... |
| Dec. | 469,118 | 506,931 | ..... |
| Year | 3,732,718 | 4,692,338 | ..... |

Estimated by Ward's Reports

| Week ended: | 1941 | 1940† |
|---|---|---|
| March 15 | 131,620 | 105,720 |
| March 22 | 124,805 | 103,395 |
| March 29 | 124,405 | 103,370 |
| April 5 | 120,055 | 101,655 |
| April 12 | 99,260 | 101,940 |

†Comparable week.

### Foundry Runs 18 Hours Daily: Output Double Last Year's

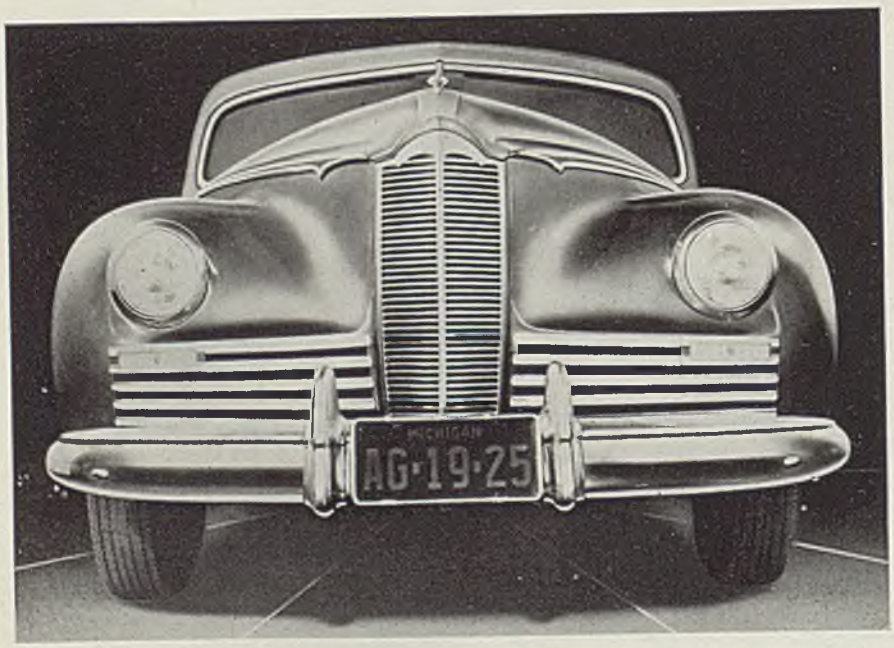
In eight months the Pontiac foundry has poured 97,252 tons of iron, compared with 46,604 tons in the same period a year previous. Plant is working 18 hours a day, with the highest day's tonnage thus far 829 tons, well above the daily average of 750 tons. Employment has increased to 1900 men. A large share of the increased output is for General Motors trucks purchased by the army—motor blocks, oil pump bodies and bearing caps.

Hours before the union walkout at Ford, the glass plant there set a record unparalleled in the history of glass manufacture. At midnight, March 30, the 100-ton glass furnace in the plant had been pouring a 51-inch wide sheet of glass without interruption for two years and a day—732 days in all—a strip of glass 2302 miles long weighing 55,840 tons.

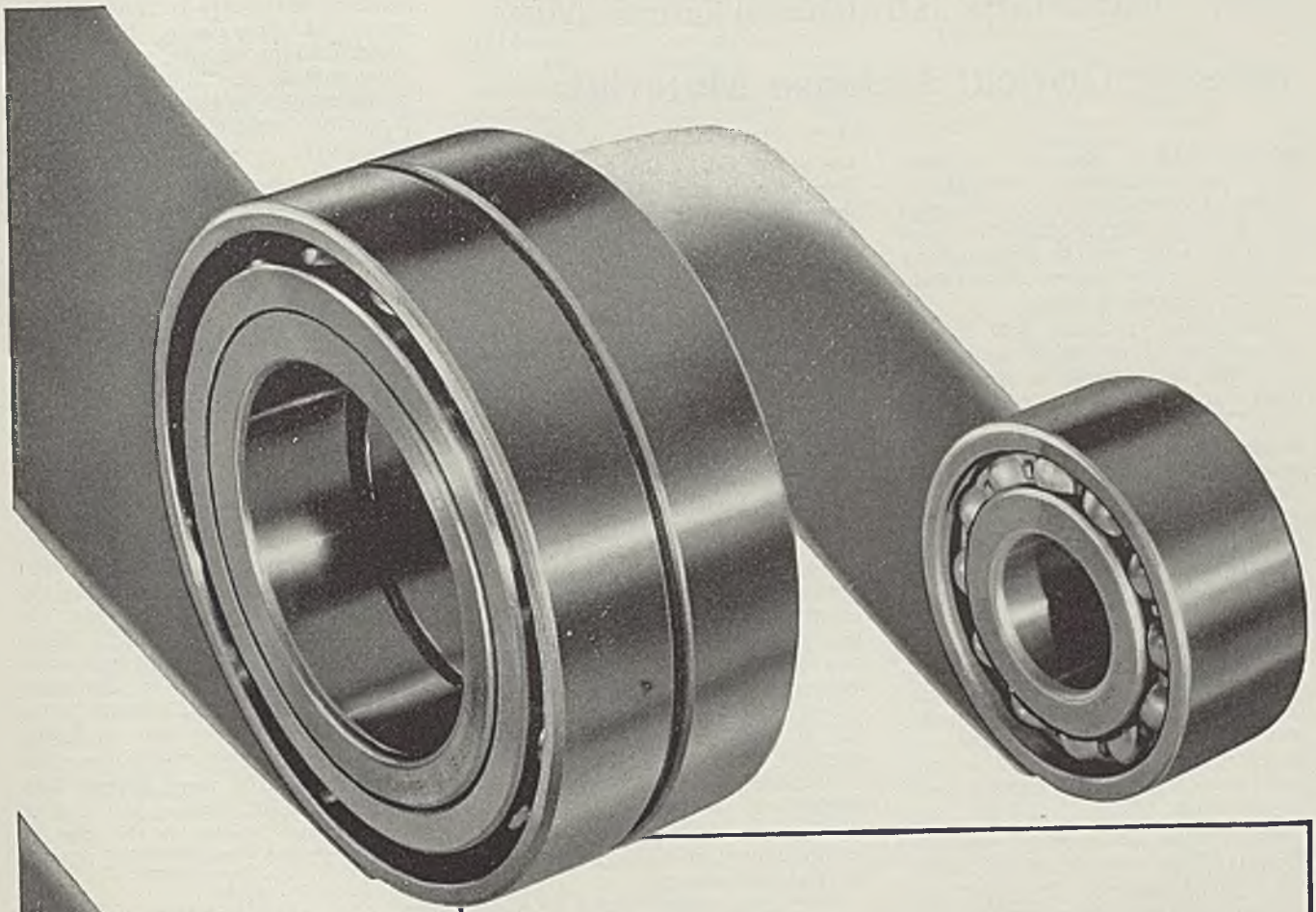
Better than one-third of the 6400 hourly wage employes at Cadillac are now engaged on national defense work. Crankshafts, camshafts and connecting rods for the Allison engine, as well as connecting rods and wristpins for a marine engine, are being supplied by the defense section of Cadillac which now occupies 273,000 square feet of floor space in the plant.

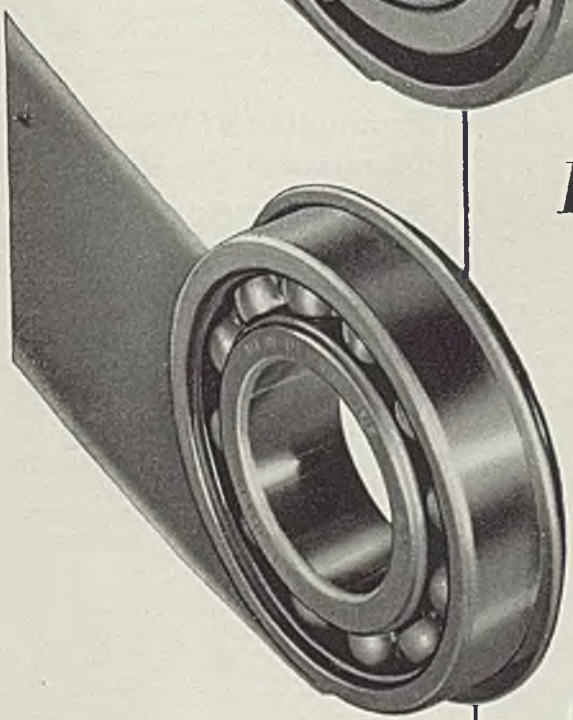
Studebaker has announced a new Skyway series of bodies in two types, available on either 6- or 8-cylinder chassis. Design was supervised by Raymond Loewy, industrial designer, who has had a hand in Studebaker styling for several years.

■ Battelle Memorial Institute, Columbus, O., is spending $35,000 for additional laboratory facilities. The expansion is the result of increased research for industry, occasioned partly by the defense program but mainly by new products research.




■ Front end styling of the new Packard Clipper. Grille and air scoops are zinc die castings, for the present, with parking lamps recessed below the headlights. For description of the Clipper see STEEL, April 7, p. 36





*Bearing the Burden*

**of**

**Production under Pressure**

**— with the Endurance**

**of Forged Steel**

# NEW DEPARTURE

## THE FORGED STEEL BEARING

New Departure - - Division of General Motors - - Bristol, Connecticut

# How Porcelain Enameled Steel May Release Critical Defense Materials

■ PORCELAIN Enamel Institute, Washington, operating through its technical committees, has surveyed the field of defense materials and reports many can be released by intelligent substitution of porcelain enamel on iron or steel.

The home appliance field is considered to be the most important and "the refrigerator is the immediate problem." Ice trays have been made of porcelain enamel. Even a year ago this would have been considered impossible but today, due to technological advance of the industry, it is being done.

Other aluminum parts such as cooling unit fronts and doors and vegetable pan fronts "are rapidly being replaced with enamel-on-steel." The butter storage unit, a new feature in many refrigerators, has quickly been redesigned to use porcelain enamel, and meat storage pans and deep trays, some of which have been made of aluminum, have been easily changed back to porcelain.

The release of stainless steel is important on account of its nickel and chrome content. The most important saving of these critical materials is being made in cooling units. Porcelain enamel was for years standard material in this field but was supplemented by stainless steel in an attempt to reduce service losses due to chipping.

"Manufacturers who have returned to porcelain enamel are being surprised by the great improvement which has been made in this material in the past five years," the institute states. "This improvement points to the continued use of porcelain enamel on cooling units and evaporators.

"Some food compartment shelves have been made of alloy steels. These shelves can readily be replaced with properly fabricated porcelain enameled stampings. Such shelves have been used for years in commercial refrigerators and can easily be adapted to domestic cabinets.

"In the field of chromium and alloy trim on all appliances porcelain enamels have already made rapid strides. Stoves can be made to yield important savings in this field. On gas stoves a very important saving can be made by using porcelain enameled cast iron for burners to replace aluminum castings.

"Washing machine agitators, formerly of aluminum, must be changed to another material. Porcelain enamel on cast iron is logical for this replacement.

"For hot water tanks a 'glass lining' gives a satisfactory finish.

"Probably the most spectacular replacement will be in pots and pans. Some American manufacturers have turned to porcelain enamel to replace aluminum in this use."

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■ A booklet, *Export Control Regulations*, has been issued by the administrator of export control, Department of Commerce, listing the classifications of iron, steel, nonferrous metals, machinery and other items subject to export control and including general information on procedure.

## February Tin Output Shows Small Increase

■ World production of tin in February is estimated at 17,800 gross tons, compared with 17,400 tons in January, according to the Tin Research Institute, Greenford, England. Production for two months totaled 35,200 tons, against 30,800 tons in the first two months, 1940.

United States deliveries totaled 12,195 tons in February, against 12,760 tons in January. For two months this year deliveries were 24,955 tons, and 16,380 tons in the corresponding period last year. Tin consumption in the United Kingdom in January was 2672 tons, compared with 2198 tons in December and with 2620 tons in January, 1940.

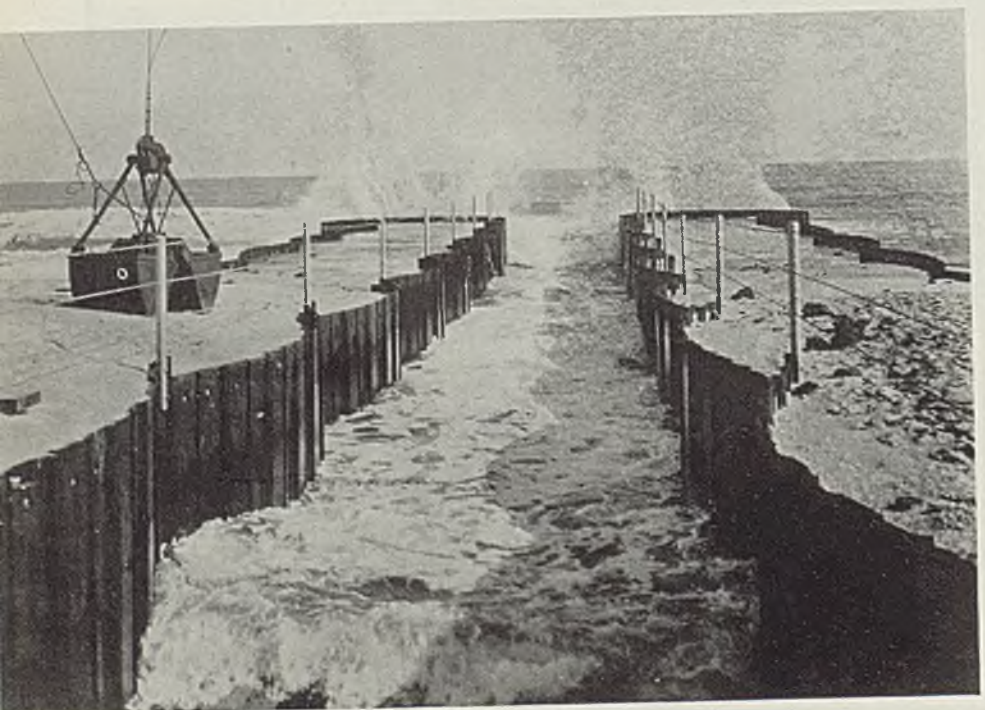
World stocks of tin, including smelters' stocks and carryover, decreased by 2103 tons during February, to 57,703 tons at the end of the month. Stocks at the end of February, 1940, were 47,525 tons.

## Production of Domestic Manganese Ore Higher

■ Domestic production of manganese ore containing 35 per cent or more manganese (natural) during February amounted to 2500 long tons, shipments were 2400 tons, and producers' stocks at the end of the month were 2300 tons, according to the Bureau of Mines. These figures are based on reports received from producers that accounted for 90 per cent of the total in 1939. In January, production was 2100 tons; shipments, 2200 tons; producers' stocks at the end of the month, 2200 tons.

◆

## Magnesium from Sea



■ Typical intake constructed at Dow Chemical Co.'s Freeport, Tex., magnesium plant. Water from the Gulf of Mexico, from which the magnesium is extracted, is drawn through this canal, formed by steel piling, into the settling basins. Dow recently was authorized by the government to double capacity at Freeport to produce this defense metal

# February Finished Steel Output 4,864,936 Tons

■ Finished steel produced for sale in February totaled 4,864,936 net tons, only 298,976 tons less than in January, despite the shorter month, according to the American Iron and Steel Institute. Exports in February were 560,035 tons, 11.5 per cent of production, compared with 558,198 tons, or 10.8 per cent, in January.

Shipments to other members of the industry for conversion into further finished products totaled 277,863 tons, against 300,543 tons in January. This left a total of 4,587,073 tons for sale to consumers outside the steelmaking industry, which is 103.9 per cent of capacity. For two months the total is 9,449,503 tons, or 101.6 per cent of capacity.

Sheets represented the most active products, output 1,093,293 tons being 107.3 per cent of capacity. In the classification "all other" products the percentage was 135.7 per cent. Other high rates were shown in cold-rolled strip, 86.6; cold-reduced tin plate, 81; drawn wire, 91.4; mechanical tubing, 92.1; bars, 87.4; plates, 88.1, and structural shapes, 81.1 per cent.

Following is a summary of reports by months, in net tons:

| 1940 | Output | Exported | Pct. Exported |
|---|---|---|---|
| April.... | 3,005,218 | 371,532 | 12.37 |
| May..... | 3,576,860 | 476,761 | 13.33 |
| June .... | 3,802,485 | 601,668 | 15.8 |
| July .... | 4,173,839 | 835,385 | 20.0 |
| Aug. .... | 4,649,065 | 1,053,110 | 22.6 |
| Sept. .... | 4,446,555 | 951,555 | 21.4 |
| Oct. ..... | 4,937,388 | 783,652 | 15.87 |
| Nov. .... | 4,760,948 | 562,587 | 11.82 |
| Dec..... | 4,909,448 | 713,802 | 14.5 |
| Year .... | 48,584,860 | 7,683,858 | 15.8 |
| 1941 | | | |
| Jan. ..... | 5,163,912 | 558,198 | 10.8 |
| Feb. ..... | 4,864,936 | 560,035 | 11.5 |

**AMERICAN IRON AND STEEL INSTITUTE**

**Capacity and Production for Sale of Iron and Steel Products**

February - 1941

| | | Number of companies | Items | * Annual Capacity Net tons | Production for Sale—Net Tons: Current Month: Total | Current Month: Per cent of capacity | Current Month: Shipments: Export | Current Month: Shipments: To members of the industry for conversion into further finished products | Year to Date: Total | Year to Date: Per Cent of capacity | Year to Date: Shipments: Export | Year to Date: Shipments: To members of the industry for conversion into further finished products |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Steel Products | Ingots, blooms, billets, slabs, sheet bars, etc. | 31 | 1 | xxxxxxx | 544,933 | xxx | 213,088 | 121,159 | 1,121,429 | xxx | 434,041 | 248,574 |
| | Heavy structural shapes | 8 | 2 | 5,175,800 | 321,950 | 81.1 | 19,211 | xxxxxxx | 691,131 | 82.6 | 44,966 | xxxxxxx |
| | Steel piling | 4 | 3 | 360,000 | 18,125 | 65.6 | 1,648 | xxxxxxx | 40,178 | 69.0 | 2,345 | xxxxxxx |
| | Plates—Sheared and Universal | 19 | 4 | 6,179,470 | 417,637 | 88.1 | 39,977 | 2,023 | 859,718 | 86.0 | 84,600 | 4,475 |
| | Skelp | 7 | 5 | xxxxxxx | 73,517 | xxx | 10,369 | 32,950 | 152,516 | xxx | 18,246 | 71,592 |
| | Rails—Standard (over 60 lbs.) | 4 | 6 | 3,613,600 | 137,380 | 49.6 | 4,940 | xxxxxxx | 273,330 | 46.8 | 17,494 | xxxxxxx |
| | Light (60 lbs. and under) | 6 | 7 | 302,800 | 15,310 | 65.9 | 6,347 | xxxxxxx | 32,943 | 67.3 | 13,073 | xxxxxxx |
| | All other (Incl. girder, guard, etc.) | 2 | 8 | 102,000 | 1,222 | 15.6 | 767 | xxxxxxx | 3,679 | 22.3 | 925 | xxxxxxx |
| | Splice bar and tie plates | 15 | 9 | 1,300,200 | 61,593 | 61.7 | 672 | xxxxxxx | 111,376 | 53.0 | 3,622 | xxxxxxx |
| | Bars—Merchant | 34 | 10 | xxxxxxx | 503,565 | xxx | 66,877 | 48,268 | 1,074,730 | xxx | 130,986 | 106,848 |
| | Concrete reinforcing—New billet | 15 | 11 | xxxxxxx | 103,747 | xxx | 18,797 | xxxxxxx | 212,352 | xxx | 38,579 | xxxxxxx |
| | Rerolling | 17 | 12 | xxxxxxx | 9,394 | xxx | 682 | xxxxxxx | 18,454 | xxx | 1,356 | xxxxxxx |
| | Cold finished—Carbon | 19 | 13 | xxxxxxx | 91,395 | xxx | 2,070 | xxxxxxx | 184,776 | xxx | 3,915 | xxxxxxx |
| | Alloy—Hot rolled | 15 | 14 | xxxxxxx | 121,503 | xxx | 12,158 | 12,641 | 249,525 | xxx | 28,149 | 24,422 |
| | Cold finished | 15 | 15 | xxxxxxx | 13,354 | xxx | 1,916 | xxxxxxx | 25,886 | xxx | 3,412 | xxxxxxx |
| | Hoops and baling bands | 4 | 16 | xxxxxxx | 7,085 | xxx | 215 | xxxxxxx | 14,125 | xxx | 348 | xxxxxxx |
| | TOTAL BARS | 52 | 17 | 12,678,085 | 850,043 | 87.4 | 102,715 | 60,909 | 1,779,848 | 86.8 | 206,745 | 131,270 |
| | Tool steel bars (rolled and forged) | 15 | 18 | 127,870 | 8,563 | 87.3 | 842 | xxxxxxx | 16,655 | 80.6 | 1,731 | xxxxxxx |
| | Pipe and tube—B. W. | 13 | 19 | 2,047,200 | 115,604 | 73.6 | 11,139 | xxxxxxx | 248,991 | 75.2 | 15,322 | xxxxxxx |
| | L. W. | 9 | 20 | 1,030,260 | 35,092 | 42.3 | 1,131 | xxxxxxx | 75,542 | 43.3 | 2,553 | xxxxxxx |
| | Electric weld | 5 | 21 | 692,520 | 29,845 | 56.2 | 711 | xxxxxxx | 54,442 | 48.6 | 1,023 | xxxxxxx |
| | Seamless | 15 | 22 | 3,119,190 | 155,115 | 64.8 | 23,906 | xxxxxxx | 314,518 | 62.4 | 31,746 | xxxxxxx |
| | Conduit | 6 | 23 | 152,145 | 10,058 | 86.2 | 138 | xxxxxxx | 21,298 | 86.6 | 189 | xxxxxxx |
| | Mechanical Tubing | 13 | 24 | 538,975 | 38,087 | 92.1 | 5,619 | xxxxxxx | 77,588 | 89.0 | 9,508 | xxxxxxx |
| | Wire rods | 18 | 25 | xxxxxxx | 119,620 | xxx | 12,867 | 19,404 | 249,903 | xxx | 29,574 | 42,526 |
| | Wire—Drawn | 36 | 26 | 2,299,340 | 161,245 | 91.4 | 12,510 | 1,908 | 340,194 | 91.5 | 24,917 | 3,856 |
| | Nails and staples | 19 | 27 | 1,137,090 | 65,836 | 75.5 | 5,580 | xxxxxxx | 135,909 | 73.9 | 9,366 | xxxxxxx |
| | Barbed and twisted | 16 | 28 | 448,770 | 22,449 | 65.2 | 5,904 | xxxxxxx | 45,852 | 63.2 | 9,836 | xxxxxxx |
| | Woven wire fence | 15 | 29 | 786,790 | 25,758 | 42.7 | 176 | xxxxxxx | 52,335 | 41.1 | 695 | xxxxxxx |
| | Bale ties | 11 | 30 | 124,450 | 4,542 | 47.6 | 6 | xxxxxxx | 8,722 | 43.4 | 36 | xxxxxxx |
| | All other wire products | 5 | 31 | 27,030 | 406 | 19.6 | - | xxxxxxx | 394 | 20.5 | - | xxxxxxx |
| | Fence posts | 14 | 32 | 147,645 | 5,649 | 49.9 | 120 | xxxxxxx | 11,957 | 50.1 | 215 | xxxxxxx |
| | Black plate | 11 | 33 | 560,455 | 29,449 | 68.5 | 974 | 7 | 55,264 | 61.0 | 1,870 | 8 |
| | Tin plate—Hot rolled | 7 | 34 | 866,120 | 18,948 | 28.5 | 5,140 | xxxxxxx | 39,677 | 28.3 | 5,534 | xxxxxxx |
| | Cold reduced | 10 | 35 | 2,995,300 | 186,082 | 81.0 | 12,187 | xxxxxxx | 374,520 | 77.3 | 28,580 | xxxxxxx |
| | Sheets—Hot rolled | 23 | 36 | xxxxxxx | 607,016 | xxx | 29,976 | 19,523 | 1,243,494 | xxx | 60,662 | 34,377 |
| | Galvanized | 14 | 37 | xxxxxxx | 145,815 | xxx | 13,260 | xxxxxxx | 299,303 | xxx | 23,186 | xxxxxxx |
| | Cold rolled | 15 | 38 | xxxxxxx | 274,676 | xxx | 5,156 | xxxxxxx | 547,455 | xxx | 12,056 | xxxxxxx |
| | All other | 13 | 39 | xxxxxxx | 65,786 | xxx | 2,181 | xxxxxxx | 133,667 | xxx | 3,957 | xxxxxxx |
| | TOTAL SHEETS | 26 | 40 | 13,280,970 | 1,093,293 | 107.3 | 50,573 | 19,523 | 2,223,919 | 103.6 | 99,861 | 34,377 |
| | Strip—Hot rolled | 23 | 41 | 3,522,980 | 158,852 | 58.8 | 8,549 | 19,980 | 332,408 | 58.4 | 15,372 | 42,173 |
| | Cold rolled | 34 | 42 | 1,371,560 | 91,121 | 86.6 | 1,761 | xxxxxxx | 185,784 | 83.8 | 2,812 | xxxxxxx |
| | Wheels (car, rolled steel) | 5 | 43 | 422,825 | 20,526 | 63.3 | 11 | xxxxxxx | 40,338 | 59.0 | 145 | xxxxxxx |
| | Axles | 4 | 44 | 472,280 | 12,618 | 34.8 | 2 | xxxxxxx | 27,335 | 35.8 | 10 | xxxxxxx |
| | Track spikes | 11 | 45 | 327,275 | 13,521 | 53.8 | 166 | xxxxxxx | 26,156 | 49.4 | 480 | xxxxxxx |
| | All other | 3 | 46 | 9,100 | 947 | 135.7 | 289 | xxxxxxx | 1,998 | 135.8 | 301 | xxxxxxx |
| | TOTAL STEEL PRODUCTS | 131 | 47 | xxxxxxx | 4,864,936 | xxx | 560,035 | 277,863 | 10,028,354 | xxx | 1,118,233 | 578,051 |
| | Pig iron, ferro manganese and spiegel | 24 | 48 | xxxxxxx | 602,988 | xxx | 44,296 | 180,312 | 1,266,636 | xxx | 90,623 | 391,080 |
| | Ingot moulds | 4 | 49 | xxxxxxx | 57,388 | xxx | 57 | xxxxxxx | 116,095 | xxx | 85 | xxxxxxx |
| Iron Products | Bars | 9 | 50 | 109,195 | 4,781 | 57.1 | - | 339 | 9,101 | 51.5 | 1 | 588 |
| | Pipe and tubes | 3 | 51 | 109,300 | 4,981 | 59.4 | 14 | xxxxxxx | 10,006 | 56.6 | 70 | xxxxxxx |
| | All other | 2 | 52 | 71,000 | 1,343 | 24.7 | 4 | - | 3,474 | 30.3 | 607 | - |
| | TOTAL IRON PRODUCTS (ITEMS 50 to 52) | 11 | 53 | 224,995 | 11,105 | 64.3 | 18 | 339 | 22,581 | 62.1 | 678 | 588 |

* To be revised. Total number of companies included - 148

The estimated average yield of products for sale from ingots produced by the companies included above is 71.2%, which applied to their total ingot capacity equals 57,533,200 net tons of finished rolled products.

Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows: Current month 4,587,073 N.T.; 103.9%. Year to date 9,449,503 N.T.; 101.6%

# Drydock, Marine Engines, Tankers Lead in Week's Defense Contracts

■ TOTAL of defense awards last week reported by the War and Navy departments was $244,447,049, highest aggregate in recent weeks. Construction awards again were heavy. One contract for construction of shipbuilding drydocks at the Brooklyn, N. Y., navy yard, was for $31,000,000 on a cost plus fixed fee basis.

Quartermaster corps purchases were also heavy, with large contracts for uniform textiles reported. Most contracts, other than those for plant expansion or construction of new defense facilities, were small.

Navy department awarded to Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash., a contract for construction of five gasoline tankers on a cost plus fixed fee basis. Estimated cost per vessel, exclusive of the $120,000 fee payable to the contractor, was $2,000,000.

Following contracts totaling $56,440,000 were awarded by the navy department:

Cleveland Diesel Engine Division of General Motors Corp., Cleveland, propelling machinery for 18 submarine chasers at $425,000 per set, $7,650,000; 158 sets of diesel engine-driven generators for minesweepers at $78,000 per unit, $12,324,000; propelling machinery for 70 motor minesweepers at $126,300 per set, $8,841,000; and propelling machinery for 20 minesweepers at $605,000 per set, $12,100,000;

United Aircraft Corp.'s Pratt & Whitney Division, East Hartford, Conn., acquisition and installation of additional machinery and equipment at the corporation's East Hartford plant, $9,606,920. Supplement to an emergency facilities contract between the Navy and United Aircraft Corp. totaling $3,522,080 for additional improvements and buildings to the East Hartford plant was also reported;

Lukenweld Inc., Coatesville, Pa., was reported by the Navy to have entered into an agreement with the Defense Plant Corp. for additional plant facilities to cost $2,400,000.

Additional work to existing cost plus fixed fee contracts reported last week by the Navy totaled $4,585,550. Supplementary contracts were largely for housing, aviation and naval station facilities.

War department announced the following Defense Plant Corp. agreements:

Tennessee Production Corp., Chattanooga, Tenn., $1,816,800 for acquisition of additional plant facilities for coke manufacture;

Wright Aeronautical Corp., East Paterson, N. J., $1,925,000 for additional plant and equipment at East Paterson. Building cost is to be $275,000, machinery and equipment $1,650,000.

Hardaway Contracting Co., Columbus, Ga., was awarded a $2,884,000 contract by the War department for construction of an air corps flying school at Albany, Ga.

War department last week reported the following:

**Ordnance Department Awards**

Allen, H. F., Co. Inc., New York, electric drills, lathes, $5580.

Allis-Chalmers Mfg. Co., Milwaukee, pintle assemblies, $1140.

Aluminum Co. of America, Pittsburgh, sheet aluminum alloy, aluminum strip, $2880.77.

American Brass Co., Waterbury, Conn., rotating bands, $3843.23.

American Car & Foundry Co., New York, tank parts, $3377.09.

American Machinery Works, Omaha, Nebr., gages for signals, $1153.60.

American Smelting & Refining Co., Federated Metals Division, Whiting, Ind., lead, $3900.

Ampco Twist Drill Co., Jackson, Mich., drills, $1010.40.

Atlas-Boxmakers Inc., Chicago, belt links, $5570.37.

Automotive Maintenance Machinery Co., North Chicago, Ill., tools, $8274.

Barber-Colman Co., Machine & Small Tool Division, Rockford, Ill., cutting tools, $5007.75.

Barbour Stockwell Co., Cambridge, Mass., castings, $1398.84.

Bendix Aviation Corp., South Bend, Ind., parts for light tanks, transmitters, $9529.52.

Bethlehem Steel Co., Bethlehem, Pa., forgings, $19,430.

Black & Decker Mfg. Co., Towson, Md., grinders and valve seats, $3486.50.

Brown-Brockmeyer Co. Inc., Dayton, O., grinders, $1221.50.

Brown & Sharpe Mfg. Co., Providence, R. I., gages, cutters, tools, $4139.36.

Buffalo Wire Works Co., Buffalo, separators, $2350.

Carpenter Steel Co., Reading, Pa., steel, $1535.

Casanave Supply Co., Philadelphia, end mills, $1739.50.

Chase Brass & Copper Co., Waterbury, Conn., rotating bands, $3952.57.

Cleveland Cutter & Reamer Co., Cleveland, reamers, counterbores, $3225.40.

Cleveland Twist Drill Co., Cleveland, reamers, $3928.98.

Cogbill, Joseph A., Inc., Millersburg, Pa., cutters, $3417.12.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., small arms materiel, $81,586.34.

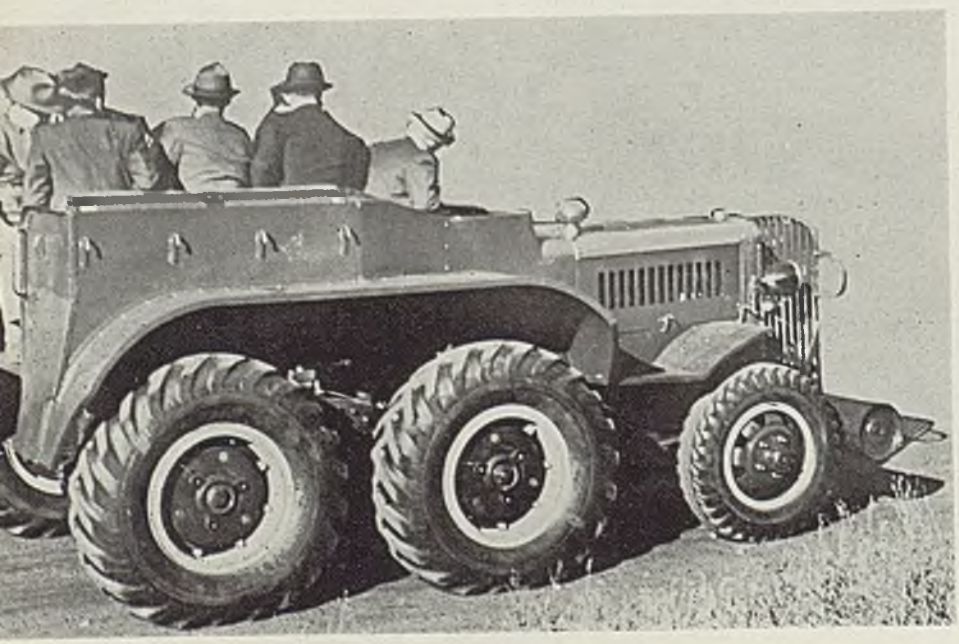
Commerce Pattern Foundry & Machine Co., Detroit, artillery materiel, $3845.60.

County Supply Co., Plainfield, N. J., cutters, drills and shapers, $24,433.84.

Cowles, C., & Co., New Haven, Conn., reflectors, $1560.

Crucible Steel Co. of America, New York, steel, drill rods, $5399.75.

Dana Tool-D Nast Machinery Co., Phila-

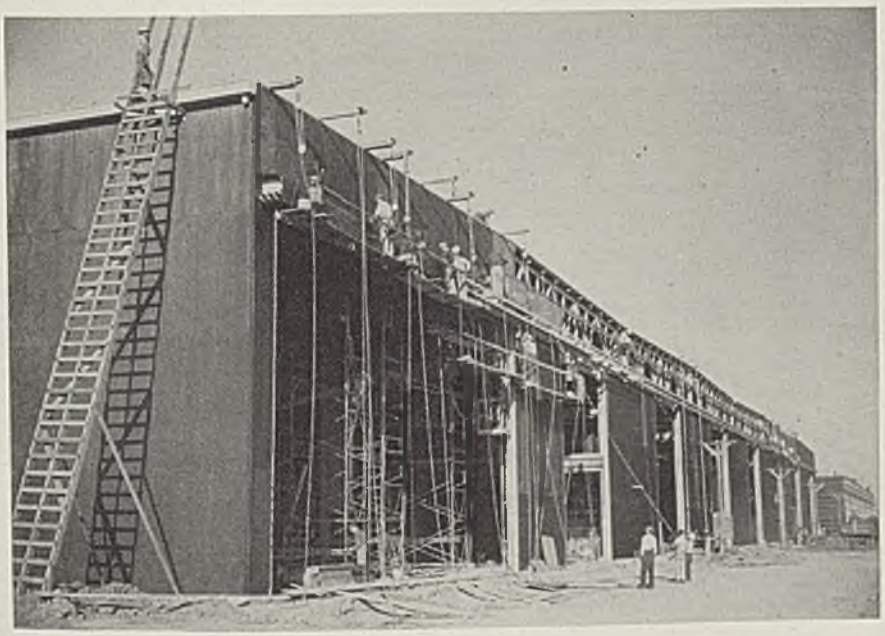


## "Jeeper-Creeper" To Haul Army's Guns

■ "Jeeper-Creeper" — nickname for a new prime mover for the United States Army's mechanized forces — recently was introduced by Minneapolis-Moline Power Implement Co., Minneapolis. It is capable of hauling a 15-ton, 155-millimeter gun, and has seating space for a fully equipped gun crew of nine men. Because of its four large drive wheels, the machine can exert an 11,000-pound pull. A winch at the rear has pulling power of 15,000 pounds, can be used to drag the "jeeper" out of mud holes by means of a cable attached to a tree. One of the machines has been sent to the Army's proving grounds at Aberdeen, Md.

delphia, wrenches, expanding mandrels, $12,093.57.
Delta Mfg. Co., Milwaukee, drill presses, $3312.
Detroit Broach Co. Inc., Detroit, fixtures, $1996.
Detroit Tap & Tool Co., Detroit, thread gages, $2456.22.
Diecasters Inc., Ridgefield, N. J., ogives for fuses, $32,572.50.
Duffield File & Tool Co., New York, files, $5176.61.
Edwards, J. R., Machinery Co., Newark, N. J., bench lathes, $96,640.50.
Electric Arc Cutting & Welding Co., Newark, N. J., welding generators, $35,330.
Ever-Tite Mfg. Co., Davenport, Iowa, shell adapters, $58,710.28.
Exact Weight Scale Co., Columbus, O., zoning scales, $2805.84.
Ex-Cell-O Corp., Continental Tool Works Division, Detroit, cutting tools, mills, $9077.50.
Fairmont Aluminum Co., Fairmont, W. Va., aluminum sheets, $3439.80.
Felt & Tarrant Mfg. Co., Chicago, comptometers, $1185.
Firth-Sterling Steel Co., Philadelphia, bottom dies for bullet jacket, steel, $3524.22.
Florence Pipe Foundry & Machine Co., Philadelphia, pipe, $1084.50.
Garden City Plating & Mfg. Co., Chicago, fuse covers, $4894.64.
General Electric Co., Schenectady, N. Y., capacitor equipment, generator sets, $7989.86.
General Motors Corp., Delco-Remy Division, Anderson, Ind., solenoid, $1773.25.
Gibbs, Thomas B., & Co., Delavan, Wis., frequency standards, $2550.
Gilbert & Barker Mfg. Co., West Springfield, Mass., water chests, $151,240.42.
Gillette Safety Razor Co., Boston, testing machines, $1800.
Goddard & Goddard Co. Inc., Detroit, cutters, $2408.42.
Hanniffin Mfg. Co., Chicago, portable riveters, $1250.
Hanssen's, Louis, Sons, Davenport, Iowa, jacks, $7094.72.
Harding Machine Screw Co., East Liberty, O., primer parts, $107,020.
Hart, Earl, Woodworking Machine Co., Chicago, rip saws, $2172.
Heald Machine Co., Worcester, Mass., surface grinders, $4685.
Homelite Corp., Port Chester, N. Y., portable generators, $5450.
Hunter Pressed Steel Co., Lansdale, Pa., springs, $2370.07.
Independent Pneumatic Tool Co., Chicago, hoists, hose couplings, $7983.
Ingersoll-Rand Co., Newark, N. J., tools, $1635.30.
International Harvester Co., Chicago, tractors, tractor trucks, $20,677.22.
Jahn, B., Mfg. Co., New Britain, Conn., dies, $3929.
Jones & Laughlin Steel Corp., Pittsburgh, strip steel, $1845.91.
Kemp Machinery Co., Baltimore, bench shapers, $3630.
Latrobe Electric Steel Co., New York, tool steel, $1009.75.
Lindberg Engineering Co., Chicago, carrier arms, furnaces, $16,280.
Lodge & Shipley Machine Tool Co., Cincinnati, lathes, $11,157.
Machinery Builders Inc., Long Island City, N. Y., assembling machines, $14,598.36.
Mack Mfg. Corp., Long Island City, N. Y., transmissions, $20,000.
Magnus Tool & Die Co., Newark, N. J., tools, $10,525.
Majestic Tool & Mfg. Co., Detroit, motor driven spindles, $2088.
Manning, Maxwell & Moore Inc., Bridgeport, Conn., pliers and sharpening stones, $2946.94.
McCrosky Tool Corp., Meadville, Pa., boring bars, $1074.26.
McKiernan-Terry Corp., Dover, N. J., staking machines, $22,390.20.
Metal, H. K., Craft Mfg. Corp., New York, steel supports, $1902.37.
Metalwash Machinery Co., Newark, N. J., trays, $1175.40.
Midvale Co., Nicetown, Pa., forgings, $22,456.07.
Milwaukee Electric Tool Corp., Milwaukee, electric drills, $4237.75.
Modern-Bond Corp., Wilmington, Del., tools, $4099.
Modern Tool & Die Co., Philadelphia, gages, $49,560.
Moore Special Tool Co., Bridgeport, Conn., shaving fixtures, $1150.
Morse Twist Drill & Machine Co., New Bedford, Mass., reamers, cutting tools, $18,465.52.
Mutual Wheel Co., Moline, Ill., cables and conduit, $1008.
National Acme Co., Cleveland, wave springs, $1037.82.
National Machine Tool Co., Racine, Wis., shears, $2925.
Niagara Machine & Tool Works, Buffalo, shears, $5067.
Nicholson File Co., Providence, R. I., files, $9885.39.
Niles-Bement-Pond Co., Pratt & Whitney Division, Philadelphia, taps, $1590.70.
Norton Co., Worcester, Mass., grinding wheels, $2532.
Oilgear Co., Milwaukee, hydraulic presses, $16,004.
Parent Metal Co., Philadelphia, cabinets and benches, $3669.85.
Philadelphia Piping & Equipment Co., Philadelphia, humidifying systems, $8740.
Potter & Johnston Machine Co., Pawtucket, R. I., milling machines, $2503.
Putnam Tool Co., Detroit, steel cutters, and counterbores, cutting tools, $20,391.10.
Quality Hardware & Machine Corp., Chicago, humidifying systems, $2886.50.
Rathborne Hair & Ridgway Co., Chicago, wire boxes, $4855.12.
Reliable Tool Co., Irvington, N. J., tools, dies, $15,918.50.
Republic Steel Corp., Cleveland, barrel blanks, $13,600.
Revere Copper & Brass Co., Baltimore, rework brass, $3308.15.
Roebling's, John A., Sons, Chicago, cable, $8180.40.
Roessler Machine Co., Elkins Park, Pa., tools, $11,240.
Rudolph & West Co., Washington, wrenches, $17,371.46.
Rustless Iron & Steel Corp., Baltimore, steel, $2898.34.
Ryerson, Joseph T., & Son Inc., Chicago, steel, $1343.15.
Scovill Mfg. Co., Waterbury, Conn., artillery materiel, $2,100,000.
Sheffield Gage Corp., Dayton, O., inspection gages, $11,243.
Sipp-Eastwood Corp., Paterson, N. J., fixtures, $1275.
Standard Gage Co. Inc., Poughkeepsie, N. Y., gages, $1884.20.
Standard Pressed Steel Co., Jenkintown, Pa., safety nuts, $2677.72.
Starrett, L. S., Co., Athol, Mass., tools, gages, $6978.22.
Stewart-Warner Corp., Chicago, nozzles, adapters, $3417.04.
Swind Machinery Co., Philadelphia, saws, $1435.
Thurston Mfg. Co., Providence, R. I., mills and cutters, $5177.50.
Timken-Detroit Axle Co., Detroit, brackets and brake mechanisms, hardware, final drive hubs, $43,761.44.
Titeflex Metal Hose Co., Newark, N. J., tubes and tubing, hose couplings, $3730.20.
Tubular Service Corp., Pittsburgh, steel tubing, $3640.42.
Union Hardware Co., Torrington, Conn., cleaning rods, $6084.
Union Spring & Mfg. Co., New Kensington, Pa., springs, $2740.
Union Twist Drill Co., Athol, Mass., drills,

## Douglas "Blackout" Plant Built in Record Time



■ Records for speed and efficiency are being established in the construction of Douglas Aircraft Co.'s large new "blackout" plant at Long Beach, Calif., one of the 12 buildings of which is shown above. Plant will be colored to blend with the landscape, will be windowless, fireproof and air-conditioned, and will have subterranean vaults to safeguard essential materials and power plants. Covering a tract of 200 acres, the plant will provide 1,400,000 square feet of working area. Some units will swing into action far ahead of estimates. Eventually it will employ 16,000 workers, and will operate 24 hours a day producing attack bombers and military transports.

cutting tools, $8835.04.
United States Motors Corp., Oshkosh, Wis., generators, $3561.
Ward's, Edgar T., Sons Co., Chicago, steel, $1065.81.
Warner Electric Brake Mfg. Co., Beloit, Wis., safety switches, $1375.56.
Watson-Stillman Co., Roselle, N. J., hydraulic presses, $13,650.
Westinghouse Electric & Mfg. Co., Springfield, Mass., furnaces, $11,684.
Woodhead, Daniel, Co., New York, plugs, $5802.93.
Wright Aeronautical Corp., Paterson, N. J., hardware, $58,758.75.
Youngstown Sheet & Tube Co., Chicago, seamless steel tubing, $69,123.97.

**Corps of Engineers Awards**

American Foundry & Furnace Co., Bloomington, Ill., heating units, $18,468.
American Steel & Wire Co., Cyclone Fence Division, Cleveland, fence and gates, $6154.
Atletwed, F. C., Co., Detroit, construction of sewage treatment plant, Selfridge field, Michigan, $98,950.
Baldwin County Butane Gas Co., Fairhope, Ala., installing butane gas equipment for mess hall, Eglin field, Valparaiso, Fla. $2650.
Blakeslee, G. S., & Co., Chicago, kitchen equipment, $6864.81.
Bristol Contracting Co. Inc., Bristol, N. H., construction of electrical distribution and street lighting systems for the air corps cantonment, Manchester airport, Manchester, N. H., $23,791.72.
Casper Ranger Construction Co., Holyoke, Mass., construction of a 10-ton incinerator, Westover field, Chicopee Falls, Mass., $23,131.
Caterpillar Tractor Co., Peoria, Ill., furnishing tractors, $11,208.32.
Clow, James B., & Sons, Chicago, iron pipe, $3760.38.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., kitchen equipment, $6505.
Dixie Culvert & Metal Co., Atlanta, Ga., metal pipe, $20,700.
Dohrmann Hotel Supply Co., Los Angeles, kitchen equipment, $4955.12.
Dole Co., Bangor, Me., construction of electrical distribution and street lighting systems for the air corps cantonment, Bangor airport, Bangor, Me., $24,975.
Drake, Wyman & Voss Inc., Portland, Oreg., construction of a concrete warehouse, garage and shop building, Bonneville, Oreg., $112,000.
Economy Heating Co., Portland, Oreg., heating units, $13,008.55.
Fuller, George A., Co., Los Angeles, construction of temporary buildings, Fresno air base, Fresno, Calif., $872,855.
Grand View Nurseries, Mt. Vernon, N. Y., construction of addition to Allentown, Pa., airport, $116,935.50.
Idaho Hardware & Plumbing Co., Boise, Idaho, galvanized iron sheets, $2716.45.
Kvale, T. A., Los Angeles, construction of Western Pacific Railroad spur., Wendover Bombing Range, Wendover, Utah, $9495.
Lowman & Hanford Co., Seattle, office equipment, $2233.90.
Maryland Dry Dock Co., Baltimore, repairing dredge, $48,245.
Northwest Stove Works Inc., Portland, Oreg., heating units, $11,858.50.
Omaha Steel Works, Omaha, Neb., furnishing fabricated structural steel for Ft. Crook Aircraft Mfg. & Assembly Plant, Omaha, Nebr., $536,610.
Petley, W. W., Los Angeles, construction of temporary buildings, Taft field, California, $652,845.
Radio Laboratories Inc., Seattle, communication equipment, $11,135.
Rauch, I., New York, smoke jacks and range hoods, $2035.75.
Ritter Bros., Harrisburg, Pa., construction of temporary hospital unit, Middletown air depot, Middletown, Pa., $54,879.
Standard Gas Equipment Corp., New

(*Please turn to Page* 45)

# PURCHASES UNDER

**(Week Ended March 29)**

| | Commodity | Amount |
|---|---|---|
| **Iron and Steel Products** | | |
| American-LaFrance-Foamite Corp., Elmira, N. Y. | Oxygen cylinders | $157,730.76 |
| American Rolling Mill Co., Middletown, O. | Steel pipe | 315,786.90 |
| American Steel & Wire Co., Boston | Steel | 34,675.26 |
| Anthracite Bridge Co., Scranton, Pa. | Steel for conveyor bridges | *28,791.00 |
| Atlas-Ansonia Co., New Haven, Conn. | Fuse parts | 59,400.00 |
| Baldt Anchor, Chain & Forge Co., Chester, Pa. | Anchor chain, links | 401,216.55 |
| Bethlehem Steel Co., Bethlehem, Pa. | Projectiles, breech ring forgings, manganese-molybdenum steel | 60,201.00 |
| Bridgeport Brass Co., Bridgeport, Conn. | Cartridge cases | 49,500.00 |
| Carroll Chain Co., Columbus, O. | Chains | 40,690.60 |
| Chase Brass & Copper Co. Inc., Waterbury, Conn. | Soap boxes | 29,500.00 |
| Cleveland Pneumatic Tool Co., Cleveland | Air hose fittings | 14,780.86 |
| Columbia Steel Co., San Francisco | Reinforcement bars | 28,000.00 |
| Connery Construction Co., Philadelphia | Stack, breechings, ducts | 23,150.00 |
| Crane Co., Philadelphia | Steel valves | 53,800.00 |
| Crucible Steel Co. of America, New York | Bar, strip steel | 37,058.00 |
| Dayton Mfg. Co., Dayton, O. | Illuminated message containers | 22,820.00 |
| Delco Products Division, General Motors Corp., Dayton, O. | Tail bomb fuses | 445,656.40 |
| Dravo Corp., Pittsburgh | Gate vessels | 3,582,000.00 |
| Fischer, Charles, Spring Co., Brooklyn, N. Y. | Casing, shafting | 17,570.00 |
| General Drop Forge Co. Inc., Buffalo | Steel forgings | 14,680.00 |
| Haarmann Steel Co., Holyoke, Mass. | Structural steel | 17,995.00 |
| International Stacey Corp., Columbus, O. | Galvanized steel | 29,560.00 |
| Judd, H. L., Co., New York | Thumb nuts | 19,500.00 |
| Kidde, Walter, & Co. Inc., New York | Oxygen cylinders | 424,653.78 |
| Morton Mfg. Co., Chicago | Ammunition chests | 260,025.35 |
| Mosler Safe Co., Hamilton, O. | Safes | 41,980.00 |
| Muskogee Iron Works, Muskogee, Okla. | Fabricated structural steel | 343,490.00 |
| Nashville Bridge Co., Nashville, Tenn. | Structural steel | *230,470.00 |
| National Lock Washer Co., Newark, N. J. | Stops, packing for fiber containers | 48,928.00 |
| National Tube Co., Washington | Steel seamless tubing | 27,097.99 |
| Norris Stamping & Mfg. Co., Los Angeles | Cartridge containers | 1,336,580.00 |
| Petroleum Equipment Co., San Francisco | Forged steel flanges | 17,378.12 |
| Pheoll Mfg. Co., Chicago | Screws | 20,740.00 |
| Pollak Mfg. Co., Arlington, N. J. | Cartridge containers | 210,140.00 |
| Republic Steel Corp., Cleveland | Steel | 102,219.26 |
| Rochester Ropes Inc., Jamaica, N. Y. | Steel cable | 38,880.00 |
| Scovill Mfg. Co., Waterbury, Conn. | Tooth brush containers, gold color metal buttons | 208,129.77 |
| Steel Improvement & Forge Co., Cleveland | Steel forgings | 40,020.00 |
| Storms Drop Forging Co., Springfield, Mass. | Forgings | 22,966.00 |
| Taylor, S. G., Chain Co., Hammond, Ind. | Chains | 11,733.15 |
| Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. | Reinforcing steel, forging shell | 5,846,557.93 |
| Tubular Service Corp., Cambridge, Mass. | Steel tubes | 11,614.72 |
| Uchtorff Co., Davenport, Iowa | Ammunition chests | 291,598.56 |
| Uff Machine Co., Upland, Pa. | Stuffing tubes | 17,112.00 |
| Vernon Co., New York | Braided cable | 72,250.00 |
| Waterbury Button Co., Waterbury, Conn. | Gold color metal buttons | 83,759.93 |
| Wright Machine Co., Worcester, Mass. | Boosters | 1,100,070.00 |
| Zallea Bros. & Johnson, Wilmington, Del. | Strainer baskets | 68,189.00 |
| **Nonferrous Metals and Alloys** | | |
| American Brass Co., Waterbury, Conn. | Copper-nickel tubing | $*35,396.35 |
| American Smelting & Refining Co., Denver | Cathode copper | 10,248.38 |
| Chase Brass & Copper Co. Inc., Waterbury, Conn. | Brass rod, copper-nickel alloy tubing, copper tubing, bullet jacket cups | 634,323.61 |
| Cohn, L. A., & Bro. Inc., Chicago | Bearing bronze pig metal | 10,470.00 |
| Crouse-Hinds Co., Syracuse, N. Y. | Lamp assemblies | 55,948.80 |
| Delta Electric Co., Marion, Ind. | Hand lanterns | 66,840.00 |
| General Electric Supply Corp., Dayton, O. | Fluorescent lamp fixtures | 24,454.10 |
| Magna Mfg. Co. Inc., Haskell, N. J. | Magnesium powder, shavings | 45,740.05 |
| Metal Reduction Corp. of New Jersey, North Bergen, N. J. | Bronze ingots | 60,700.00 |
| Multiplex Display Fixture Co., St. Louis | Displayers | 13,094.63 |
| Reed & Barton Corp., Taunton, Mass. | Tableware | 51,502.00 |
| Revere Copper & Brass Inc., Baltimore | Cartridge brass | 77,200.00 |
| Reynolds Metals Co., Louisville, Ky. | Aluminum alloy | 36,619.22 |
| Trenton Pipe Nipple Corp., Trenton, N. J. | Brass nipples | 20,036.42 |

# WALSH-HEALEY ACT

**Machinery and Other Equipment**

| Commodity | Amount |
|---|---|
| Ace Fastener Corp., Chicago — Paperfastening machines | $13,200.00 |
| Aerial Machine & Tool Corp., New York — Trigger motor units | 29,250.00 |
| American Foundry & Furnace Co., Bloomington, Ill. — Hot air heating units | 18,468.00 |
| American Tool Works Co., Cincinnati — Drills | 54,082.00 |
| Baldwin Locomotive Works, Philadelphia — Testing machines | 10,210.00 |
| Barrett Equipment Co., St. Louis — Brake drum lathes | 33,626.25 |
| Buda Co., Harvey, Ill. — Connecting rods | 16,088.00 |
| Caterpillar Tractor Co., Peoria, Ill. — Power driven graders, tractors | 100,717.12 |
| Chicago Metal Hose Corp., Maywood, Ill. — Steel fuel oil hose | 26,626.08 |
| Christiansen, C. B., Newark, N. J. — Ring storage rods | 14,940.00 |
| Clayton & Lambert Mfg. Co., Detroit — Engine gasoline heaters | 25,731.63 |
| Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. — Parts for revolver | 84,470.00 |
| Cone Automatic Machine Co. Inc., Windsor, Vt. — Screw machines | 28,196.00 |
| Cooper-Bessemer Corp., Mt. Vernon, O. — Compressors, motors | 357,690.00 |
| Detroit Aluminum & Brass Corp., Detroit — Parts for diesel engines | 20,158.50 |
| Edmos Products Corp., Brooklyn, N. Y. — Cleaning staff | 20,424.00 |
| Exact Weight Scale Co., Columbus, O. — Scales | 21,645.00 |
| Ex-Cell-O Corp., Detroit — Parts for diesel engines | 17,030.00 |
| Gardner Denver Co., Quincy, Ill. — Air compressors | 12,675.00 |
| General Steel Castings Corp., Eddystone, Pa. — Steel castings | 346,820.00 |
| Gilbert & Barker Mfg. Co., Springfield, Mass. — Water chests | 96,271.04 |
| Gisholt Machine Co., Madison, Wis. — Balancing machines | 11,350.00 |
| Gosiger, C. H., Machine Co., Dayton, O. — Drill presses | 23,800.00 |
| Graham-Paige Motors Corp., Detroit — Piece parts | 271,974.00 |
| Hevi Duty Electric Co., Milwaukee — Electric furnaces | 13,200.00 |
| Howard Foundry Co., Chicago — Protecting cap assemblies | 450,800.00 |
| Imperial Machine & Foundry Corp., Long Island, N. Y. — Vegetable peeling machines | 29,492.00 |
| International Postal Supply Co., Brooklyn, N. Y. — Cancelling machines | 13,930.00 |
| Jeffrey Mfg. Co., Columbus, O. — Conveyor system, coal crusher | 61,255.00 |
| Jones & Lamson Machine Co., Springfield, Vt. — Semiautomatic lathes | 17,758.00 |
| Koppers Co., Baltimore — Semiwater gas plant | 429,035.00 |
| Landis Tool Co., Waynesboro, Pa. — Electric grinders | 110,440.00 |
| Link-Belt Co., Chicago — Car dumpers | 44,743.00 |
| McKiernan-Terry Corp., Harrison, N. J. — Anchor windlass | 260,773.00 |
| Machinery Builders Inc., Long Island City, N. Y. — Loading presses | 26,685.92 |
| Macwhyte Co., Kenosha, Wis. — Tie rods | 38,738.25 |
| Mercer Engineering Works Inc., New York — Two-wheel trucks | 19,054.60 |
| Mercury Mfg. Co., Chicago — Electric trucks | 49,125.00 |
| Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford, Conn. — Reaming machines, jig borer machines, shell gages | 46,002.00 |
| Noble & Westbrook Mfg. Co., East Hartford, Conn. — Marking machines | 13,260.50 |
| Northwest Engineering Co., Chicago — Dragline excavators | 33,494.00 |
| Northwest Stove Works Inc., Portland, Oreg. — Hot air heating units | 11,858.50 |
| Pacific Marine Supply Co., Seattle — Portable pumps | 64,898.00 |
| Reed Prentice Corp., Worcester, Mass. — Routing, milling machines | 22,352.00 |
| Sauerman Bros., Chicago — Storage, reclaiming system | 31,680.00 |
| Sellers, William, & Co. Inc., Philadelphia — Boring machines | 3,299,169.00 |
| Silent Hoist Winch & Crane Co., Brooklyn, N. Y. — Tractor cranes | 18,775.00 |
| Simmons Machine Tool Corp., Albany, N. Y. — Lathe equipment | 23,113.00 |
| Smith & Wesson Inc., Springfield, Mass. — Parts for revolver | 139,640.00 |
| Taft-Peirce Mfg. Co., Woonsocket, R. I. — Gage assemblies | 12,850.00 |
| Thermo, H. M., Control Co., Los Angeles — Post assemblies | 71,550.00 |
| Trent, Harold E., Co., Philadelphia — Electric ovens | 21,330.00 |
| Union Steel Castings, Division of Blaw-Knox Co., Pittsburgh — Armor steel gun emplacements | 34,000.00 |
| U. S. Electrical Motors Inc., Brooklyn, N. Y. — Test stands | 59,202.00 |
| U. S. Hammered Piston Ring Co. Inc., Stirling, N. J. — Piston rings | 38,066.76 |
| U. S. Pipe & Foundry Co., New York — Cast iron pipe | 10,732.27 |
| Vapor Car Heating Co. Inc., Chicago — Steam generating units | 33,790.13 |
| Vinco Corp., Detroit — Gage assemblies | 22,050.00 |
| Warner Elevator Mfg. Co., Cincinnati — Electric elevators | 11,195.00 |
| Wiedemann Machine Co., Philadelphia — Gages | 12,946.50 |
| Winchester Repeating Arms Co., New Haven, Conn. — .22 rifles | 161,745.35 |
| Worthington Pump & Machine Corp., Boston — Steam driven gas circulators | 94,356.00 |
| Yale & Towne Mfg. Co., Philadelphia — Electric trucks, 2-wheel drive tractors | 111,383.99 |
| York Ice Machinery Corp., York, Pa. — Piece parts | 71,822.50 |

*Estimated.

## Defense Awards

(*Concluded from Page* 44)

York, kitchen equipment, $9326.73.

Thygesen, Henry, & Co. Inc., Albuquerque, N. Mex., construction of air navigation facilities, Las Vegas, N. Mex., airport, $166,949.85.

Tietjen & Lang Dry Dock Co., New York, repairing dredge, $3430.

Todd Galveston Dry Docks Inc., Galveston, Tex., repairs to dredge, $7090.

Wagner Electric Corp., St. Louis, transformer, Bonneville dam, Oregon, $25,798.

Worthington Pump & Machinery Co., Los Angeles, furnishing and installing power generating equipment, Wendover bombing range, Wendover, Utah, $65,146.

Wrought Iron Kitchen Co., Boston, kitchen equipment, $2534.

**Quartermaster Corps Awards**

Aldrich, W. J., San Antonio, Tex., construction, barracks, mess hall, storehouse and reception building, Ft. Clark, Texas, $26,577.

Aluminum Cooking Utensil Co., New Kensington, Pa., cooking utensils, $8439.

Aluminum Goods Mfg. Co., Manitowoc, Wis., kitchenware, $155,682.50.

Aluminum Products Co., LaGrange, Ill., tableware and kitchenware, $59,450.

Beckett, A. T., Oakland, Calif., post office building, Hamilton field, California, $7428.

Equitable Equipment Co. Inc., New Orleans, steel barges, $13,650.

Fairbanks, Morse & Co., South Seattle, Wash., furnishing and installing centrifugal pump, Ft. Lewis, Washington, $3220.

Fargo Motor Corp., Detroit, 5-passenger sedan cars, $539,500.

Ford Motor Co., Dearborn, Mich., 1½-ton trucks, for CCC, $1,417,673.22.

General Motors Corp., Chevrolet Division, Detroit, field ambulances, 1½-ton trucks, $331,962.85.

Grattan, J. G., San Francisco, churn and core borings, $1720.

Higgins Industries Inc., New Orleans, landing boats, $9725.

International Harvester Co., Chicago, 2½-ton trucks, $1,400,852.25.

International Silver Co., Meriden, Conn., forks and spoons, $45,234.11.

Jacobsen Construction Co., Salt Lake City, Utah, maintenance and operation building and magazine, Utah general depot, Ogden, Utah, $262,795.

Landers, Frary & Clark, New Britain, Conn., knives, $71,520.

McCarthy Bros. Construction Co., St. Louis, construction, $607,975.

McKee, Robert E., Los Angeles, construction, $581,565.

Owens Yacht Co., Dundalk, Baltimore, rescue (picket) boats, $254,660.

Pacific Construction Co. Ltd., Honolulu, T. H., construction, $9551.

Pearson Construction Co., Benton Harbor, Mich., construction of ordnance shop and boiler house, Ft. Custer, Michigan, $50,382.

Robins Shipbuilding & Welding Corp., Delanco, N. J., motor car ferry, $42,624.

Spiniello Construction Co., Newark, N. J., construction of water and sewer systems at Ft. Hancock, New Jersey, $35,679.41.

Studebaker Corp., South Bend, Ind., 2½-ton trucks, $1,373,171.50.

Thomason, M. R., Montgomery, Ala., parachute training towers, Ft. Benning, Georgia, $7400.

Wallace, R., & Sons Mfg. Co., Wallingford, Conn., forks and spoons, $45,234.05.

Weddle, E. E., & Co., Norfolk, Va., construction of mess hall, Ft. Story, Virginia, $30,450.

Yarbrough, S. O., and George T. Reinhardt, Austin, Tex., construction of

special service club, Ft. Sam Houston, Texas, $58,566.

**Signal Corps Awards**

American Automatic Electric Sales Co., Chicago, automatic telephones, $17,100.
Bell & Howell Co., Chicago, motion picture cameras, $8828.
Bendix Radio Corp., Baltimore, couplings, $25,650.
Bochme, H. O., Inc., New York, pecker pin, springs, toggle blocks, etc., $574.84.
Bonney Forge & Tool Works, Allentown, Pa., holding tools, $1422.72.
Buckeye Telephone & Supply Co., Cincinnati, augers, $1864.
Fairmont Tool & Forging Co., Cleveland, wrenches, $1458.24.
Federal Telegraph Co., Newark, N. J., spare parts, $4774.25.
Graybar Electric Co., Philadelphia, tools, $13,210.40.
Janette Mfg. Co., Chicago, motor generator set, $7066.40.
McElroy, T. R., Boston, recording equipment, $7425.
Mitchell Camera Corp., West Hollywood, Calif., motion picture cameras, $54,127.50.
Murdock, Wm. J., Co., Chelsea, Mass., headsets, $30,321.60.
National Cine Laboratories, New York, tripods, $13,747.80.
Onan, D. W., & Sons, Minneapolis, power units, $9775.
Seyler Mfg. Co., Pittsburgh, anchor rods, $2806.07.
Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., automatic telephones, switchboard positions, $61,058.
Underwood Elliott Fisher Co., New York, accounting machine, $1100.
Weston Electrical Instrument Co., Newark, N. J., voltmeters, $3500.

**Medical Corps Awards**

Bard-Parker Co. Inc., Danbury, Conn., blades for operating knives, $114,336.
Becton, Dickinson & Co., Rutherford, N. J., dental syringe needles, $10,932.60.
Ritter Equipment Co. Inc., Rochester, N. Y., dispensary equipment, $89,809.20.
White, S. S., Dental Mfg. Co., New York, dental chairs, $27,192.

**Air Corps Awards**

Alemite Co. of Maryland, Baltimore, lubricating guns, $5365.50.
American Bosch Corp., Springfield, Mass., magneto assemblies, $325,710.
Aviation Mfg. Corp., Lycoming Division, Williamsport, Pa., spare parts, $1,513,333.90.
Bendix Aviation Corp., Eclipse Aviation division, Bendix, N. J., supercharge regulator assemblies, indicator and tube assemblies, $531,254; Scintilla Magneto Division, Sidney, N. Y., distributor and magneto assemblies, $450,887.70.
Caterpillar Tractor Co., Peoria, Ill., graders, $52,071.
Crouse-Hinds Co., Syracuse, N. Y., lamp assemblies, $55,948.80.
Curtiss-Wright Corp., Curtiss Aeroplane Division, Buffalo, engine mount assemblies, $110,975.36.
Fairchild Engine & Airplane Corp., Fairchild Aircraft Division, Hagerstown, Md., spare parts, $95,970.59.
Leece-Neville Co., Cleveland, generator and panel assemblies, $97,085.
Thermo, H. M., Control Co., Los Angeles, post assemblies, $71,550.
U. S. Electrical Motors Inc., Brooklyn, N. Y., generator test stands, $84,850.
Weston Electrical Instrument Corp., Newark, N. J., indicator assemblies, $25,269.

♦

Navy department reported the following:

**Bureau of Supplies and Accounts Awards**

Alan Wood Steel Co., Conshohocken, Pa., black and galvanized steel sheets, $1,230,760.
Aluminum Co. of America, Pittsburgh, ingot aluminum-alloy, $12,138.
Anaconda Wire & Cable Co., New York, triple conductor, oil-resisting cable, $27,950.24.
Austin-Hastings Co. Inc., Cambridge, Mass., drilling and tapping machines, $14,934.
Axelson Mfg. Co., Los Angles, lathes, $1,168,082.50.
Bay City Shovels Inc., Bay City, Mich., diesel engine driven crawler type cranes, $28,355.
Bell & Howell Co., Chicago, motion picture cameras, $8473.80.
Bethlehem Steel Co., Bethlehem, Pa., steel angles and bars, class B-S steel, $1,259,583.39.
Bucyrus-Erie Co., South Milwaukee, Wis., crawler type lifting crane, $9366.
Buffalo Fire Appliance Corp., Buffalo, pumping fire engine, $7579.62.
Carnegie-Illinois Steel Corp., Pittsburgh, steel strips, angles, I-beams, $1,520,647.60.
Caterpillar Tractor Co., Peoria, Ill., diesel engines and attachments, $11,086.11.
Clayton Mfg. Co., Alhambra, Calif., steam generating units, and spare parts, $125,934.20.
Clark Cooper Co., Philadelphia, fog horns, $8025.
C-O-Two Fire Equipment Co., Newark, N. J., fire extinguisher devices, $101,000.
Crane Co., Chicago, steel valves, $167,952.40.
Cummins Engine Co., Washington, generator sets, voltage regulators and spare parts, $73,852.
Electric Boat Co., Bayonne, N. J., motors, controllers, switches and spare parts, $21,232.75.
Elwell-Parker Electric Co., Cleveland, industrial electric trucks, $6900.
Emerson Electric Mfg. Co., St. Louis, fans, $78,363.51.
Erie Forge Co., Erie, Pa., steel forgings, $13,110.
Folmer Graflex Corp., Rochester, N. Y., equipment, Graflex identification and developing unit, $39,381.04.
General Electric Co., Schenectady, N. Y., cable, electric dynamometers, $30,923.10.
General Motors Corp., Detroit, motor trucks, $56,057.59.
Gray, G. A., Co., Cincinnati, milling machine, $50,788.
Graybar Electric Co. Inc., New York, double and multiconductor, oil-resisting cable, $60,790.50.
Jones & Laughlin Steel Corp., Pittsburgh, steel I-beams, $65,000.
Koppers Co., American Hammered Piston Ring Division, Baltimore, piston rings, $10,063.20.
Leavitt Machine Co., Orange, Mass., valve reseating outfits, $47,190.
Lehmann Machine Co., St. Louis, motor driven lathes, $31,081.50.
Liquidometer Corp., Long Island City, N. Y., gages, $212,136.
Lukens Steel Co., Coatesville, Pa., black and galvanized steel plates, $3,099,200.
Manning, Maxwell & Moore Inc., Bridgeport, Conn., steel valves, $19,060.16.
Michigan Tool Co., Detroit, gears, turret turning, worm gearing and pinions, etc., $99,140.
Morse Chain Co., Ithaca, N. Y., chains and sprockets, $9197.50.
Pollak Mfg. Co., Arlington, N. J., aluminum cartridge containers, $376,890.
Shenango-Penn Mold Co., Dover, O., recoil cylinder, centrifugal cast liners, $10,222.
Square D Co., Kollsman Instrument Division, Elmhurst, N. Y., compass transmitters; compass indicators, $246,000.
Stetson-Ross Machine Co., Seattle, traveling bed, timber planing and shaping machine, $18,600.
Steuart Motor Co., Washington, motor trucks, $12,758.75.
Tidewater Supply Co. Inc., Norfolk, Va., boring, drilling and milling machines, $15,210.
Worth Steel Co., Claymont, Del., black and galvanized steel plates and sheets, $2,370,586.

**Bureau of Yards and Docks Awards**

Barclay White Co., Philadelphia, pattern shop extension, battery storehouse, quay wall and services at navy yard, Philadelphia, on a cost plus fixed fee basis, $915,000.
Barret & Hilp, San Francisco, administration building and miscellaneous buildings at navy yard, Mare Island, California, on a cost plus fixed fee basis, $930,000.
Cooper-Bessemer Corp., Mt. Vernon, O., auxiliary electric generating equipment at naval ammunition depot, Puget Sound, Washington, and naval torpedo station, Keyport, Wash., at total cost of $75,816. Also air compressor for Norfolk navy yard, Portsmouth, Va., $74,439.
Ford, Bacon & Davis Inc., New York, power plant improvements at naval training station and naval torpedo station, Newport, R. I., $735,000 and $2,205,000 respectively; total, $2,940,000, on a cost plus fixed fee basis.
General Electric Co., Seattle, improvement of electric distribution system, Puget Sound navy yard, Bremerton, Wash., $278,377.
Rollerson, Edward A., Plainfield, N. J., radio transmitter building at naval air station, Lakehurst, N. J., $27,375.
Walsh Construction Co., J. Rich Steers Inc., Cauldwell-Wingate Co., and Raisler Corp., New York, construction of shipbuilding drydocks at navy yard, Brooklyn, N. Y., on a cost plus fixed fee basis, $31,000,000.

## Martin Bombers May Be Built in Canada

*TORONTO, ONT.*

■ Canadian government officials are negotiating with United States interests relative to the manufacture in the Dominion of Glenn L. Martin type bombers. It has been reported that an order for 200 such planes, to cost about $100,000 each, already has been placed with National Steel Car Co., Malton, Ont. While the report has not been confirmed officially, C. D. Howe, Minister of Munitions and Supply, has admitted negotiations are under way.

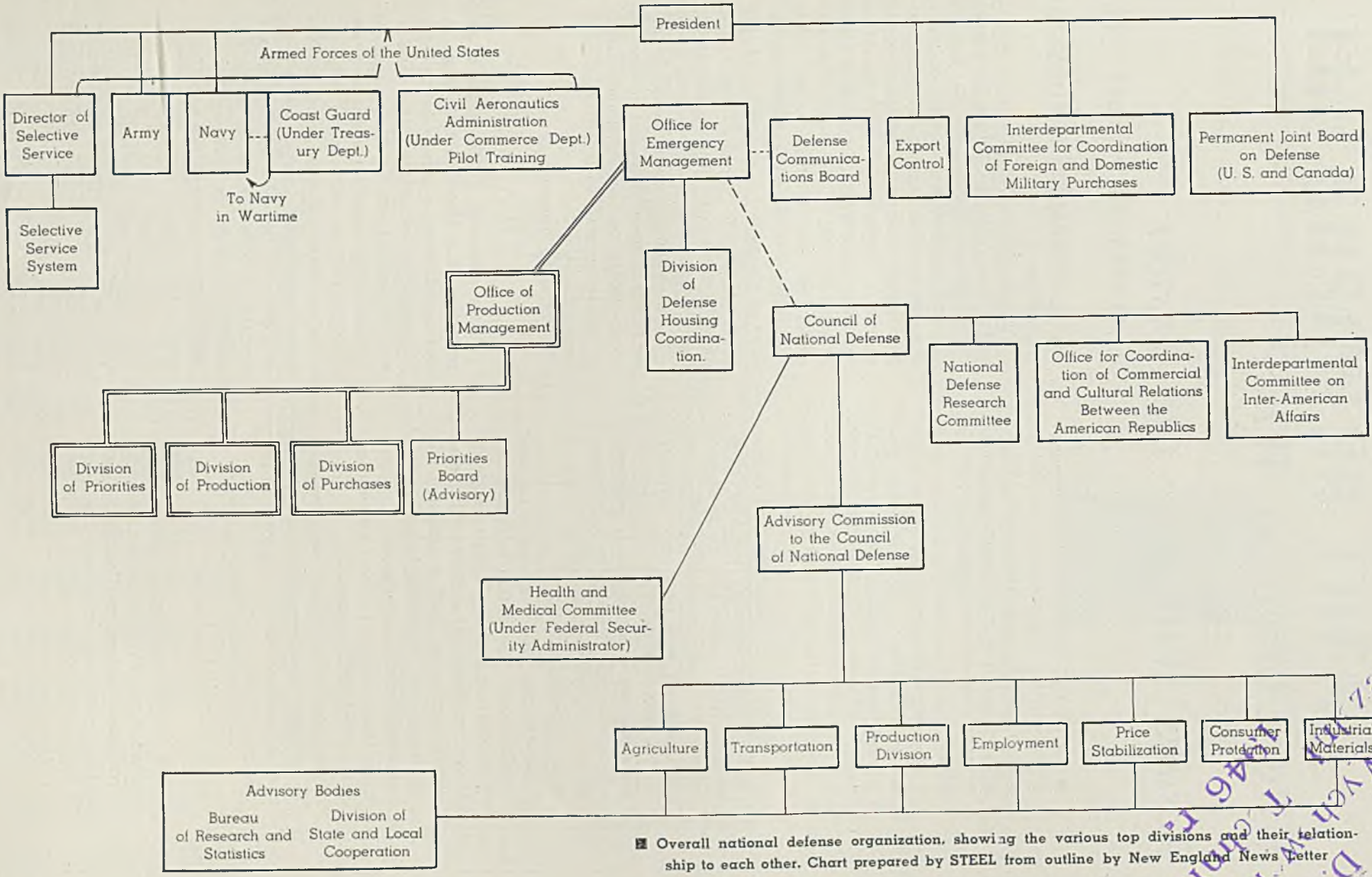
Wartime Merchant Shipping Ltd., a government controlled company directed by H. R. MacMillan, has been formed to direct all cargo shipbuilding operations in Canada. Head office will be at Montreal, Que., and the company will have direct connection with Department of Munitions and Supply. It is planned to concentrate on building of one type merchant vessel, that of 10,000 tons.

All shipyards in Canada capable of building ships of this size will be utilized under the new program, which calls for continuous construction of merchant vessels. Instead of establishing new shipyards, it is reported, existing plants will be enlarged. Large expenditures on shipyards on the St. Lawrence, the Maritimes and the Pacific coast are expected. War craft will not be handled by the new company.

Algoma Steel Corp., Sault Ste.

(*Please turn to Page* 119)

# *Overall National Defense Organization—March, 1941*




**Overall national defense organization, showing the various top divisions and their relationship to each other. Chart prepared by STEEL from outline by New England News Letter**

# *Wage Advances Wise?*

# *Results Will Give the Answer*

■ GRANTING higher wages to employes under existing circumstances can be a ghastly mistake or a wise move. Which it turns out to be will depend upon what happens after the new rates become effective.

From the standpoint of cold logic it is almost impossible to find an excuse for granting wage increases that will hold water.

• • •

Employes in the iron, steel and metalworking industries were receiving good wages in 1929. According to the annual reports of many industrial companies, most employes were paid more per year in 1940 than in 1929. This fact is all the more impressive because many employes who were putting in from 48 to 50 hours per week in 1929 worked from 36 to 40 hours per week in 1940.

But the real test of income is its purchasing power. According to reliable indexes, the cost of living in 1940 was down 18 per cent from that of 1929. When employes' income for 1940 is corrected for this factor, the purchasing power of the 1940 earnings of many employes turns out to be from 25 to 30 per cent higher than that of their 1929 income.

Why then, should a sharp wage increase be granted now—especially since living costs have advanced only negligibly in the past year?

• • •

One answer which comes glibly to the tongues of many persons is that industrial corporations enjoyed good profits in 1940 and will make even more money in 1941. Why shouldn't employes share in these increased profits?

Persons who use this argument do not realize how poorly stockholders have fared during the past decade. Nor do they understand that wage increases, in many cases, simply mean that the common stockholder must be deprived of part of his legitimate income.

For instance, if U. S. Steel had added 10 cents per hour to the wages of its employes in 1940, common stockholders would have received about $12,000,000 instead of $35,000,000 in dividends and only about $15,000,000 instead of $42,000,000 could have been retained in surplus for future needs.

The pendulum has swung so far in taking money from investors and giving it to wage earners that any additional favors to the latter may be looked upon with suspicion.

Such are the arguments of logic.

• • •

On the other side is the factor of expediency. If a 10-cent-an-hour wage increase would insure a morale among industrial employes comparable to the esprit-de-corps evidenced in the production spurt of 1918, then the granting of wage boosts now would be worth many times the cost.

But so much depends upon developments henceforth. Can we count upon co-operation? Or must we contend with a continued selfish attitude on the part of those who bargain for employes?

Only time can answer these questions.

E. L. Shaner

*EDITOR-IN-CHIEF*

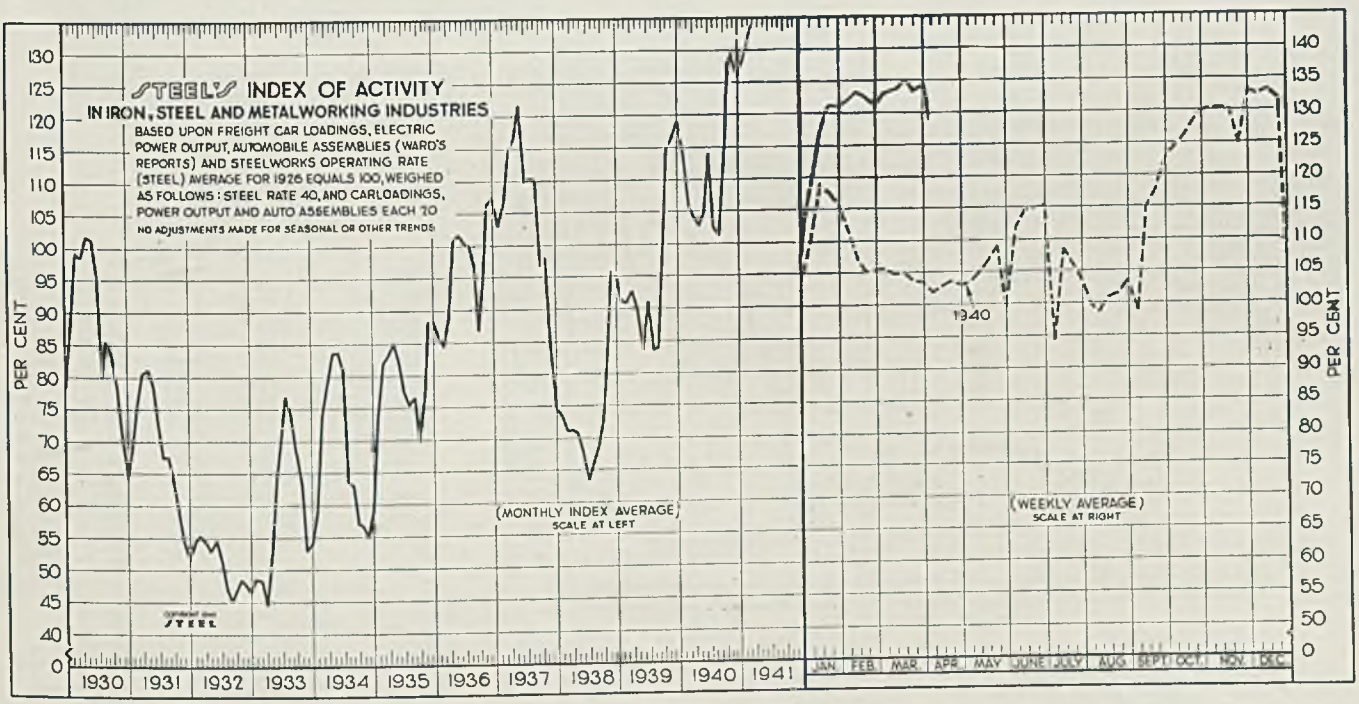
# The BUSINESS TREND

## Activity Index Reflects Labor Disturbances

■ REFLECTING the disruption of industrial production occasioned by strikes, STEEL's index of activity in the iron, steel and metalworking industries declined five points to 128.9 during the week ended April 5. At this time last year the index stood at 101.8, while in the comparable weeks of 1937 and 1929 it was 112 and 119.9 respectively.

Strike at Ford Motor Co., resulted in reduction of total automobile output to 116,255 units during the week ended April 5, and was the chief factor in the 1.5 point decline in the national steel rate to 98 per cent. Complete shutdown of bituminous coal mines brought about a sharp curtailment in soft coal carloadings.

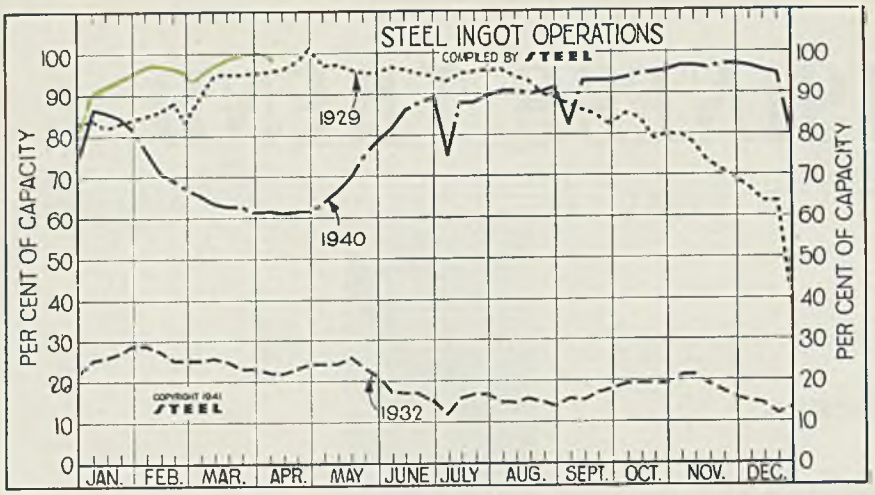
New demand continues unabated. Reports from leading industries indicate little headway has been made against record order backlogs accumulated during recent months. Consumers' inventories are undoubtedly expanding in some instances. However, many sellers have recently increased their efforts to limit new bookings to actual requirements of their customers.




*STEEL'S index of activity declined 5 points to 128.9 in the week ended April 5:*

| Week Ended | 1941 | 1940 |
|---|---|---|
| Jan. 18 | 130.8 | 117.3 |
| Jan. 25 | 130.7 | 115.4 |
| Feb. 1 | 132.0 | 111.6 |
| Feb. 8 | 132.7 | 107.2 |
| Feb. 15 | 132.3 | 105.1 |
| Feb. 22 | 131.2 | 105.4 |
| March 1 | 133.0 | 105.6 |
| March 8 | 133.1 | 104.7 |
| March 15 | 135.0 | 104.9 |
| March 22 | 133.5 | 103.7 |
| March 29 | 133.9 | 103.2 |
| April 5 | 128.9 | 101.8 |

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




### Steel Ingot Operations

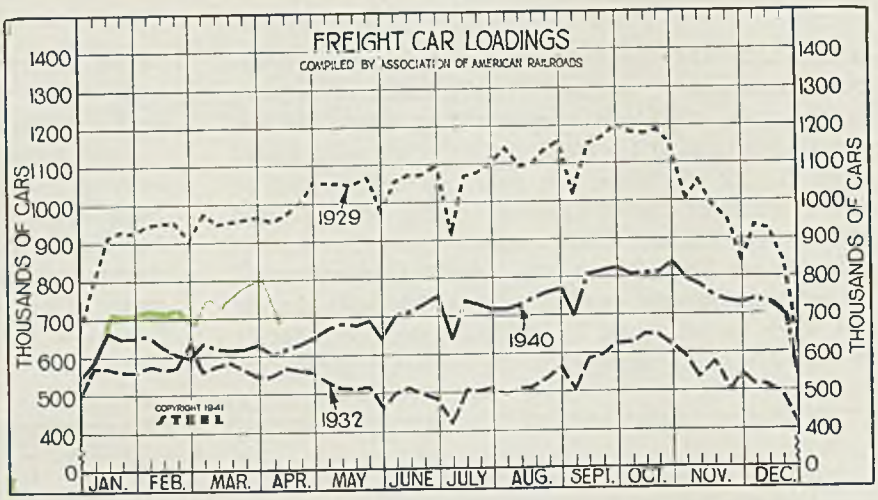
(Per Cent)

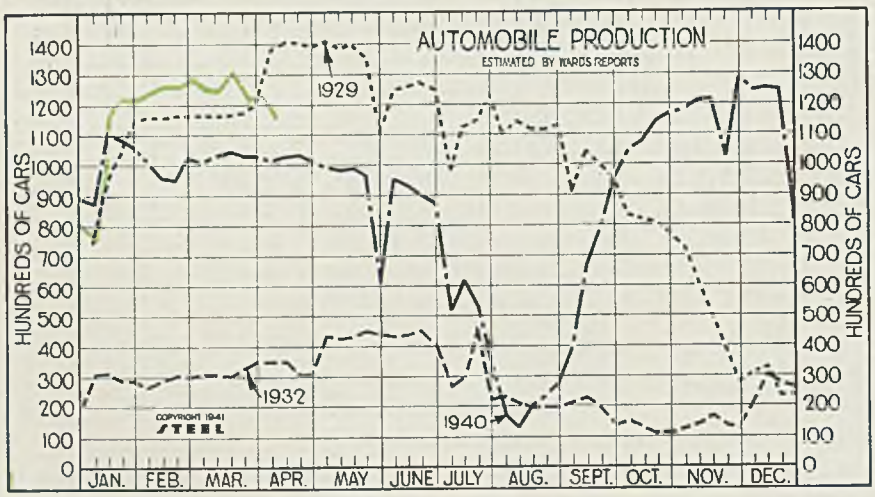
| Week ended | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|
| April 5 .. | 98.0 | 61.5 | 53.5 | 32.0 |
| March 29 .. | 99.5 | 61.0 | 54.5 | 36.0 |
| March 22 .. | 99.5 | 62.5 | 55.5 | 35.0 |
| March 15 .. | 98.5 | 62.5 | 56.5 | 32.0 |
| March 8 ... | 97.5 | 63.5 | 56.5 | 30.0 |
| March 1 ... | 96.5 | 65.5 | 56.0 | 29.5 |
| Feb. 22 .... | 94.5 | 67.0 | 55.0 | 30.5 |
| Feb. 15 .... | 96.5 | 69.0 | 55.0 | 31.0 |
| Feb. 8 .... | 97.0 | 71.0 | 54.0 | 30.0 |
| Feb. 1 .... | 97.0 | 76.5 | 53.0 | 31.0 |
| Jan. 25 .... | 95.5 | 81.5 | 51.5 | 33.0 |
| Jan. 18 .... | 94.5 | 84.5 | 51.5 | 30.5 |
| Jan. 11 .... | 93.0 | 86.0 | 52.0 | 29.0 |
| Jan. 4 .... | 92.5 | 86.5 | 51.5 | 26.0 |
| **Week ended** | **1940** | **1939** | **1938** | **1937** |
| Dec. 28 .... | 80.0 | 75.5 | 40.0 | 21.0 |
| Dec. 21 .... | 95.0 | 90.5 | 52.0 | 23.0 |

### Freight Car Loadings

(1000 Cars)

| Week ended | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|
| April 5 ..... | 682 | 603 | 535 | 522 |
| March 29 .... | 792 | 628 | 604 | 523 |
| March 22 .... | 769 | 619 | 605 | 573 |
| March 15 .... | 759 | 619 | 595 | 540 |
| March 8 ..... | 742 | 620 | 592 | 557 |
| March 1 ..... | 757 | 634 | 599 | 553 |
| Feb. 22 ..... | 678 | 595 | 561 | 512 |
| Feb. 15 ..... | 721 | 608 | 580 | 536 |
| Feb. 8 ..... | 710 | 627 | 580 | 543 |
| Feb. 1 ..... | 714 | 657 | 577 | 565 |
| Jan. 25 ..... | 711 | 649 | 594 | 553 |
| Jan. 18 ..... | 703 | 646 | 590 | 570 |
| Jan. 11 ..... | 712 | 668 | 587 | 581 |
| Jan. 4 ..... | 614 | 592 | 531 | 552 |
| **Week ended** | **1940** | **1939** | **1938** | **1937** |
| Dec. 28 ..... | 545 | 550 | 500 | 457 |




### Auto Production

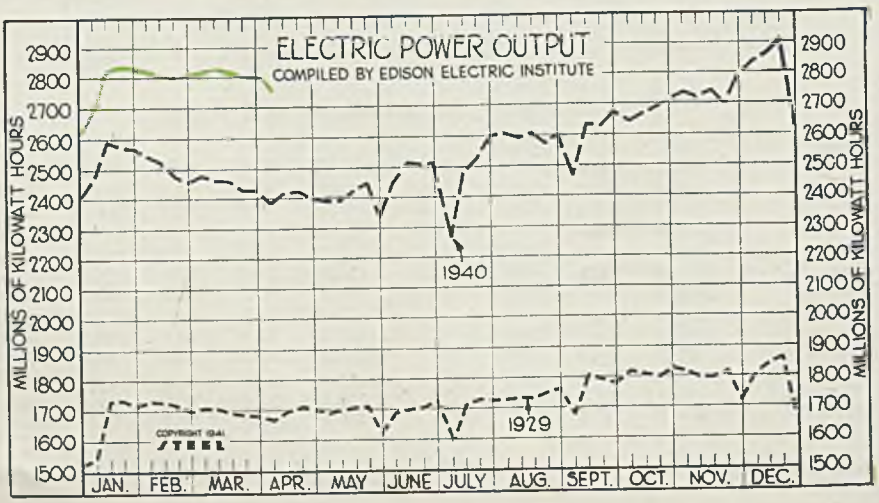
(1000 Units)

| Week ended | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|
| April 5 .... | 116.3 | 101.7 | 87.0 | 61.0 |
| March 29 .. | 124.2 | 103.4 | 86.0 | 57.5 |
| March 22 .. | 123.8 | 103.4 | 89.4 | 56.8 |
| March 15 .. | 131.6 | 105.7 | 86.7 | 57.6 |
| March 8 ... | 125.9 | 103.6 | 84.1 | 57.4 |
| March 1 ... | 126.6 | 100.9 | 78.7 | 54.4 |
| Feb. 22 .... | 129.2 | 102.7 | 75.7 | 57.0 |
| Feb. 15 .... | 127.5 | 95.1 | 79.9 | 59.1 |
| Feb. 8 .... | 127.7 | 96.0 | 84.5 | 57.8 |
| Feb. 1 .... | 124.4 | 101.2 | 79.4 | 51.4 |
| Jan. 25 .... | 121.9 | 106.4 | 89.2 | 59.4 |
| Jan. 18 .... | 124.0 | 108.5 | 90.2 | 65.4 |
| Jan. 11 .... | 115.9 | 111.3 | 86.9 | 65.7 |
| Jan. 4 .... | 76.7 | 87.5 | 76.7 | 54.1 |

### Electric Power Output

(Million KWH)

| Week ended | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|
| April 5 .. | 2,779 | 2,381 | 2,174 | 1,990 |
| March 29. | 2,802 | 2,422 | 2,210 | 1,979 |
| March 22. | 2,809 | 2,424 | 2,199 | 1,975 |
| March 15 . | 2,818 | 2,460 | 2,225 | 2,018 |
| March 8.. | 2,835 | 2,464 | 2,238 | 2,015 |
| March 1.. | 2,826 | 2,479 | 2,244 | 2,036 |
| Feb. 22... | 2,820 | 2,455 | 2,226 | 2,031 |
| Feb. 15... | 2,810 | 2,476 | 2,249 | 2,059 |
| Feb. 8... | 2,824 | 2,523 | 2,268 | 2,052 |
| Feb. 1.. | 2,830 | 2,541 | 2,287 | 2,082 |
| Jan. 25... | 2,830 | 2,566 | 2,293 | 2,099 |
| Jan. 18... | 2,844 | 2,572 | 2,290 | 2,109 |
| Jan. 11... | 2,835 | 2,593 | 2,270 | 2,115 |
| Jan. 4... | 2,705 | 2,473 | 2,169 | 2,140 |
| **Week ended** | **1940** | **1939** | **1938** | **1937** |
| Dec. 28... | 2,623 | 2,404 | 2,121 | 1,998 |

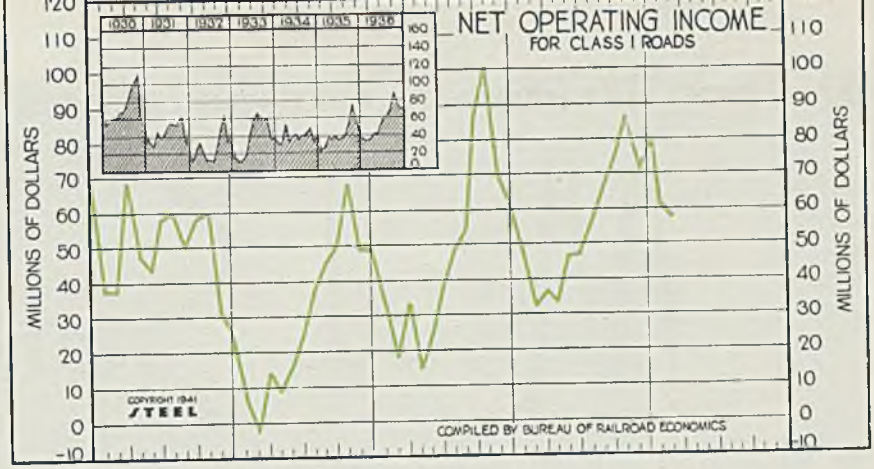


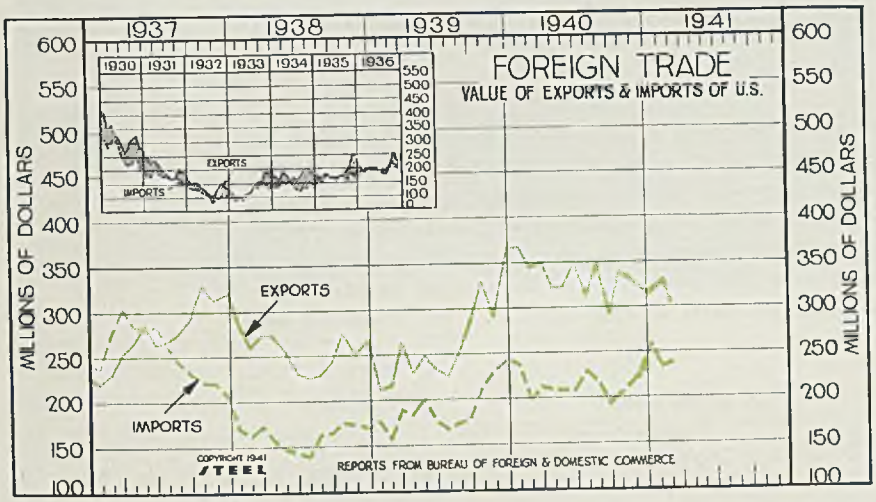
## Class I Railroads
## Net Operating Income

(Unit: $1,000,000)

| | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|
| Jan. | $62.36 | $45.57 | $32.89 | $7.14 |
| Feb. | 58.49 | 32.86 | 18.59 | 1.91* |
| Mar. | ..... | 36.73 | 34.32 | 14.73 |
| April | ..... | 33.82 | 15.32 | 9.40 |
| May | ..... | 47.08 | 25.10 | 16.67 |
| June | ..... | 47.42 | 39.10 | 25.16 |
| July | ..... | 57.08 | 49.01 | 38.43 |
| Aug. | ..... | 66.01 | 54.59 | 45.42 |
| Sept. | ..... | 74.19 | 86.43 | 50.36 |
| Oct. | ..... | 86.99 | 101.62 | 68.57 |
| Nov. | ..... | 71.10 | 70.35 | 49.67 |
| Dec. | ..... | 78.79 | 60.95 | 49.37 |
| Average | ..... | $56.84 | $49.02 | $31.02 |

*Indicates deficit.




## United States
## Foreign Trade

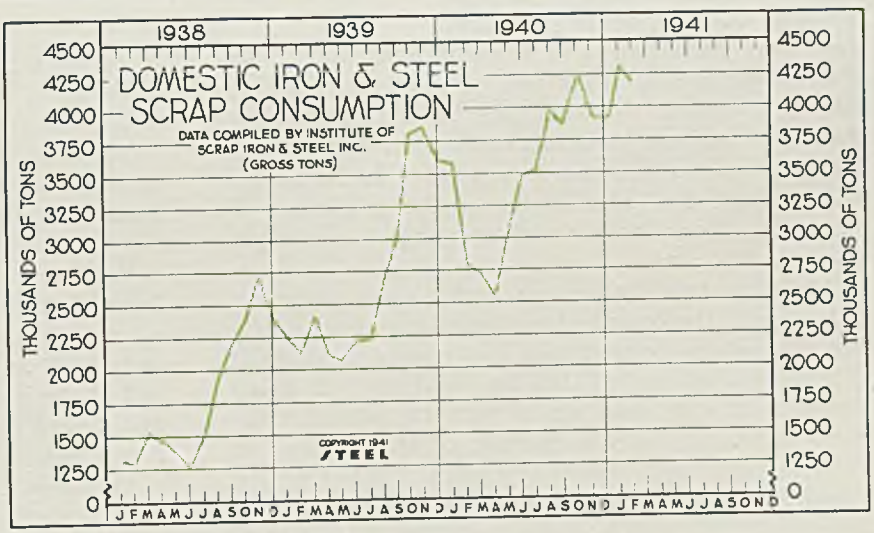
(Unit: $1,000,000)

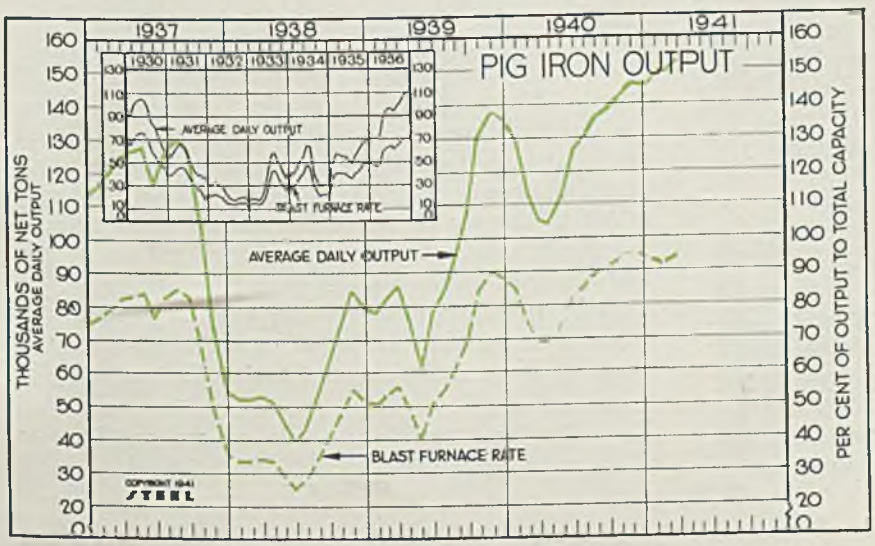
| | Exports | | Imports | |
|---|---|---|---|---|
| | 1941 | 1940 | 1941 | 1940 |
| Jan. | $325.4 | $368.6 | $228.7 | $241.9 |
| Feb. | 303.4 | 347.0 | 233.7 | 199.8 |
| Mar. | ..... | 352.3 | ..... | 216.7 |
| April | ..... | 324.0 | ..... | 212.2 |
| May | ..... | 325.3 | ..... | 211.4 |
| June | ..... | 350.2 | ..... | 211.4 |
| July | ..... | 317.0 | ..... | 232.3 |
| Aug. | ..... | 349.9 | ..... | 220.5 |
| Sept. | ..... | 295.2 | ..... | 194.9 |
| Oct. | ..... | 343.5 | ..... | 207.1 |
| Nov. | ..... | 327.7 | ..... | 223.4 |
| Dec. | ..... | 322.3 | ..... | 253.1 |
| Total | ..... | $4,021.6 | ..... | $2,625.4 |

## Iron and Steel
## Scrap Consumption

(Gross Tons)

| | 1941 | 1940 | 1939 | 1938 |
|---|---|---|---|---|
| | | (000 omitted) | | |
| Jan. | 4,278 | 3,581 | 2,257 | 1,331 |
| Feb. | 4,172 | 2,812 | 2,124 | 1,306 |
| Mar. | ..... | 2,728 | 2,419 | 1,543 |
| Apr. | ..... | 2,548 | 2,114 | 1,477 |
| May | ..... | 3,061 | 2,079 | 1,387 |
| June | ..... | 3,482 | 2,221 | 1,257 |
| July | ..... | 3,526 | 2,247 | 1,520 |
| Aug. | ..... | 3,968 | 2,675 | 1,953 |
| Sept. | ..... | 3,876 | 3,018 | 2,218 |
| Oct. | ..... | 4,233 | 3,809 | 2,393 |
| Nov. | ..... | 3,922 | 3,858 | 2,732 |
| Dec. | ..... | 3.950 | 3,613 | 2,411 |
| Total | ..... | 41,687 | 32,434 | 21,528 |
| Mo. Av. | ..... | 3,474 | 2,703 | 1,794 |




## Pig Iron Production

| | Daily average —Net Tons— | | | Blast furnace —Rate (%)— | | |
|---|---|---|---|---|---|---|
| | 1941 | 1940 | 1939 | 1941 | 1940 | 1939 |
| Jan. | 150,524 | 129,825 | 78,596 | 95.5 | 85.4 | 51.0 |
| Feb. | 150,244 | 113,943 | 82,407 | 95.3 | 75.0 | 53.5 |
| Mar. | 151.707 | 105,502 | 86,465 | 96.3 | 69.5 | 56.1 |
| Apr. | ..... | 104,635 | 76,732 | .... | 68.9 | 49.8 |
| May | ..... | 112,811 | 62,052 | .... | 74.2 | 40.2 |
| June | ..... | 127,103 | 79,125 | .... | 83.6 | 51.4 |
| July | ..... | 130,984 | 85,121 | .... | 86.1 | 55.0 |
| Aug. | ..... | 136,599 | 96,122 | .... | 89.9 | 62.4 |
| Sept. | ..... | 139,085 | 107,298 | .... | 91.5 | 69.7 |
| Oct. | ..... | 143,152 | 131,053 | .... | 94.2 | 85.2 |
| Nov. | ..... | 146,589 | 138,883 | .... | 96.4 | 90.3 |
| Dec. | ..... | 146,544 | 136,119 | .... | 96.4 | 88.5 |
| Ave. | ..... | 128,128 | 86,375 | .... | 84.3 | 62.6 |

# Do You Realize the Important Possibilities of Metal Spraying In Repetitive Production Work?

**Universally accepted by repair shops as a shaft and piston rod reconditioning method, metal spraying is being almost completely overlooked by manufacturers of original equipment. Under present conditions when economy, speed and versatility are of such great importance on defense projects and on repetitive production work of all kinds, metal spraying warrants much more consideration as a production tool than it now gets. The possibilities of the process, its advantages and limitations, its most promising fields of application . . . are presented here**

By W. C. REID
Vice President
Metallizing Engineering Co. Inc.
Long Island City, N. Y.

■ PROGRESS in metal spraying has been quite similar to that in welding. As with welding, its first uses were on repair and reconditioning work. As with welding, too, realization is now beginning to take hold that it has important advantages in production of new machines and equipment. While welding as a process has been incorporated in the design and production of new equipment for a number of years, it appears that metal spraying has not yet reached that stage.

While for many years practically every large repair shop in the country has been using metal spraying successfully to resurface and restore to original dimensions cylindrical bearing surfaces of every description, it is amazing to note the almost complete absence of any utilization of the process on original equipment. The only explanation is that the possibilities of the process have not been effectively presented. This article is an attempt to do just that.

First let it be emphasized that metal spraying is a proved production process, having passed the experimental stage long ago. No longer are there any unknown or uncontrollable variables. To make it perfectly clear why metal spraying is suitable for production work, it is well to understand the variables involved. Referring to Fig. 1, here the wire to be melted is fed through a close-clearance nozzle at center of part A. B is a row of openings through which the fuel gases are fed in such a manner as to surround the wire. The wire C is fed continuously through the hollow center of A. Compressed air is forced through opening between the nozzle A and cap to atomize the melted metal from the wire. The oxyacetylene flame's characteristic cone F and long flame G extend out from the nozzle of the gun for a total distance of perhaps 3 inches. The wire C is melted off at point about 1/3 the distance from the end of the nozzle to the end of the cone, is atomized and forced against the work at H, which is about 5 or 6 inches from the end of the nozzle.

**Variables Controlled:** Possible variables in operation of such a gun include rate at which the gases are fed, controlling the character and length of the flame; rate at which wire is fed; air pressure; distance the nozzle is held from the work and rate of travel of the work past the nozzle. Of these variables, the gas rates and air pressure are very easily fixed and accurately maintained by suitable pressure regulators and needle valves in the supply lines. The wire is fed to the nozzle by an air turbine which affords practically constant rate of speed regardless of the pull required to unwrap the wire from the reel. The distance from the nozzle to the work is fixed in the setup, and the rate of travel of the work past the torch is easily adjusted and maintained accurately.

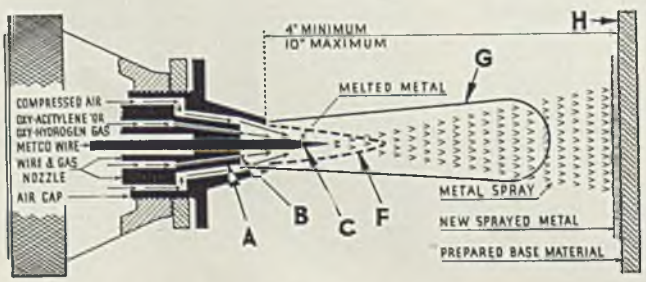



Fig. 1—Section through wire nozzle, air cap and flame to show different elements involved in operation of metal spray gun

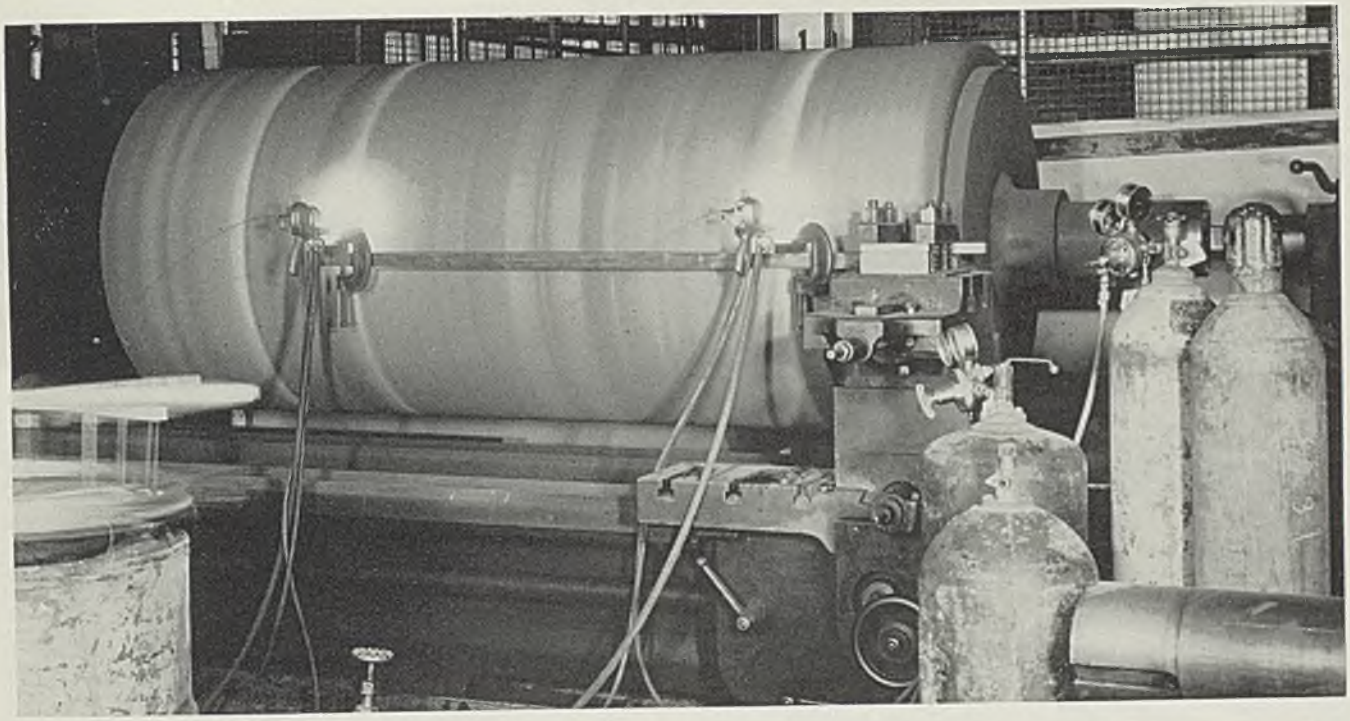


Fig. 2—Spraying a special variety of 18-8 stainless steel on surface of large sugar mill roll. About 0.125-inch on the radius is sprayed. This shows the use of a two-gun setup with a lathe being employed to revolve the work and to move the guns. Such an arrangement is common in production work. Three or more guns may be employed for certain jobs

Thus there are no variables not under strict control.

Recent improvements in metal-spray guns are permitting use of larger diameter wire and faster feeds by changing the size and position of the gas orifices to produce a longer melting zone, thus permitting faster melting because of the preheat action as the wire travels through the longer flame. This faster melting means greater rates of deposition, thus lowering the cost of deposited metal directly in proportion. These advances have not yet approached the limits of the process . . . still faster deposition and lower costs are expected.

Since all variables are under precise control, it is possible to make changes in any one, record the results and thus build up an accumulation of data to afford a guide for applying the process quickly and successfully to almost any type of work. Also it permits performance to be predicted under any given set of conditions with surprising accuracy. Such information already has been gathered and is available for use.

**Automatic** and semiautomatic operation are feasible. Already a number of automatic setups have been constructed and are in operation. One of these uses five guns to spray aluminum on aircraft engine cylinders on an automatic high-production basis and will be described in an early issue of STEEL.

Production metal spraying can be divided roughly into two classes: Work on which metal is deposited to obtain a *hard wear-resistant* surface; work on which metal is sprayed to afford a covering for *protection against corrosion.* Sometimes a combination of both is wanted. Sprayed metal as a surface protection will be covered in another article, this one being confined to depositing hard wearing surfaces.

**Hardnesses** up to 450 brinell are easily placed on wearing surfaces of any cylindrical surface. They may also be produced on flat surfaces but with some difficulty because the bond produced is purely mechanical and depends upon keying the deposit mechanically to the base metal underneath. This involves certain difficulties as will be explained in a subsequent article. However, many flat surfaces have been metal sprayed satisfactorily, and such work can be done with assured results under proper conditions. This article is confined to work on cylindrical surfaces.

Largest field for production metal spraying at present is on shafts of exceptional size, piston rods and similar work where costs might be prohibitive if the hard surfaces needed were produced by heat treatment or by making the entire object of a hard alloy steel. Fig. 3 shows a type of work on which metal spraying is particularly advantageous. Shafts on which flanges are integral parts automatically eliminate the possibility of shrinking sleeves of hard or corrosion resistant metal to form the desired surface. For instance, Fig. 3 shows a centrifugal pump impeller spindle incorporating two flanges with three shaft diameters. Made of SAE 1040 steel and sprayed with stainless steel on the three bearing surfaces, a piece is produced at low cost that exactly fits the requirements of the job. Similarly, a deep-well pump shaft 18 feet long has three sections coated with stainless steel for bearing surfaces, the remainder being sprayed with zinc or aluminum as a surface protection. Outer diameter is same throughout length of shaft. Likewise undercut surfaces can be handled easily by metal spraying.

**Applications** of metal spraying in production work are exceptionally wide. The only type of new equip-

(*Please turn to Page* 87)

# High-Speed Tooling for

# MACHINING HIGH-

■ *Starting Jan. 27, 1941, this series of weekly articles on shell production has covered: One, background on shell production; two, types of shell and their metallurgy; three, parting off and heating billets for forging; four, forging problems and the Witter cross roll; five, the Baldwin-Omes and upsetter forging machines; six, machining considerations; seven, "emergency" lathes designed by National Machine Tool Builders' Association; eight, step-by-step study of operations at S. A. Woods Machine Co. shell plant; nine, multi-spindle automatic lathes; ten, survey of equipment for machining shell; eleven, typical tooling setup for multi-spindle automatic lathe work.*

*Next week, second part of this section on high-speed tooling will cover cutting speeds, how horsepower requirements are calibrated, high-speed tooling at National Steel Car Corp. Ltd., Hamilton, Ont., tool life, "scabbing" and reaming, how work-rest-to-centerline distance influences cutting.*

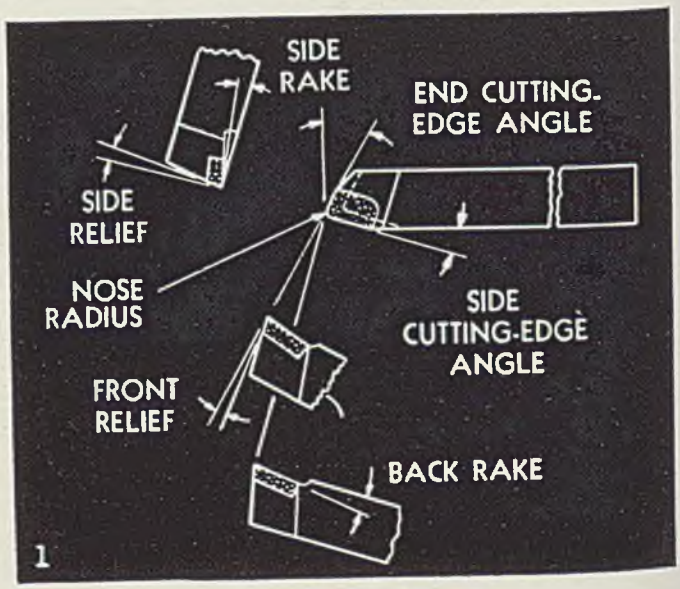
■ OTHER articles in this series on machining shell have purposely omitted reference to the cutting tools since the intention was to deal with this aspect of the matter in a separate article of which this is the first part. One might have supposed, after the lapse of close to half a century since Taylor and White invented high-speed steel that there would be such a wide-spread familiarity with the potentialities of this and more recent developments in the shape of cemented carbides that nothing more should be necessary than to refer the reader to the comprehensive data offered in the Manual on Cutting of Metals prepared by the Committee of the American Society of Mechanical Engineers on metal cutting.

However it is only too plainly evident in a great many cases that the wealth of information available is not applied with efficiency and that an effort toward elucidation and interpretation of the admittedly complex mass of material is in order.

**Only One Consideration Now:** Our objectives boil down to a single "objective," since our present situation tends to dwarf if not altogether eliminate any other consideration than making as many shell as possible in the time at our disposal—whatever that period may be. This in turn resolves itself—at least as far as the roughing cuts on the shell blank are concerned—in how to remove the greatest possible number of cubic inches of steel over a specified time, *including a tool changing period* bearing the average relation to cutting time.

No other consideration can have more than a minor validity, and we observe at once that as the time required to change the tools diminishes, the less and less important becomes tool life and the more nearly may we approach the ultimate capacity of the machine, should this not already have been reached. A cardinal virtue of machine tool design from this standpoint is the ease and rapidity with which tool changes may be effected. Other essential characteristics include ample power and considerable rigidity for the punishing task of shell roughing.

Under normal economic circumstances, factors governing tool life include not only the time required to change the tool but also the cost of the tool or metal consumed per grind, the wages of the operator and those of the setup man, together with the overhead charges on the labor and machines involved. With the exception of the first, most if not all of the remaining factors should properly go by the board in the light of today's urgent need for production, except insofar as an unreasonable prodigality




This article is an attempt to present the fundamental concepts of the "art of cutting metals" in the simplest possible fashion and, by reference to characteristic examples from practice, to introduce the reader not already familiar with the MANUAL published by the American Society of Mechanical Engineers to the wealth of valuable material which it contains.

The author wishes to acknowledge his indebtedness especially to Albin H. Henrikson, the Wesson Co., Detroit, and to Dr. M. Kronenberg, Cincinnati Milling Machine Co., Cincinnati, for their valuable assistance; and to the Carboloy Co., Detroit, for the use of diagrams.

The Author

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University Station, Va.

# EXPLOSIVE SHELL

## And Other Ordnance Work

**Here Professor Macconochie explains factors in tool design, their relation to the objective in the present emergency—the removal of maximum amount of metal in minimum time. He points out economic considerations are of little present consequence, describes kinds of tools and their application, how they are made and what shapes are required, the "best" form of tool, the chip breaker, and the effects of cutting fluids on tool life**

of either cutting tools or labor would tend to defeat our purpose.

This concept has the double advantage of essential simplicity and patriotic directness and will be employed to illuminate our path in what follows.

**What Is Tool Life?** Since the term "tool life" has been used, the writer may be pardoned if he digresses for a moment to explain exactly what this means. Briefly it might be defined as the period during which the tool continues to function and to produce the results intended—diameter of piece, for example—for which the tool was set. In many cases the end of tool life is rather definite as when break through of the nose occurs, or spalling or fracture is observed. In other cases, the end of the run is not so well marked if the tool merely becomes dull; but in this case, also, experimenters have noted a rather sharp rise in the radial component of the pressure between the tool and the work.

This lack of precision is a partial cause of the variations sometimes apparent in the reports of different research workers. We may as well make up our minds that while the art of cutting metals lends itself in a surprising degree to mathematical simplification and co-ordination, it remains distinctly an art and retains certain elusive characters which defy analytical investigation. We do not know, for instance, just how the chip is removed during the cutting operation. As it happens this particular gap in our knowledge is not of prime consequence, although the results of the action as it affects tool life, power absorption, tool form and "chatter" are the very essence of our problem.

**Three Factors:** The man in the shop is confronted with three basic questions; namely, the kind of tool, the cutting speed and the feed. For the kind of machining we are considering—that is, heavy roughing cuts—the sintered carbide tool outclasses the more familiar 18-4-1 (18 per cent tungsten, 4 per cent chromium and 1 per cent vanadium), provided the machine has sufficient power to permit use of maximum feeds and speeds. These sintered carbides consist of powdered crystals of tungsten, tantalum, titanium and other hard carbides, cemented together by a binder of from 3 to 12 per cent cobalt or other material. Thus we are not dealing here with an alloy, but rather with a cement-type mixture of tiny particles, each possessing a hardness of its own.

**Making Carbide Tips:** This hardness results from the carbonizing of the tungsten metal particles in a sealed graphite tube at a temperature approaching 3000 degrees Fahr. for several hours, the metallic particles having previously been thoroughly milled with carbon, perhaps in the form of coke, in a ball mill. A hydrogen furnace is usually employed for this purpose. The product of this process is now the required metallic carbide in powdered form, the size of individual particles ranging from 4 to 15 microns (a micron being 0.001-millimeter, or 0.00003937-inch), or about one seventeen-hundredth

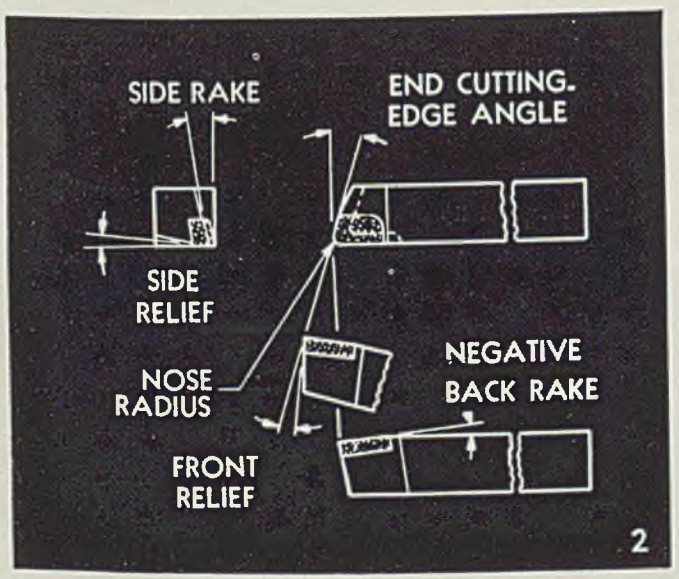



Fig. 1—Generally accepted form of tool for roughing out shell from forged blank. Fig. 2—Small negative rake angles as shown in this tool are desirable for handling eccentric or uneven stock as they help take the load off the tool point

part of an inch. The necessary amount of binding material in the form of cobalt, cobalt-molybdenum alloy and the like is next added, and the mixture again milled for several hours to produce a fine, intimate mixture, which then is compressed to the desired shape in a tungsten-steel mold under a pressure of around 25 tons per square inch. When presintered, this becomes a blank of the desired size and shape. Finally the molded shape is sintered in a graphite crucible in a hydrogen furnace, a process which takes several hours on account of the necessity of applying the heat rather gradually. The actual temperature required varies but is of the order of 2500 degrees Fahr. The blanks are now ready to become the business end of a cutting tool.

Before being brazed to the shank, the sintered carbide blank is usually ground on the side that will be in contact with the brazing medium. Some carbide manufacturers, especially those offering a tantalum brand, nickel plate their blanks to secure a good bond, since the brazing agents usually employed will not adhere successfully to tantalum. Such blanks should not, of course, be ground. Brazing media in common use include "Easy-Flo," a silver alloy that requires a temperature of 1450 degrees Fahr., Tobin bronze which calls for 1750 degrees, and pure copper which must be heated to 2100 degrees for successful results. While the first mentioned can be brazed in the open with a torch and the second in a gas muffle furnace, copper brazing should only be carried out in a hydrogen atmosphere to avoid disintegration of the carbides.

The actual method employed to unite the tip of the tool shank is quite important. The reason is that the temperature reached by the cutting edge of the tool may easily exceed the melting point of any brazing material except pure copper. Hence it is desirable to purchase tools which already have been tipped or to follow the manufacturer's instructions very closely.

**What Carbide To Use:** Within recent years, some four or more compounds of hard carbides have appeared on the market for operations on different metals as well as fibers and plastics. These include the plain tungsten carbide; titanium and tungsten carbide; tantalum and tungsten carbide; and tantalum, titanium and tungsten carbide. The straight tungsten carbide tools can be applied to all general machining operations on cast iron, nonferrous metals and nonmetallic materials. They have a limited use on steel.

The grades principally used for steel cutting consist of tungsten and tantalum carbide, commonly known as tantalum carbides, the effect of the tantalum apparently being to reduce friction as the chip flows over the nose of the tool and to prevent particles of tungsten carbide from "pulling out." Although the tantalum is responsible for some of the cutting action, we rely principally on the tungsten carbide, the tantalum providing a lubricating effect which is helpful in preventing the building up of alloy iron and aluminum chips on the edge of the tool.

The titanium and tungsten carbides exhibit superior resistance to abrasive wear, are capable of higher speeds and when fractured, are more readily restored to service by grinding because of the restriction of the shatter zone to a relatively small area at the tip. But for tough assignments at high speeds, the blend of all three is tops. To secure the grade of sintered carbide best adapted to his needs, the prospective purchaser should consult manufacturers' lists which nowadays, are exceptionally complete.

**What Tool Form:** The question as to the kind of tool to be used on a given job has two aspects. First, there is the matter of its composition, with which we have just dealt. Next is its proper form. What the best form may be depends on the kind and hardness of the metal to be cut, the character of the cut (that is, whether roughing or finishing) and the way in which the tool is presented to the work. Since we are confined to a consideration of the roughing cuts on shell bodies, the range of possibilities is narrowed sufficiently to permit effective treatment within the space at our disposal.

Consider for a moment the essentials of the problem. It consists in its simplest form of machining off a hollow cylinder from the blank, a task which might be approached in several different ways, but which in practice is carried out by the use of a "point tool." Since the lathe cutting tool, or any other type of cutting tool for that matter, is nothing but a knife with a large lip angle—the included angle of the tool material between the face and the ground flank measured in a plane at right angles to the cutting edge—we might present the cutting edge to the work parallel to the normal or radial direction, after the fashion of a knifing tool and so machine off successive flat rings of steel.

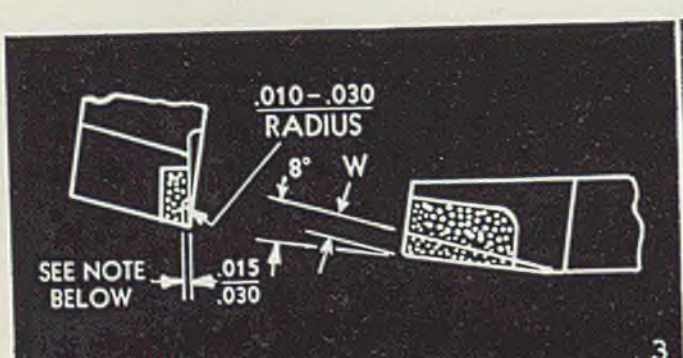
**Cutting Load Determines Form:** There are several objections, however, to this course. When entering the work, the full cutting load would come on the tool at once, resulting in heavy shock and again on leaving a ring would be pushed off which might damage the cutting edge. Hence we are led to the desirability of inclining the cutting edge, as this is viewed in

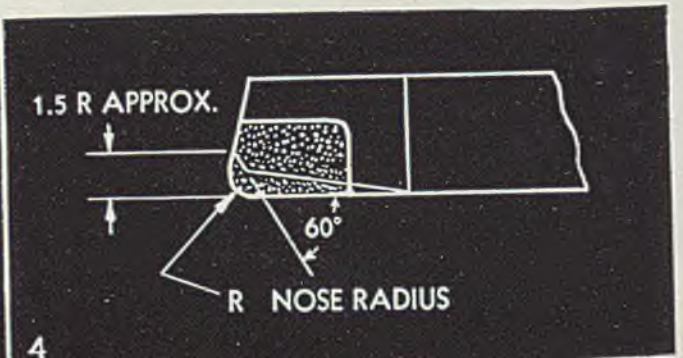
## Other Articles on Production of Ordnance

■ For other articles in addition to the series by Professor Macconochie, see issue of March 11, 1940, p. 38, for Design and Modern Methods of Making Shrapnel Shell; Dec. 2, 1940, p. 50, for Operation and Construction of Bofors Anti-Aircraft Guns; Oct. 14, 1940, p. 160, and Jan. 6, 1941, p. 219, for How Technical Progress Aids Defense; Jan. 13, 1941, p. 48, or Some Typical Shell-Forging Methods; Jan. 20, 1941, p. 54, for Recommendations on Heating Billets for Shell Forging; Jan. 20, 1941, p. 74, for Making Cylinders for Packard V-12 Torpedo-Boat Engines; Feb. 10, 1941, p. 67, for New Method of Checking Gun Bores.

Fig. 3—Common form of chip breaker for general use. Chip breaker is ground into tool tip

Fig. 4—Another form of chip breaker—for a tool having a large nose radius. Dimensions not shown here are same as those in Fig. 3



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plan, at some angle to the normal, 30 degrees let us say, both in order that the starting load may be taken at a point back of the nose where the tool is stronger and so the load may come on and go off gradually. This is known variously as the side cutting edge angle and the approach angle. See Fig. 1.

Next it is easy to see that there should be no sharp corner where the side and end of the tool meet and that a radius here is in order. See "nose radius," Figs. 1 and 2. Such a rounding off will add to the strength of the tool, and it will be less likely to heat up beyond the point where injury to the carbides might result. Also it will have a smoothing-off effect on the work. Except in the case of finishing tools, with which we are not immediately concerned, the tool profile in plan will be advantageously completed along the "end clearance angle" of 6 degrees.

**"Rake" Angles Give Clearance:** Now as far as the inclinations of the other surfaces of this very interesting solid figure are concerned, we have such other definitions as "true-rake angle" which measures the actual slope of the tool face toward the base from the active cutting edge in the direction of chip flow. This is a combination of "back-rake" and "side-rake" angles and will obviously vary with the feed and depth of cut. Our instincts will suggest a positive slope or an inclination toward the shank for the face of the tool; and we also have no difficulty in agreeing with the necessity for clearance both in front and on the side of the tool. This results in "end-relief" and "side-relief" angles. Thus we arrive at the generally accepted form of the shell roughing tool shown in Fig. 1.

**Tool Action Again Determines Angles:** Among the considerations which determine the selection of actual values of these rake angles are the necessity of obtaining a free cutting tool that will not chip or break provided it is re-sharpened before it is too dull, and which will give the maximum number of pieces per grind. A couple of degrees may make an important difference. Again the end cutting angle, while seemingly unimportant may demand consideration if the action begins not at the end of the piece but some distance along the body, as in the case of multiple tools. For this type of operation the tool usually feeds crosswise until it reaches the depth of the cut while the longitudinal feed is in operation. But on the other hand, the tool may plunge into the work until it reaches the desired depth before the longitudinal feed goes into action. Nose angles, if less than 85 degrees, are apt to produce a tool which is hardly strong enough for heavy work; and rake angles, while normally positive, may have small negative values if engaged on eccentric or uneven stock in order to take the load off the point. See Fig. 2. Clearance angles should not be larger than necessary for free cutting action, but too much is better than too little since a rubbing pressure may develop in the latter case and crack the tool bit.

**The "Chip Breaker":** An interesting feature of single point tool design is the provision of a "chip breaker" or "chip curler" as need may determine. In the absence of this device, the chip tends to flow over the face of a freshly ground tool as a straight ribbon, gradually assuming a spiral form of decreasing radius as the tool wears. Especially with the higher speeds now in common use, such chips may be troublesome or dangerous and have to be broken lest they also undermine the carbide tip. Common practice inclines toward the grinding of a groove in the face of the tool immediately beyond the cutting edge as shown in Figs. 3 and 4. This bends and breaks the chip as it moves from the cutting edge.

An additional piece of metal may be clamped to the tool in the path of the chip to bend it sharply upward and break it up or at least curl it up in a tight helix. This method is illustrated in Figs. 5 and 6. Here the material of which the breaker is made should be at least as hard as the substance of the cutting tool, since the chip exerts considerable force against it and exercises a powerful abrasive action on its face.

**How About Coolants:** A. H. Henrikson, service manager of the Wesson Co., Detroit, reports that the use of coolants increases the tool life on all steel cutting jobs, soluble oil proving superior to other coolants, although in several satisfactory setups a good cutting oil has done an acceptable job. The curious aspect of this matter is that little or nothing is known as to the manner in which the cutting fluid performs its duties, especially in regard to its lubricating action. "Several theories have been advanced," write the authors of the Manual on Cutting of Metals, "but none as yet have been confirmed by complete experimental investigations." They also report in connection with the selection of the correct cutting fluid to be used for best results for any given set of conditions that research has not been carried to the point where definite statements can be made. "It is known that the cutting fluid which will give best results for rough turning with deep cuts and relatively thin chips, will not necessarily give satisfactory results for shallow cuts and relatively wide chips. . . ."—a very curious conclusion if one thinks it over.

By way of comparison, Mr. Henrikson further reports that on one particular shell rough-turning operation he had two different machines, one cooled with soluble oil and operating at a speed of 285 feet per minute with a feed of 0.020-inch per revolution and a cut which increased from ⅛ to ⅝-inch deep. This machine had an output of 300 shell per 8-hour shift, with an average of one tool grind per shift and very small breakage.

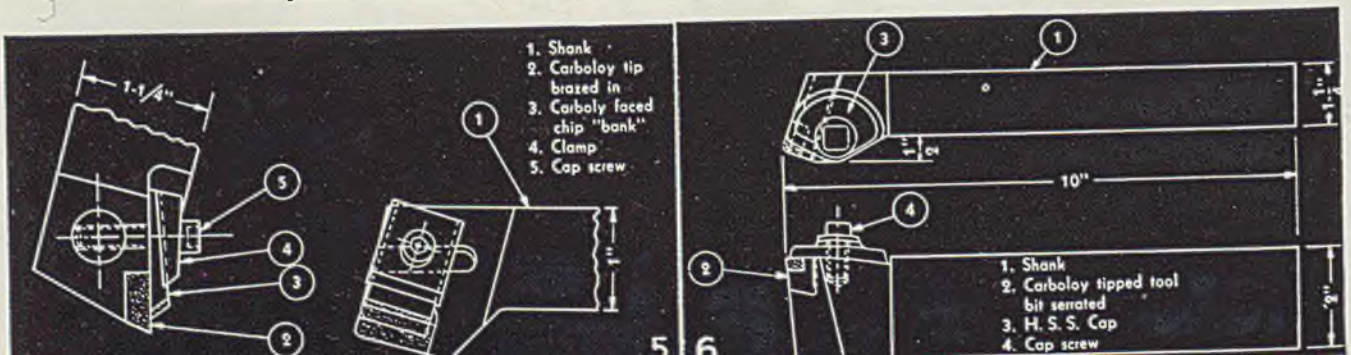
The other machine, operating under identical conditions, except that it ran dry and at 335 feet per minute instead of 235 feet per minute had a production of only 250 in an 8-hour shift due to frequent sharpening of tools and delays incident to breakage resulting from uneven heating of the tip.

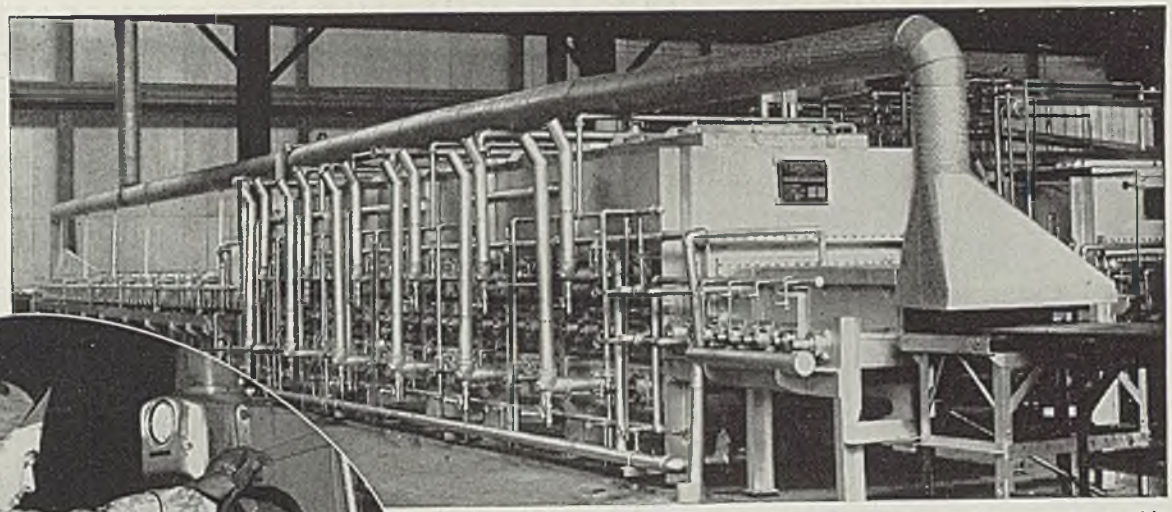
This brings us to the vital matter of cutting speed, which will be discussed next week in the second portion of this article.

(Concluded Next Week)

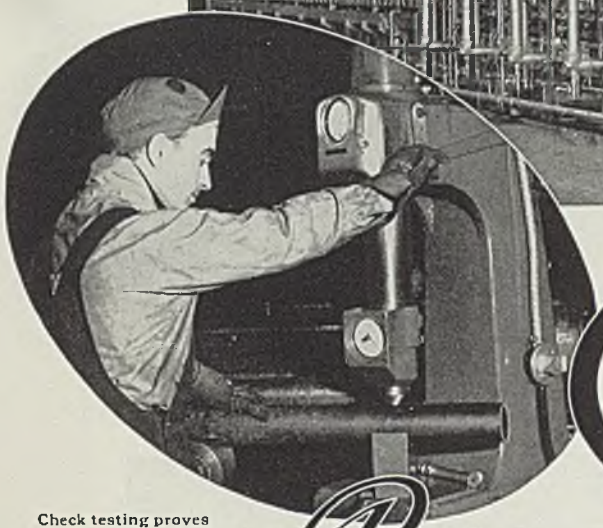
Fig. 5—An additional piece may be clamped to tool tip to act as chip breaker as shown here. Note this chip "bank", 3, is also Carboloy faced

Fig. 6—Still another type of chip breaker—a high-speed steel cap clamped in such a position as to form the chip "bank"





Bright annealing and normalizing in this controlled atmosphere type of furnace produces a uniformly bright, non-oxidized tube.



Check testing proves accuracy of anneal on all tubes.

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Years of research went into the development of this new method of annealing and heat treatment. Research still continues. Alert attention to all technological improvements that can further the progress in seamless tube manufacture is today, as in years gone by, the solid foundation upon which rests the reputation of "OHIO QUALITY" tubing.

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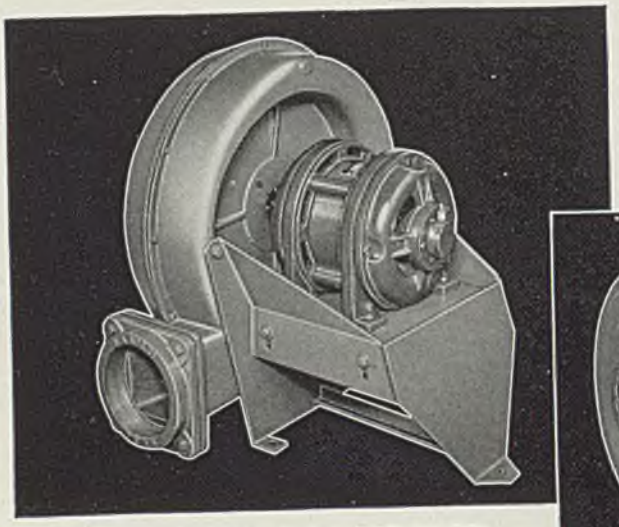

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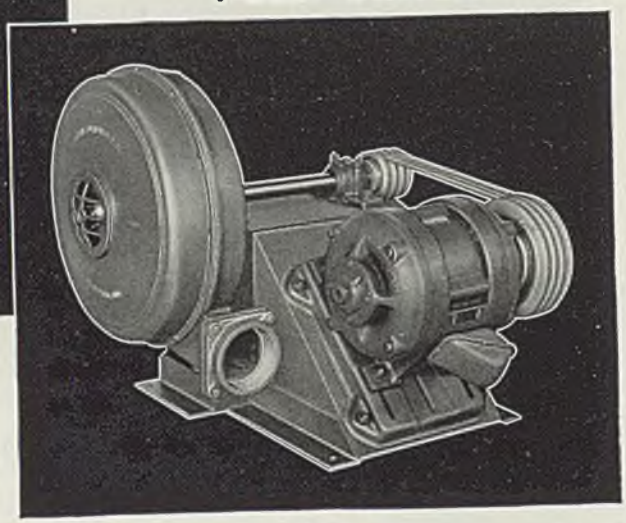

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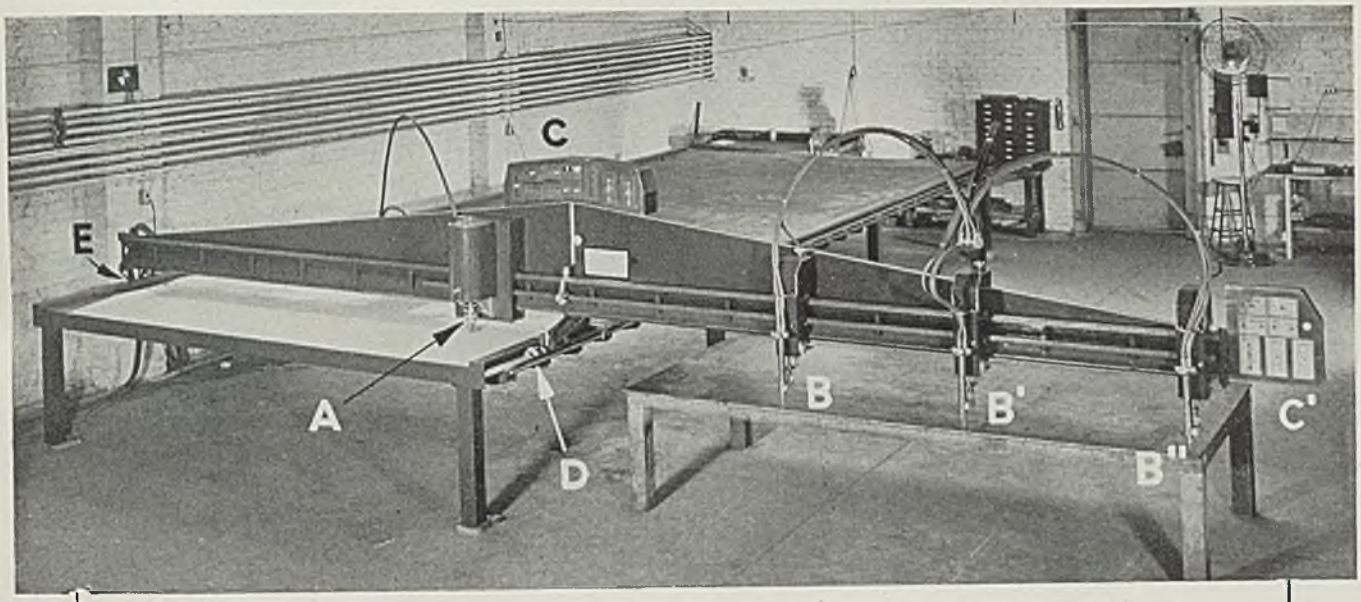



Fig. 1—Torch cutting machine shown here employs a number of unusual design and fabricating features described in the accompanying article

# Controlling Distortion and Alignment in Welded Tubular Construction

**Many other welded steel constructions can utilize to advantage the same principles described here and used to provide an extremely rigid construction and yet afford precise control over distortion and squareness of the finished work. The example given details construction of a precision, multiple torch, mechanically guided, flame-cutting machine**

By C. MOTT, Chief Engineer
National Cylinder Gas Co., Chicago

■ DESIGN and construction methods employed to produce efficiently the flame-cutting equipment described here may interest many other fabricators because of the unique methods employed to assure alignment, to prevent distortion during assembly and to assure a light, rigid piece of equipment. As in much other equipment, rigidity in flame-cutting machines is essential. In fact, maximum economy of the process depends entirely on the quality of the cut made, for it determines if subsequent machining operations can be minimized or entirely eliminated. Smooth accurate cuts in turn depend upon the rigidity of the machine and sensitiveness of the carriage movement.

**Fabrication Economies Designed In:** Minimum preparation costs such as edge straightening and planing, and minimum finishing costs such as machining and grinding have been achieved by a number of ingenious methods which will be detailed. Of equal importance is the precise aligning of parts, accomplished without the use of welding jigs but employing a transit. Distortion during assembly is avoided by carefully worked out system of skip welding. Too, a unique method is employed to counteract any slight distortion that does develop in the work.

While various methods have been used to obtain rigidity and sensitive carriage movement, the type "R" designs recently introduced by National Cylinder Gas Co., Chicago, have all structural members weld-fabricated from square welded steel tubing. Inherently strong and stiff, the light weight of this material permits considerable increase in sensitiveness of the carriage movement, reduces strain on supports and cuts power requirements. With the carriage constructed entirely of steel, changes in alignment due to unequal rates of expansion are eliminated.

Fig. 1 is a complete machine. The skeleton carriage is shown in Fig. 2; a table before being covered, Fig. 3. Note the square steel tubing. Set up for operation, Fig. 1, a guiding head or tracer follows a drawing or templet placed on the table with the multiple torch heads on the overhung arm following each movement of the tracer. The overhung carriage is supported at D, Fig. 1, by a set of rollers riding on a track carried on a table with a gear rack provided alongside the track.

Opposite end of the carriage, E, Fig. 1, is shown in closeup in Fig. 4.

Fig. 2 shows the carriage, basically a truss construction, triangular in both vertical and horizontal section with a taper from center to the ends. A 150-pound man standing on the overhung end of this truss produces a deflection of only 0.030-inch —affording some idea of its exceptional rigidity.

Center and end plates of this carriage truss are made from solid ⅝-inch steel plate, latticed out by

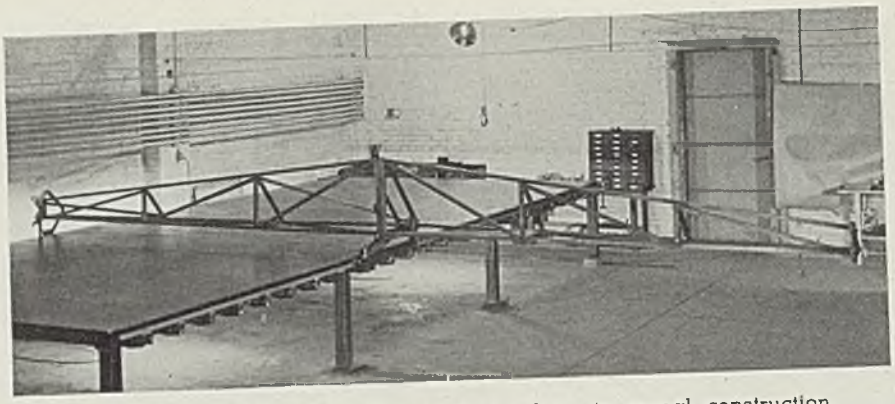


Fig. 2—Bare beam framework is shown here to reveal construction

flame cutting and reinforced by welding. The truss also carries a crosshead beam shown in Fig. 4 along which the crossheads and drive unit roll. Through all crossheads and drive units there runs a square tube attached to the top face of this beam. Fig. 5 shows how the crossheads roll upon this truss beam. A second truck at the bottom, Fig. 5, has ball-bearing rollers held up against the bottom guide rail by springs. This crosshead beam extends from end to end of the carriage truss to provide an extremely rigid structure.

Commercial tolerances permit welded square tubing to be used on all parts just as it comes from the mill. It is made from cold-rolled strip steel, SAE 1010, medium temper. On the 1¼-inch square size, for example, the smallest gage tolerance is plus 0.000 to minus 0.006-inch; side tolerance plus or minus 0.006-inch. Other tolerances, such as squareness of sides and twist, are also satisfactory.

The main tubular assemblies, table and carriage truss, are shown in Figs. 2 and 3. The table, Fig. 3, is for a unit with a 10 x 20-foot cutting range. Its construction is identical to that of the 10 x 30-foot table, Figs. 1 and 2. It is made up of two 9-foot sections and measures 11½ x 18 feet overall. Each table section is framed by 4 x 4 x 3/16-inch steel tubing. Within this frame is a center joist of 4-inch square tubing extending the length of the table section with four cross joists made up of eight pieces of 2 x 2 x ⅛-inch tubing separated by the longitudinal joist. All joists are flush with top of frame. In addition to acting as stiffeners, they support the table top of ⅛-inch steel plate. Finally, two diagonals of 2-inch square tubing, one in one piece and the other in two pieces, are used beneath the joists in each of the two sections of the table.

Table legs are 4-inch square tubing capped on top and bottom, a long cap being provided at the top and attached to the underside of the table sections by means of ½-inch cap screws.

**Alignment Without Jigs:** In fabricating the table, an ingenious method has been worked out to assure perfect alignment of all sections—an important essential for smooth operation of the machine. The four pieces of 4-inch square tubing that make up the frame are first assembled on the shop floor on a portion which has been carefully leveled for this work. Trammel marks are made at each corner. Then an engineer's transit is employed to make the frame square.

First one corner is welded; next the corner diagonally opposite; then the one directly across from the first corner and finally the one diagonally opposite that. This sequence has been found most satisfactory.

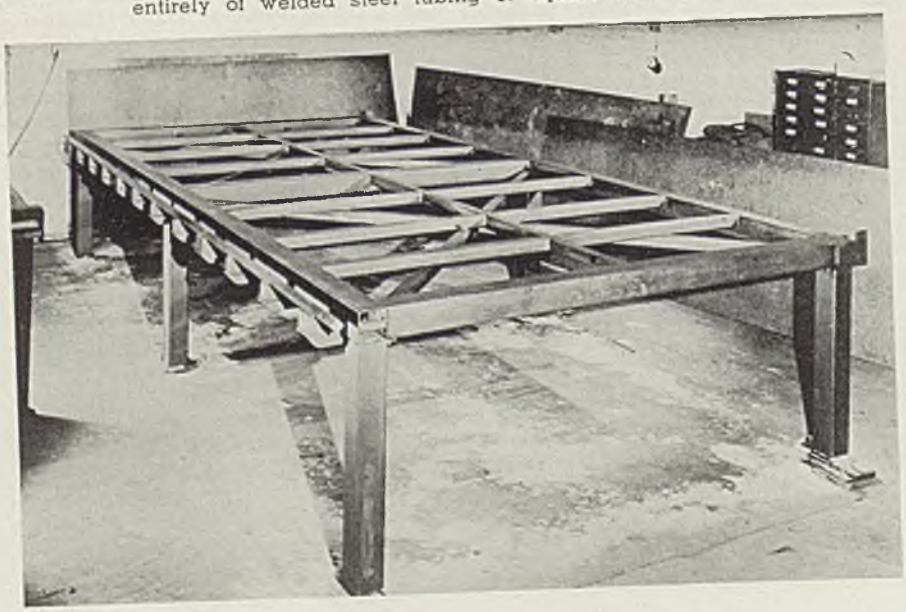
Before making the closing weld, diagonal distances are checked against a 1½ x 2-inch bar which has been marked to the exact diagonal length. If the frame is found to be out of square, the difference between the actual and required diagonal distance is noted and half this difference marked on the test bar. Then with the diagonal test bar held in place as a guide, the fourth joint is closed.

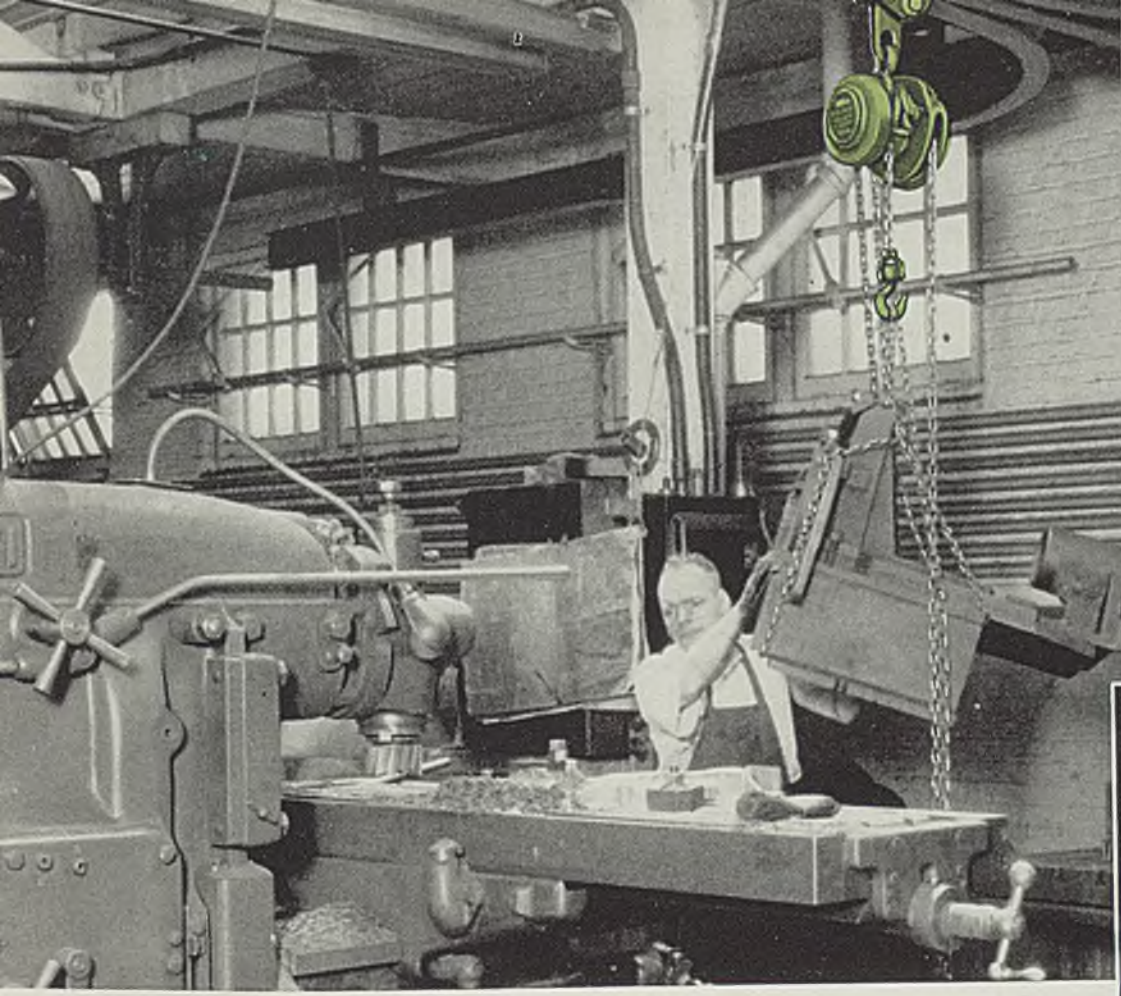
**Avoiding Distortion:** Next the longitudinal joist is put in place and welded and then the cross joists in a 1, 5, 3, 4, 2, 6 type of sequence to give minimum distortion. Since the frame rests face down on the floor during this work, the faces of all joists when dropped in place are level with the top of the frame, too. In welding the joists, the diagonal test bar mentioned above is also used constantly to determine the amount that the welding affects the squareness. From this, the exact order of welding the joists is determined. If one joist weld pulls the table frame a little out of square, the next joist welded will be one that will be in such a position as to pull it back again. A little experimenting serves to make this method suitable for handling a large variety of other assembly work as well.

Finally, the diagonal members of the frame are put in place on top of the joist, the table still being face down. First the long diagonal is welded to the frame, and then the two pieces forming the other diagonal are welded to it and to the frame. Here, too, the transit and the test bar are employed to check the squareness of the frame constantly. The sequence of welding is adjusted so each weld is in such a position as to counteract any distortion induced by the preceding weld.

**Stretching the Top:** Since the top sheet must be perfectly flat, it is stretched on the table frame during construction. After the frame is completed, the top plate is placed over it and tack welded along one edge. Then a torch is used to apply heat to the central portion of

Fig. 3—This is closeup of a table before the top is welded in place. It is made entirely of welded steel tubing of square cross section



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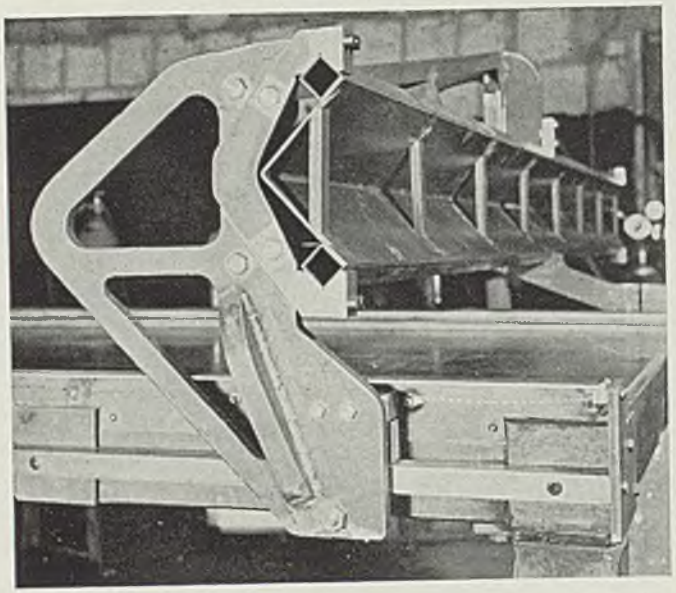

Fig. 4—Closeup of beam end showing fixture cut from plate and end view of beam revealing how square tubing is employed to stiffen the assembly

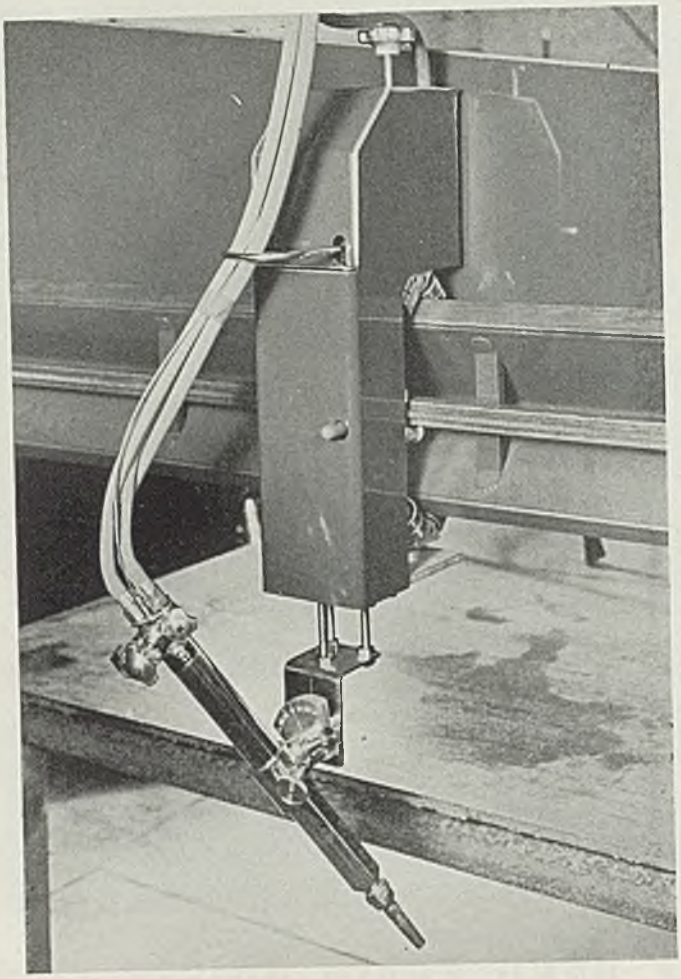

Fig. 5—Closeup of torch head, showing rollers on which it rides on the top of one of the square tubes shown in Fig. 4, constituting the track. The lower tube affords a guide as another set of rollers is held against it by a spring

the plate, thus expanding it a small amount. While it is expanded, intermittent welds are made on the opposite edge. When the plate cools, there is just enough pull to straighten it out flat and level, when the welding of all sides is completed. Thus the top plate, itself a stretcher leveled sheet, is actually stretched flat upon the table frame.

There are many places in making welded assemblies with sheet covering members in which a perfectly flat, smooth attachment of the sheet to the frame is desired. The method just described can easily be adapted to much of this work with excellent results.

**Fabricating the Truss:** The carriage truss is made of 1¼ x 1¼ x 0.120-inch steel tubing. Welding procedures for insuring squareness are similar to those described in fabricating the table frame except for welding the final closing joint.

Before the final tie-up welding, a short length of bar stock of a size that will just fit inside the tubing is inserted in one of the abutting tubes with one end protruding. A few holes have been drilled in the same tube to receive the round nose of a screw-type C-clamp. Then the joint is heated and the squareness of the entire truss checked by means of a transit in the same manner as was done with the table frame. When perfectly square, the truss is closed by tightening the C-clamps with the protruding bar extending out from the tube the correct distance to abutt tightly against the adjoining member. Then the protruding end of the bar is welded against the abutting portion of the truss. Finally plug welds are made through the drilled holes of the tube into the bar insert. Then the C-clamps are removed and the holes through which they clamped the bar are plugged by welding.

Just as the method described for obtaining squareness and for controlling distortion can be adapted to much other work, so can this method of adjusting the closing joints of a frame be utilized for much similar work.

The carriage beam, Fig. 4, employs a particularly interesting design. The central portion is formed of ⅛-inch steel plate with 5-inch legs. Along top and bottom are mounted 1¼-inch square x 12-gage steel tubes. The stiffeners of ¾-inch channel are welded across the beam. Upper tube is the guide rail for the tracer and torch heads. While straightness tolerances governing carriage travel are extremely close, this tubing is purchased without any special specifications for straightness other than the standard commercial tolerances for square welded tubing. As in the case of the table frame and tubular truss which have been described, welding sequence and transit control are depended upon to produce the required straightness of the finished beam.

No machining or other finishing operations are necessary on the beam surfaces. This beam assembly weighs only 5 pounds per foot.

The mechanisms of the tracer head A and the torch heads at B, B′, B″ are enclosed by neat steel covers. Similar steel enclosures house control stations at C near the tracer head and at C′ at the far end of the overhung truss. A ⅛-inch plate is between the carriage beam and truss.

## Versatility of Duplicator Control Shown in Folder

■ With the current interest focused on any equipment which increases or multiplies the effectiveness of skilled or unskilled machinists, Detroit Universal Duplicator Co., 217 St. Aubin street, Detroit, has issued a folder which shows various applications of its duplicator control as applied to turret lathes, planers, shapers, millers, etc. In fact, the unit can be used to control almost any machine tool, providing accurate duplicating control and permitting the reproduction of the original model directly in metal, according to the company.


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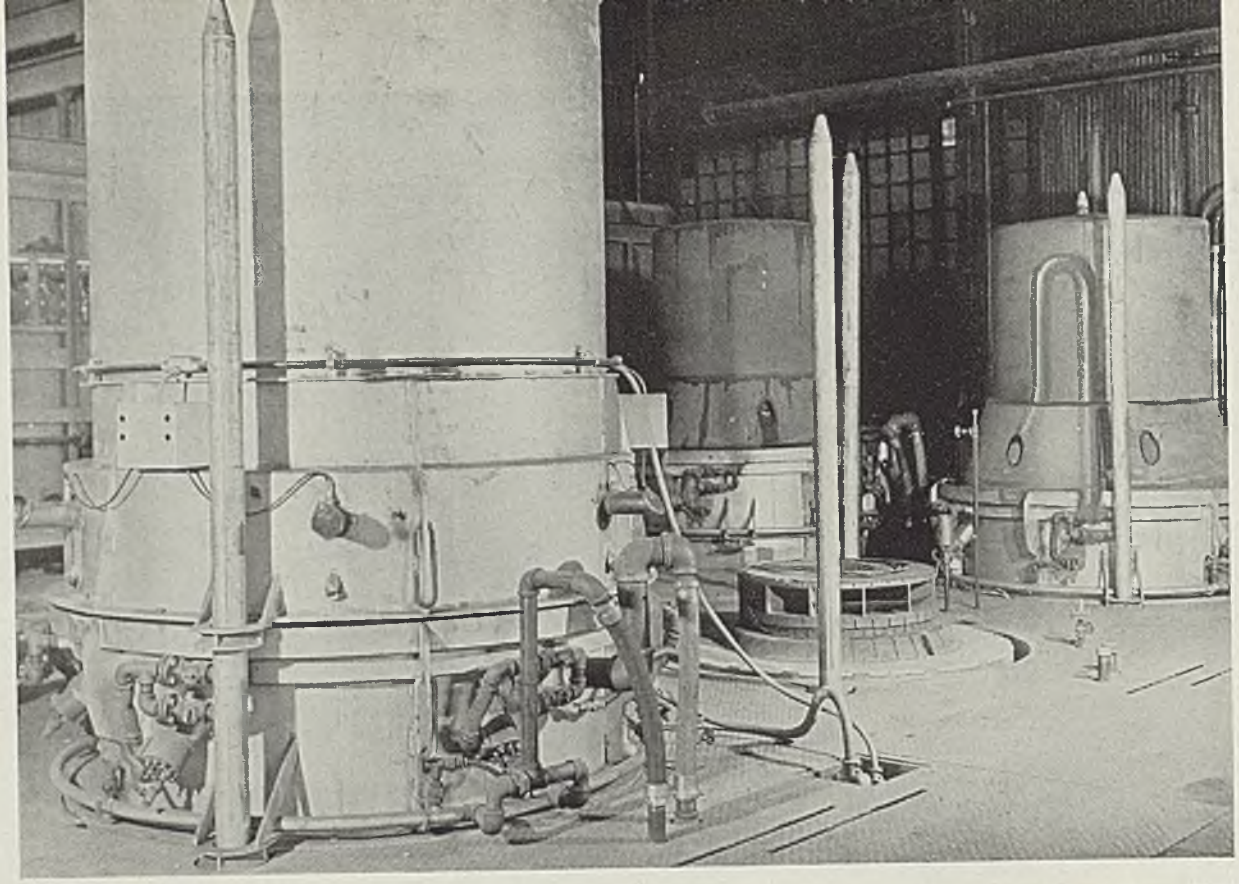

Fig. 1—New Wilson firing-retort type furnace at Superior Steel Corp., Pittsburgh. In the row of three bases extending from left to right, furnace bell is in position on one retort, one base is empty and the third is covered by its firing retort. Position of a radiant tube in the firing retort is shown by the phantom tube inside retort at right

# Improved Radiant-Tube Strip Annealing Furnace

*Six months' use of new design of bell-type furnace shows unit gives marked increase in speed of heating, cuts fuel consumption and is expected to show greatly increased life of radiant tubes, since they seldom exceed temperature of strip by more than 50 degrees Fahr.*

■ THE FIRST installation in the strip steel industry of the new Lee Wilson cylindrical bell-type furnace with radiant tubes as part of the inner cover was completed recently at the Superior Steel Corp., Pittsburgh.

Fig. 1 shows the appearance of the completed job as it is in operation today. The installation consists of three bases, three firing retorts of the new type and one furnace bell. The nomenclature of these furnace components differs somewhat in meaning in this new type unit and this difference is defined as follows: The furnace base is the same in design as the older furnace installations. Each base contains its high capacity recirculating fan and has an oil seal.

The firing retort is an inner cover in which a number of return-bend radiant tubes are installed. See Fig. 1. The lower part of this unit is refractory lined up to the point where the conical alloy hood is welded to the structural steel casing. Each tube is welded to this casing at the firing end while the exhaust end is welded to the alloy sides of the cover. The tube is held in place at the top or return bend but can float free to meet expansion requirements. Each tube thus is welded securely in place and so is gas tight with reference to furnace atmosphere leakage.

The furnace bell is only an insulated cover which retains the heat generated by combustion in the radiant tubes of the inner cover. Other than this function, the bell takes no part in the combustion of the furnace gases, except to carry the spark plug igniters and transformers.

Furnace handles a charge, 42 inches in diameter by 84 inches high. With it are used three bases, three furnace retorts, one furnace bell. Fuel is natural gas under a pressure equivalent to a 16-inch water column. Combustion system is dual pressure type. Base seals are oil or water. Recirculating fans handle 2500 cubic feet per minute. Deoxidizing gas is a partially combusted natural gas, dried to a plus 45 degrees Fahr. dewpoint.

**Different Combustion System:** The combustion system on this unit is very different from previous inspirating burner designs. A dual pressure system is employed with both gas and air supplied at a constant low pressure to the gas and air headers on the firing retort. The burners are completely enclosed so

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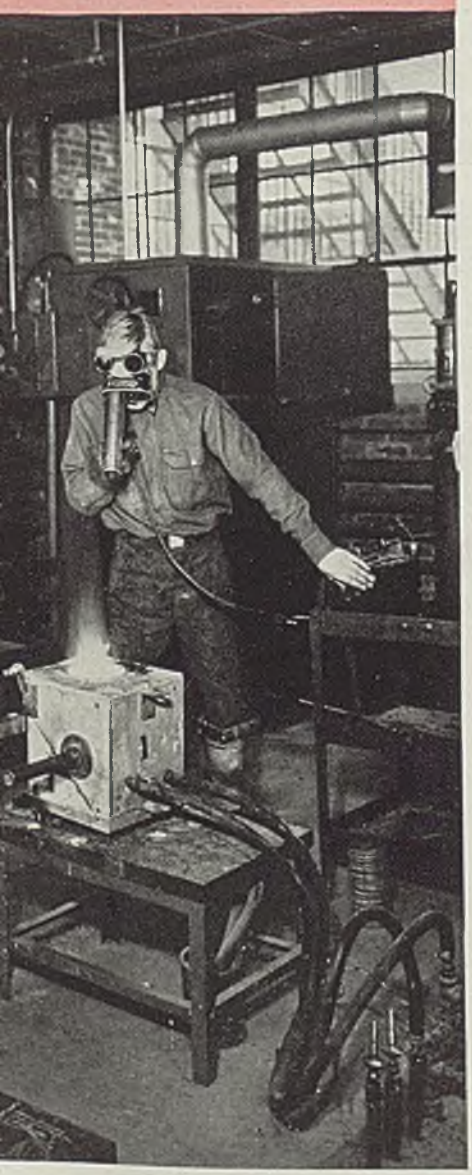

In the preliminary studies of new alloys of nickel in the laboratories of The International Nickel Company, Inc., small experimental melts made in coreless induction furnaces are used extensively to determine the optimum alloy ranges in the large series of closely controlled melts that must be made in the development of new alloy compositions.

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At the left we show one of these furnaces of 35 KW capacity in the laboratories of the International Nickel Company. Two of these units are used at Bayonne, New Jersey, and one at Copper Cliff, Ontario, for testing and research in the ever-widening trend of nickel alloys.

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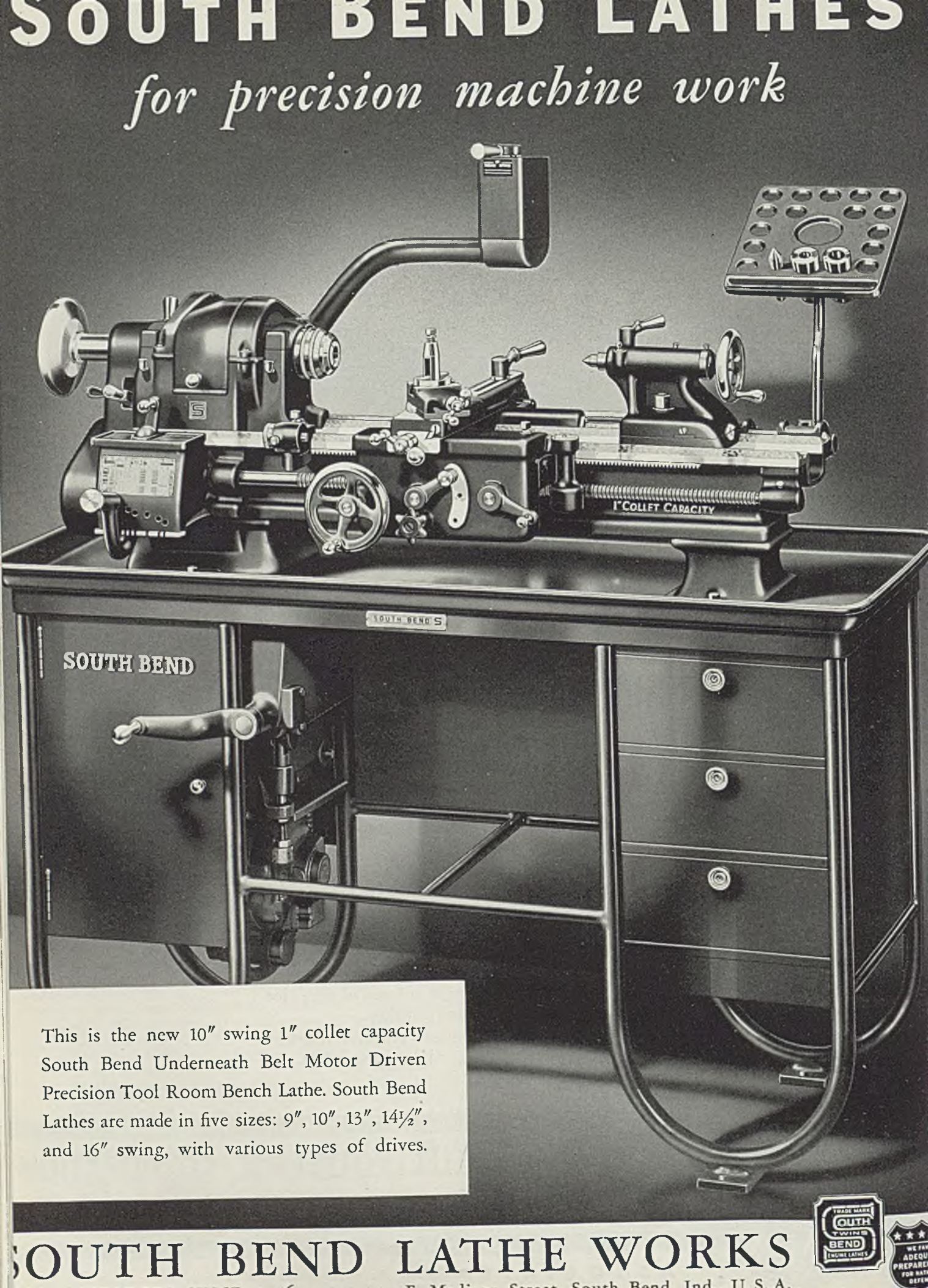


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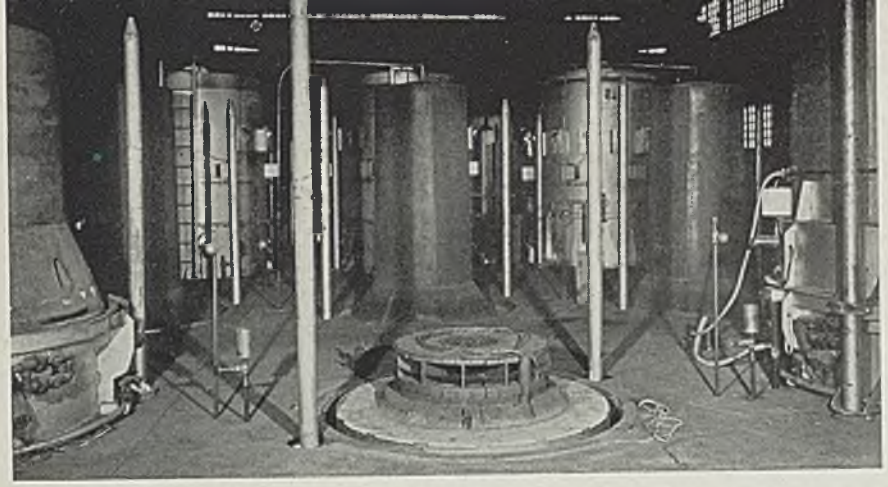


Fig. 2—General view in annealing department at plant of Superior Steel Corp.

combustion involves only the fuel and air passed through the automatic control mechanism. A secondary adjustment on the burners permits a micrometer regulation of the flame length, so all of the former advantages of close control over the vertical heat application are retained. Further, this system produces complete combustion even at the lowest position of turndown.

The advantages of this new type of furnace are readily apparent when its construction is examined. The inner cover is approximately 18 inches larger in diameter than in former designs. This greatly increases the radiation area of the furnace. The radiant tube areas can now be added to that of the inner cover for total radiation. Thus this area in the new design furnace becomes twice the former figure. The fan recirculation passes directly over the source of heat and the turbulence of the gases is increased by the protuberance of the radiant tubes in the gas stream. The waste gases pass out of the firing retort and then under the furnace bell to exit through the roof. This provides the B.t.u.'s required to make up for radiation losses of the bell.

**Fuel Cut 20 Per Cent:** These features should be expected to improve economies and overall efficiency. By actual operating records, this unit at the Superior Steel Corp. is annealing more tonnage than the previous Wilson installations there, and at a fuel consumption 20 per cent lower than their best previous records, as shown by several months' operation of the new unit.

**No Tube Replacements:** By actual operating records the temperature of the radiant tubes is never more than 50 degrees higher than that of the strip charge, and this condition does not exist longer than 15 minutes. And, what is vitally important is that the tubes cannot be used any more frequently than the inner cover. This fact, combined with the reduction in tube temperature differential from 200 to 50 degrees, means that tube replacements are not necessary during the normal life of the furnace.

**More Easily Manipulated:** There are several other features of this design which make it especially adaptable for installation in existing or new strip plants. Since the weight of the furnace is divided between the bell and the retort, the weight of any unit to be lifted is only half that of the older design. A sizable unit can be served by a crane as small as 3-ton capacity. Also, the head room required is approximately 2 feet less—a prime consideration in the usual mill.

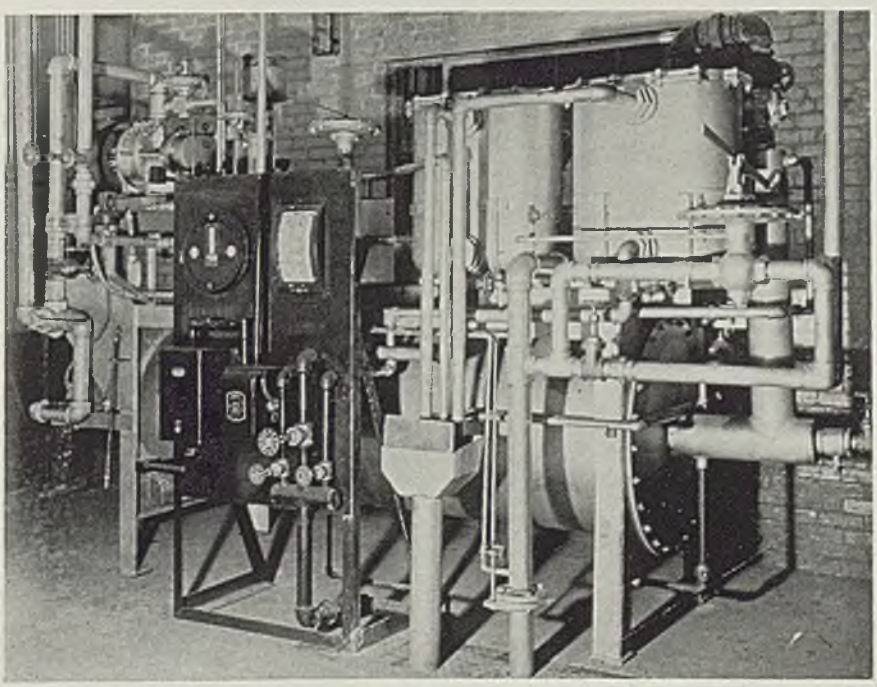
**Faster Cooling:** Beyond the possibilities of the usual methods for cooling the charge after annealing, this furnace can be cooled faster by blowing air through the radiant tubes. Since the tubes are adjacent to the charge, they can remove a tremendous quantity of heat in this manner. These increased cooling rates allow a charge of 12,000 pounds to be cooled in 22 hours where former cooling time was 30 hours. The difference assures the adequacy of three bases per furnace.

Furnace movements are normal in type and number. Fig. 2 shows another view of the coil annealing department at Superior Steel with the new furnace in the foreground. Three links are used to lift the furnace bell and firing retort. A 3-arm rig with three suspended chains is lowered over either unit and lifts it by the links.

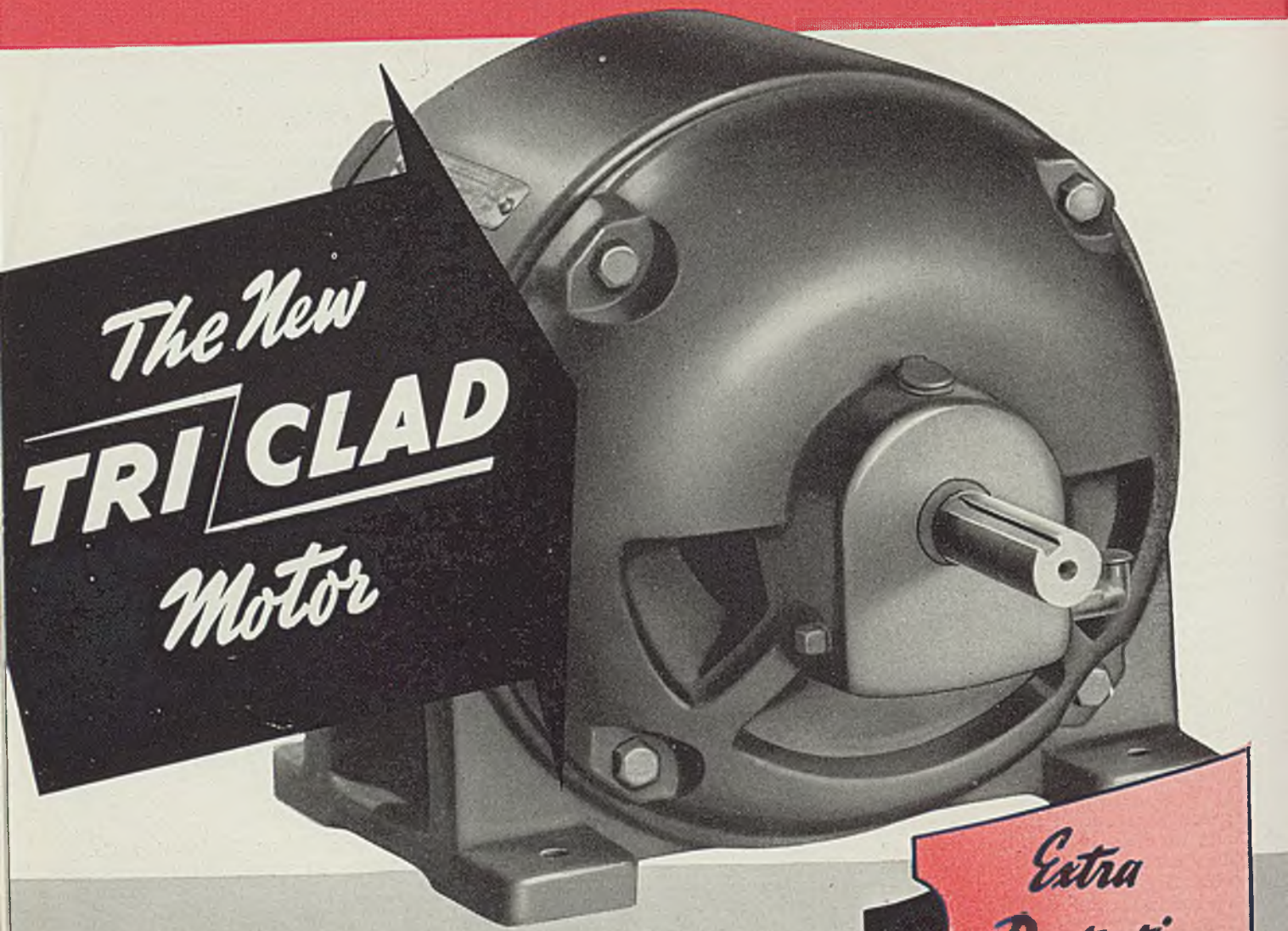
The installation at Superior Steel provides a charging base 42 inches in diameter and a charge height of 84 inches which will accommodate a usual charge of 12,000 pounds of strip coils, 16 inches inside diameter x 36 inches outside diameter. Each base is equipped with a high capacity recirculating fan to speed up the heating and cooling cycles and assure exceptional uniformity throughout the charge. Fig. 2 shows one of the bases unloaded. The thermocouples are to be seen, as well as the very neat floor arrangement up to the bases. Fig. 1 shows the floor slots through which the operating handles are placed.

The deoxidizing gas apparatus is shown in Fig. 3. It consists of a gas combuster in which natural gas is used to prepare a gas for bright annealing low carbon steel. This gas is dried to a dewpoint of plus 45 degrees Fahr. in a refrigerator before it goes to the bases. The fuel and air are maintained at the desired ratio with automatic equipment. This unit also was designed and built by Lee Wilson Engineering Co.

Fig. 3—Deoxidizing gas generator designed by Lee Wilson Engineering Co. Note air-gas ratio control equipment on panel



# Inner Strength

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### ITS DIELECTRIC FILM UNDER SEVERE CONDITIONS

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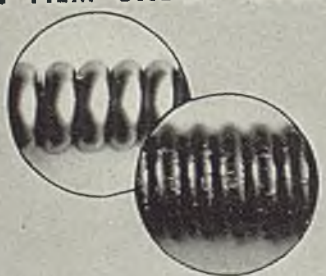
ormex wire is insulated ith a vinylacetal-type astic developed by G-E ngineers after 10 years of search. Tests of resistance abrasion show a 3-to-1 periority of Formex wire ver high-grade enameled ire. Formex wire in *your* otors gives added assur- nce of dependable, con- nuous operation.

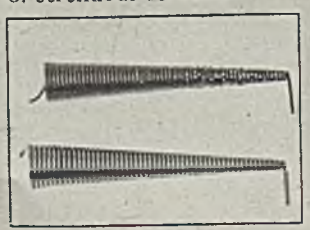


### ELONGATION

Compare the two pictures above. The top photo shows Formex wire stretched 20 per cent and wound on its own diameter. The lower picture shows enameled wire stretched 10 per cent and wound on twice its diameter.

### HEAT SHOCK

The top sample (below) shows what happens to good enameled wire when it is wound in a helix and heated to 150 C. Formex wire (shown at bottom) is unaffected by this heat shock. That is why it does not become brittle and crack away even after years of strenuous service.



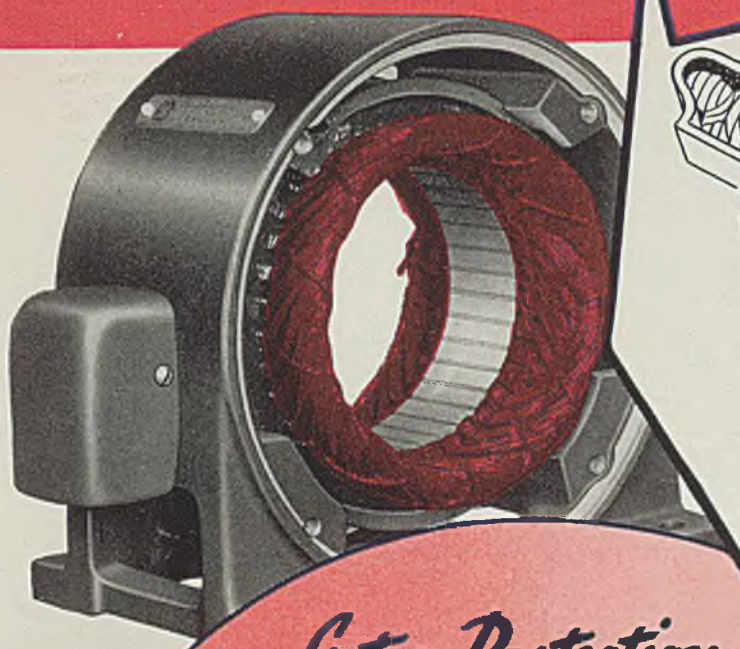
### Extra Protection

**against physical damage**

Strong, one-piece, cast-iron frame and end shields, with upper portion completely enclosed, protect vital motor parts from external blows, flying chips, settling dust, dripping liquids.

*...built for protection first ...to last!*

# Begins WITH FORMEX



## NO "MUMMY INSULATION" HERE

With Formex wire, G-E engineers were able to "take off the wraps" on random-wound motors. Away went organic "mummy" coverings and heat-enclosing compounds. Having Formex wire, G-E engineers built a stronger, tougher motor insulation.

## Extra Protection

### against electrical breakdown

When you're looking for a longer-lasting motor—one that won't wilt and weaken after years of strenuous service, or fail you in an emergency—you want the Tri-Clad motor with its *inner strength.*

When G-E engineers designed the Tri-Clad motor, they saw that the toughness of Formex wire insulation opened up new opportunities for strengthening the entire coil assembly from the inside out. They utilized new G-E synthetic-resin bonding varnishes to give rigidity and extra resistance. They fortified the slot-cells. They welded internal connections.

Finally, they selected for application on end turns a coating of Glyptal No. 1201 Red as an additional armor against the many adverse operating conditions commonly found in industrial service.

Thus, in the Tri-Clad motor you get a more compact winding—one that dissipates heat quickly and keeps the motor young.

With double-end, "controlled-velocity" ventilation and advanced electrical design throughout, the Tri-Clad motor's tougher coil windings mean extra years of service. Next time you order induction motors . . . . make sure they are Tri-Clad motors. General Electric, Schenectady, N. Y.

**Integral-hp sizes up to 20 hp (at 3600 rpm), open or splashproof, are now available—also capacitor-motors in sizes up to 5 hp.**

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Sleeve bearings of new design have longer life, greater capacity, improved lubrication features. One-piece cast-aluminum rotor winding, with fans cast integrally, is practically indestructible. Sealed ball bearings retain lubrication, exclude dirt.

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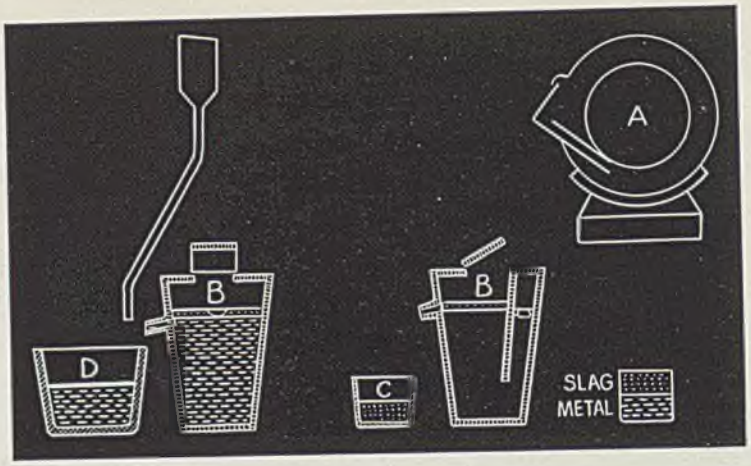


Fig. 1—Desulphurization of mixer metal made by "O.M." process
A—Mixer.
B—15-ton syphon ladle, lined with loam and having firebrick bottom. This separates metal from mixer slag.
C—Vessel into which mixer slag overflows.
D—Ladle which receives clean metal from B, and a charge of sodium carbonate from hopper above.

## Recent Developments in

# EUROPEAN Blast Furnace PRACTICE

■ DIFFICULTIES encountered in England in the early 1930's when the low-grade aluminous iron-ore deposits of Northamptonshire were being developed for basic steelmaking, were first overcome by the processes introduced at the Corby plant of Stewarts and Lloyds, Ltd. The burden of the blast furnace was modified in such a manner that the slags formed were of low melting point. It was well known that slags of high lime and high alumina content have high melting points, with consequent difficulties of operation. These slags of low melting point may have a lower capacity for carrying sulphur than high lime slags of common practice, and in the manufacture of basic pig iron it is, in general, essential that the liquid iron shall be desulphurized after tapping the metal from the blast furnace.

The desulphurization of pig iron is carried out in several different ways, among them being: (a) By the use of a limey slag in the blast furnace; (b) by manganese additions to the blast furnace burden, and (c) by treatment with sodium carbonate in a ladle, after the iron is tapped from the furnace.

Methods (a) and (b) have certain limitations both from the operational and the economic points of view, whereas (c) is capable of application to a wide range of pig irons.

### Continental Work

The sodium-carbonate desulphurizing process is now new, but it has only been widely developed commercially during the past decade as a result of research work carried out in Great Britain. The method afterwards quickly found favor in Luxemburg, France, Belgium and Germany, until in 1938-39 the consumption of sodium carbonate for metal refining in these countries was at the rate of 80,000 to 100,000 tons per annum, representing the treatment of something like 6,000,000 tons of iron.

The first major Continental development employing sodium-carbonate treatment was the "O.M." (ohne mangan or manganese-free) process, i. e., the manufacture of pig iron without additions of manganese ore to the blast-furnace burden. The reason for this was probably mainly economic. Manganese had to be imported, and, particularly in Germany where the doctrine of economic self-sufficiency was being pushed to the limit, there was a strong inducement to use as little of it as possible. In addition, there were certain technical reasons which favored the "O.M." process. Manganese is less easily reduced than iron in the blast furnace, and a considerable proportion of the amount charged with the burden is lost in the slag.

In order to minimize the proportion of the manganese oxide which is thus lost, additional limestone has to be used. Further, the reduction of manganese oxides can only be completed in the bosh of the blast furnace by solid carbon, and, as a result of these two factors, the coke consumption is increased proportionately to the percentage of manganese oxide in the burden. This in turn reduces the rate of output and increases the liability to scaffolding in the furnace and the production of falling slags. Manganese oxide is also said to render the slag less suitable for cement manufacture, as it impairs the hydraulic properties[1] of the cement.

The Minette ores native to Northern France, Luxemburg and Belgium contain sufficient manganese to give a maximum of about 0.7 per cent of manganese in the pig iron made from them. This is regarded as the upper limit for irons within the "O.M." range. Often, much less manganese than 0.7 per cent is present. This compares with 1.2 to 1.6 per cent of manganese which was formerly considered desirable in basic iron. An important function of added manganese is to remove sulphur from the iron in the form of manganese sulphide. This method of desulphurization has been replaced, in the "O.M." process, by sodium-carbonate treatment.

### Luxemburg Experiments

In a series of experiments carried out at a works in Luxemburg, the addition of manganese ore to the blast furnace burden was progressively lowered, as shown in Table I. The furnace, which was making

From a paper presented to the East Anglian Section of the Institute of British Foundrymen.

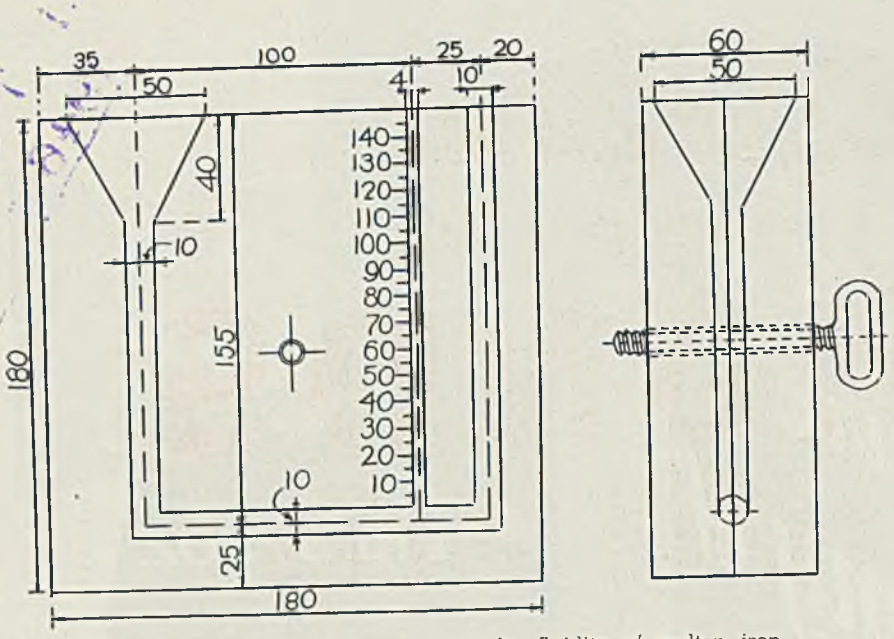


Fig. 2—Apparatus for measuring the fluidity of molten iron

basic iron, was operated with a slag having a basicity ratio $CaO:SiO_2 = 1.45:1$. Each successive diminution of manganese in the burden caused a corresponding increase in the sulphur content of the iron.

The iron was desulphurized in a ladle by treatment with sodium carbonate. This reagent was put into the bottom of the ladle, and the iron was tapped on to it, special precautions being taken to prevent any siliceous slag becoming mixed with the soda slag. The treatment was carried out after the iron left the mixer A (Fig. 1) from which it was poured into a ladle B. The sodium carbonate was run from the hopper E into ladle D, and before the iron reached this it was passed through the ladle B, which was of the "teapot" type and effected a separation of the metal from any slag coming from the mixer. The teapot ladle had a capacity of 15 tons, and had a rammed acid lining with a bottom made of silica-alumina firebricks. Two spouts were provided, one about two-thirds of the way up, for clean metal to overflow into ladle D, and the other slightly higher, for running off the soda slag into the slag pan C. The ladle D, in which the sodium-carbonate treatment was carried out, was deslagged by tilting it and allowing the fluid soda slag to run away, assisted by a rabble. The iron was then taken to the basic-bessemer converter to be blown to steel.

The consumption of sodium carbonate was about 11 pounds per ton of iron. One part of anthracite was mixed with five parts of sodium carbonate, it being claimed that this minimized the amount of iron passing into the slag. The average decrease in the sulphur content of the metal was 38 per cent, i.e., from 0.08 per cent to less than 0.05 per cent, a further reduction taking place in the basic converter. At the end of the dephosphorization stage in the converter, the residual manganese in the iron was 0.08 per cent as compared with 0.20 per cent when the blast furnace was operated with manganese additions. The usual manganese additions were made to the steel after blowing. Steel made by this process, of an extra soft quality for wire manufacture, was found to give good results. An improvement was also noted in the ductility of sheet steel (as measured by the Erichsen test) when made from "O.M." iron desulphurized with sodium carbonate. Theisen[4] reported fewer rolling mill rejects after adopting the desulphurization process and the "O.M." method of operation effected a considerable reduction in costs.

It has been demonstrated that sodium-carbonate treatment of basic-bessemer cast iron improves its temperature and fluidity. At a French works, where sodium carbonate has been used for a long period, the monthly average analysis of the iron after treatment was as follows:

| Element | Per Cent |
|---|---|
| Silicon | 0.30 |
| Manganese | 0.90 |
| Phosphorus | 1.80 |
| Sulphur | 0.03 |

The following temperatures, which are uncorrected readings with an optical pyrometer, are averages of observations taken over a long period.

| | Degrees Fahr. |
|---|---|
| Untreated iron at mixer spout | 2264 |
| Untreated iron entering converter | 2210 |
| Treated iron entering converter | 2246 |

The higher temperature of the treated metal is not unexpected, and confirms experience in this country in the treatment of foundry iron. Desulphurization itself is probably an endothermic reaction, but it is usually accompanied by a slight desiliconizing reaction which is exothermic and more than counterbalances the loss of heat in desulphurization.

### Results Confirmed

Fluidity tests offer a striking confirmation of these results, and prove that, other conditions remaining constant, treated iron is much more fluid than untreated.

The gage used for measuring fluidity is illustrated in Fig. 2. It consists of a cast iron mold in two parts screwed together, comprising a U-tube of 10 millimeter diameter with a tun-dish on the top of one limb. A third limb, 4 millimeters diameter is graduated in millimeters along its length. The molten metal under test is poured into the tundish until it reaches the top of the other 10 millimeter limb. The distance of the flow along the 4 millimeter limb before solidification takes place is a measure of fluidity of the metal under test. Results

TABLE I

Influence of Manganese Additions to Blast Furnace Burdens

| Manganese added to burden lbs./ton iron | Analyses of iron Si., % | Mn., % | S., % | P., % |
|---|---|---|---|---|
| 48.5 | ... | ... | .... | ... |
| 33.0 | 0.43 | 1.00 | 0.063 | 1.77 |
| 22.0 | 0.44 | 0.62 | 0.075 | 1.80 |
| 22.0 | 0.47 | 0.62 | 0.073 | 1.82 |
| 17.5 | 0.52 | 0.57 | 0.080 | 1.86 |
| 17.5 | 0.45 | 0.52 | 0.097 | 1.84 |
| 11.0 | 0.46 | 0.45 | 0.100 | 1.84 |
| 0 | 0.54 | 0.34 | 0.080 | 1.84 |
| 0 | 0.55 | 0.26 | 0.082 | 1.79 |

TABLE II

Slag and Metal Analyses in Application of Acid Burdening

| | Northampton-shire ores[5] Normal practice | Northampton-shire ores[5] Acid practice | German Dogger ores[2] Acid practice |
|---|---|---|---|
| Slag composition*, % | | | |
| $SiO_2$ | 30.9 | 33.6 | 44.1 |
| $Al_2O_3$ | 22.1 | 26.0 | 15.1 |
| CaO | 40.0 | 35.7 | 36.3 |
| MgO | 7.0 | 4.7 | 4.6 |
| Ratio $CaO:SiO_2$ | 1.29 | 1.06 | 0.83 |
| Iron analysis, % | | | |
| Si | 0.55 | 0.6 | 1.58 |
| S | 0.05 | 0.13 | 0.448 |
| P | 1.85 | 2.00 | 1.95 |
| Mn | 1.42 | 1.4 | 0.18 |
| Limestone per ton of iron, lbs. | 1120 | 50 | 1610 |
| Coke per ton of iron, lbs. | 2875 | 2425 | 3950 |
| Sulphur in slag, % | 1.42 | 1.80 | 0.69 |

*The four main constituents calculated to 100 per cent.

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over a period of a month follow:

| | Height of 4-mm. limb, in millimeters |
|---|---|
| Undesulphurized metal at mixer spout | 55 to 65 mm. |
| Desulphurized metal before going to converter | 85 to 95 mm. |

An important practical effect attributed to this greater fluidity is that desulphurized iron can be blown in the basic-bessemer in 3 to 5 minutes less than untreated iron.

Desulphurization is in some cases carried out in ladles with a basic lining of dolomite. These have a longer life (800 to 1000 heats) than silica-alumina firebrick linings (400 to 600 heats). When not in use they are kept hot over burners using blast furnace gas. Preliminary tests carried out by the author suggest that the use of basic lining may sometimes result in a desiliconizing reaction greater than that occurring in an acid lining, and this may have accentuated the temperature rise and the improved fluidity noted in the French tests.

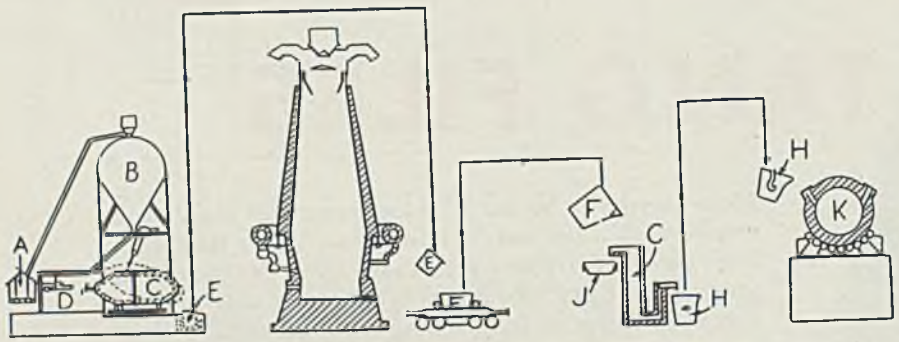


Fig. 3—Schematic diagram for desulphurization of iron with molten sodium carbonate

A—Bulk delivery of sodium carbonate.
B—Storage bin for sodium carbonate.
C—Rotary furnace lined with tar/dolomite; charged with sodium carbonate by worm conveyor D.
E—Unlined steel plate ladle; preheated and used for conveying molten sodium carbonate to blast furnace.
F—Hot metal ladle into which molten iron and molten sodium carbonate are poured at same time.
G—Tall syphon ladle lined with tar-dolomite for separating metal from soda slag. Slag-free metal runs into ladle H, and is conveyed to mixer K. Soda slag overflows into slag pan J.

### German Experiments

Many of the ores used in France and Luxemburg are of a calcareous nature, and have proved suitable for processing by the "O.M." method without further modification to the blast furnace burden. A typical analysis of the native German Dogger ore is as follows[2]:

| Element | Per Cent |
|---|---|
| Iron | 20.0 |
| Phosphorus | 0.42 |
| Manganese | 0.20 |
| Sulphur | 0.45 |
| Silica | 19.6 |
| Lime | 11.5 |
| Magnesia | 1.9 |
| Alumina | 7.5 |

The difficulties involved in smelting ore of this composition by conventional blast furnace methods are obvious. Not only is the iron content low, but the gangue of the ore is excessively rich in silica. To obtain a slag with a normal basicity ratio of $CaO:SiO_2=1.5:1$ would involve the addition of such a large proportion of limestone that the rate of output of the blast furnace would be severely restricted and the coke rate would soar to a hopelessly uneconomic figure.

This difficulty was tackled along the lines which had been highly successful in the development of Northamptonshire ore in this country, but taking into account the conditions peculiar to the composition of the German ore. A representative analysis of certain types of Northamptonshire ore is as follows:

| Element | Per Cent |
|---|---|
| Iron | 29.8 |
| Phosphorus | 0.55 |
| Manganese | 0.2 |
| Sulphur | 0.4 |
| Silica | 7.9 |
| Lime | 6.4 |
| Magnesia | 1.0 |
| Alumina | 5.6 |

When this ore is smelted with practically no additions of limestone, the resulting slag contains 33 per cent of both lime and silica, i.e., these two oxides are present in the ratio of 1:1. This ratio has definite advantages from the point of view of furnace operation as compared with the more usual ratio of lime:silica=1.5:1.

The slags of low melting point have a low viscosity at the working temperature, and as a result their sulphur carrying capacity is reasonably high. The capacity of a slag for carrying sulphur depends not only on its composition, but on the degree of superheat which it possesses. The omission of limestone from the burden enables an increased rate of output to be obtained from the furnace, with the minimum coke consumption per ton of iron, because the limestone is replaced by iron ore. The application of these principles in conjunction with the sodium-carbonate desulphurizing process in Northamptonshire and elsewhere in Great Britain has been attended with considerable success.

### Difficulty Was Encountered

In Germany, however, the problem was more difficult on account of the high-silica content and low-iron content of the Dogger ore. The ratio $CaO:SiO_2$ in the ore itself is about 0.6:1. Lennings,[2] who describes the early experiments using varying proportions up to 100 per cent of this and other native German ores, added sufficient limestone to bring the basicity ratio to 0.83:1. He later replaced some of the limestone by dolomite to raise the magnesia content of the slag from 2.3 per cent to 4.5 per cent, thus improving its fluidity. The coke consumption per ton of pig iron was 3820 pounds, the slag weight 5600 pounds per ton of pig iron and the output 304 tons of pig iron per 24 hours. The hot blast temperature was 1515 degrees Fahr. The average sulphur content of the iron on tapping was 0.448 per cent, and this was reduced to 0.082 per cent at the mixer entry by treatment with a mixture of sodium carbonate and limestone in the proportion of 52.5 pounds of sodium carbonate and 31 pounds of limestone chippings per ton of pig iron. This is a heavy consumption of sodium carbonate, and Lennings was criticized in that connection by Holschuh,[3] who had operated the acid burden process at Volklingen, desulphurizing with molten sodium carbonate. British practice is to use a mixture of sodium carbonate, limestone and fluorspar, which has proved to be more efficient.

It is recognized that if the acid burden process is to be operated economically with native ores in Germany, some method of beneficiation of the low-grade ores before smelting will be essential. Lennings considered that his best results were obtained with a ratio of lime:silica =0.75:1. Although the slag volume might be further reduced by using less limestone, several disadvantages outweigh this. The viscosity of the slag increases as it becomes more siliceous, and so does its iron oxide content and the iron lost as pellets in the slag ("shoddy"). A minimum magnesia content of 4 per cent in the slag is recommended to give the necessary fluidity.

In Table II is given a comparison of slag and metal analyses in Brit-

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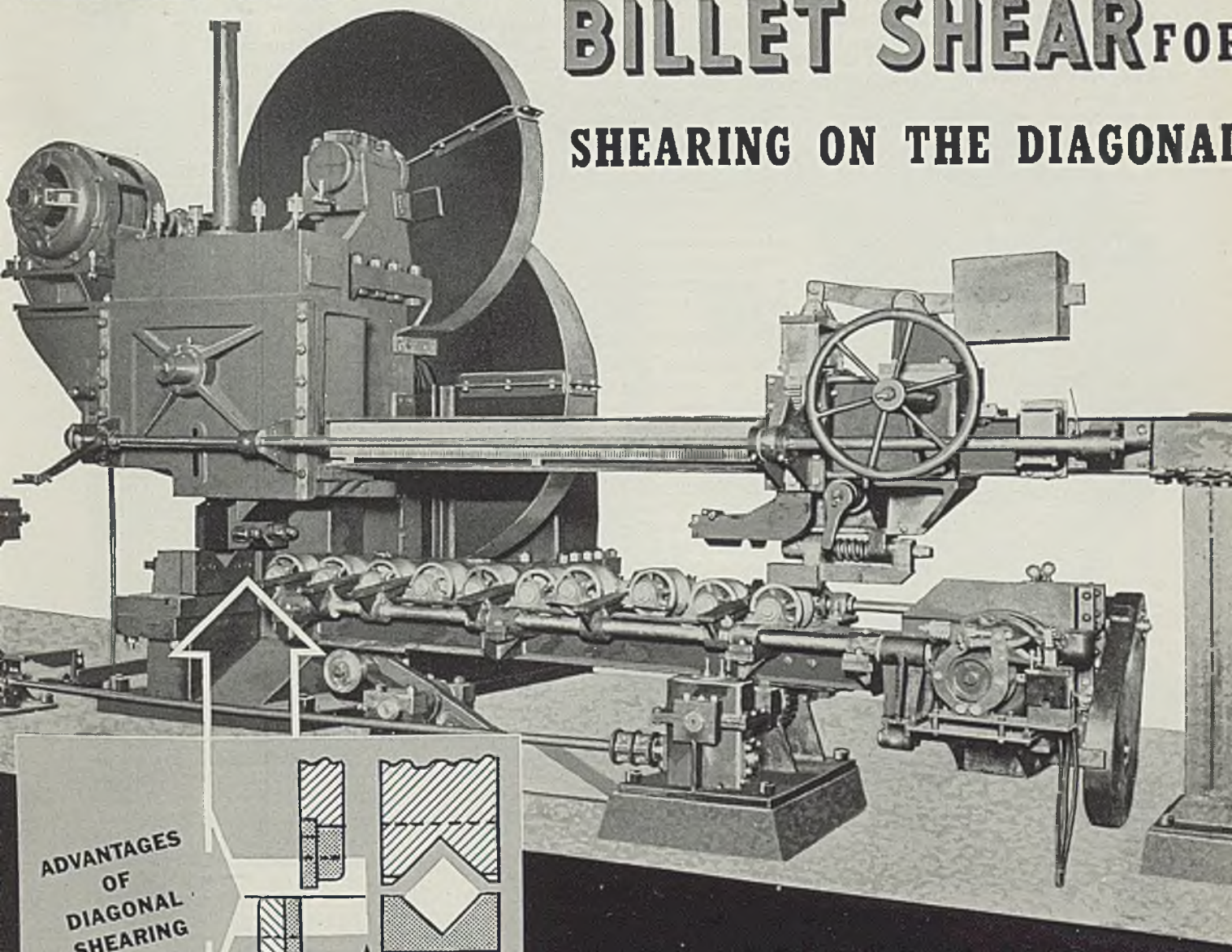




Shears up to 4½ in. square hot alloy steel billets, with less deformation in the billet by reason of the diagonal shearing action giving a clean edge.

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ish and German applications of acid burdening.

The author visited Volklingen in 1938 and saw the acid burden process in operation at the Rochlingsche Eisen- und Stahlwerke A.-G. At that time this works was not smelting 100 per cent of lean ores, but used a mixture of which the Dogger ore was dried and calcined to give an iron content of 25 per cent. The basicity ratio $CaO:SiO_2$ in the blast furnace slag was 1.22:1. With this comparatively limey slag the sulphur content of the iron was usually no more than 0.12 per cent at the taphole. This was an early stage in the intended transition to 100 per cent Dogger ore. Anticipating that when the final stage was reached, high-sulphur irons might be made (1 per cent sulphur was even envisaged), an interesting modification of the sodium-carbonate process was introduced, namely, the use of molten sodium carbonate.

### How It Was Accomplished

The sodium carbonate (see Fig. 3)[2] was delivered to the works in bulk wagons and was unloaded by pneumatic power which carried it along a pipe to a silo. From the silo it was fed through a worm conveyor into a rotary furnace lined with a mixture of dolomite and tar, and fired with coke-oven gas. In this furnace the sodium carbonate was melted, and, when required for use, it was tapped into an unlined ladle which had been preheated internally by means of a coke-oven gas burner projecting downwards from a lid. The lid was only in position while the ladle was empty. When filled with molten soda, the ladle was carried along on a monorail and the soda poured through a tun-dish into the stream of iron in the blast furnace runner and thence into the hot metal ladle, which was lined with firebrick containing 32 per cent of alumina and which had a capacity of 25 tons. By use of molten sodium carbonate in the proportion of 1 per cent of the weight of metal, the sulphur content of the iron was reduced to 0.4 per cent, i.e., 66 2/3 per cent of the sulphur was removed. An iron containing 0.18 per cent sulphur had this reduced to 0.06 per cent by treating with 1.2 per cent of sodium carbonate. Holschuh claimed to get from 20 to 25 per cent more desulphurization with molten sodium carbonate than with the solid form.[3]

The iron ladles were transported to the steel plant, and there the soda slag was separated from the metal by pouring through a teapot ladle into another ladle in which it was carried to a mixer. The teapot ladle was lined with a mixture of tar and dolomite similar to that used for lining the soda melting furnace. At the time of the author's visit the lining had been used for some 12,000 tons of iron, and it was subsequently stated that its life was 20,000 tons per lining. A feature of the ladle is its tall shape, giving it an unusual depth. This is in order to prevent small traces of soda slag passing right through the teapot spout, and also to allow the iron to be poured through a deep layer of sodium-carbonate slag. This depth of soda slag remaining in the larger limb of the ladle gives a greater degree of desulphurization than would otherwise be obtained. The ladle is never emptied during the life of a lining, so it is kept continuously hot, as is necessary for the dolomite lining.

### Slag Is Reclaimed

In Germany a use has been found for the waste soda slag. It is crushed and mixed with Florida phosphate rock and the mixture is melted in a horizontal retort heated by coke-oven gas to a temperature of 2192 degrees Fahr. The molten mixture is granulated by running it into water, and, after being ground, it is used as a fertilizer. It has a $P_2O_5$ content of 20 per cent, of which 96 to 98 per cent is soluble in citric acid. Being a double phosphate of lime and soda, it has not the same acidifying action on the soil as has superphosphate.

Among other details which have been the subject of investigation in Germany in relation to the acid burden process, is the utilization of acid blast furnace slag. This problem is not so easy to deal with there as it is in Northamptonshire, where, by applying well-known and tried principles, the acid slag provides a high class roadmaking material. The more siliceous slag produced from the German Dogger ores has a tendency to be glassy rather than stoney. By suitable mixing and other treatment it has been utilized for cement manufacture and for brickmaking.[6]

The use of the "O.M." process in Great Britain raises certain more controversial problems. Its value in relation to basic-bessemer practice may be taken as proved, but there are differing views as to the need or otherwise for a certain minimum residual manganese content at the end of the steelmaking operation in the basic open-hearth process. It seems at least possible that under present conditions it may become desirable to reduce the manganese content of the pig iron to some extent even if manganese ore is not entirely omitted from the burden. In such an event the best use would be made of such manganese as was present in the burden, and the sulphur content of the metal could be controlled with certainty by sodium-carbonate treatment.

Desulphurization has another important application as a result of the revival of the "Armstrong Whitworth" process for the production of high-carbon iron from remelted scrap as a substitute for pig iron in the manufacture of steel. In the manufacture of high-grade alloy steels, scrap, nickel-chrome or other alloy steel is remelted in a basic open-hearth furnace together with carbonaceous matter. The resultant high-carbon steel is cast into ingots and remelted in the acid open-hearth furnace. On tapping from the basic furnace, desulphurization may be desirable and may justify expenditure on reagents, etc. It is well known that the desulphurization of low-sulphur iron is more difficult than that of irons of moderate or high-sulphur content. The use of basic-lined ladles such as have been employed on the Continent offers great possibilities. The efficiency of sodium carbonate as a desulphurizing reagent is impaired when it is contaminated by silica. Invariably such contamination occurs when an acid-lined vessel is used or when siliceous furnace slag is allowed to enter the ladle. A normal soda slag contains up to 35 per cent of silica. The author is at present investigating the use of ladles with a tar/dolomite lining, and has succeeded in reducing the silica content of the soda slag, with a resulting marked improvement in the degree of desulphurization of the iron.

The acid burden process originated in Great Britain and has become a well-established practice. Much of the ore which is being made available is of the high alumina type. Because of the limited amount of limestone needed for acid smelting, the maximum rate of output is obtained from the blast furnace with a minimum coke rate. Under very favorable conditions, phenomenal increases in production rates have been obtained, and in the average case, an increase of the order of 10 per cent may be expected. This factor would be of inestimable value in helping to remedy any potential shortage of foundry pig iron.

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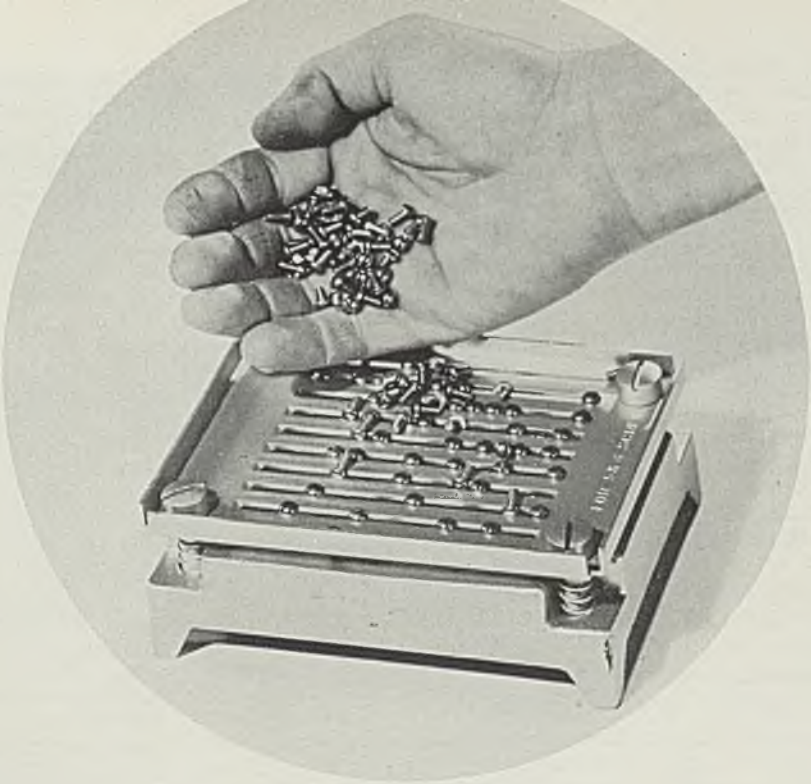


Fig. 1—All types of machine and work screws can be handled by the new device. Here a handful is being dumped into the tray

## New Handling Method

# Speeds Screwdriving

**Three time-wasting hand operations—hand pickup, hand start, 2-hand drive—are eliminated by new method. A power screwdriver with a special pickup device reduces the work to three quick operations—sorting, pickup, driving. By increasing efficiency of these handling operations, assembly speeds are increased three to nine times**

■ BREAKING the "butterfingers" bottleneck in handling operations is just as important as in any other phase of plant operation. Fumbling fingers cause the loss of many contests in football . . . and many hours on plant assembly lines. A tiny screw picked up and dropped by human "butterfingers"—or a small bolt started "out of line" in a hole—result in only a small delay. Yet these apparently slight delays, when multiplied many times each day by many workers, can become a troublesome production bottleneck.

Manufacturers of clocks, time control mechanisms, switch mechanisms, radios, cameras, air conditioning units, automotive and aircraft accessories, find that handling operations can easily make or break an assembly line setup.

Quite naturally, production engineers have long recognized this possibility. Mechanical aptitude tests are employed to select the most proficient and sure workers. Time and motion studies may even be made to determine the most efficient arrangement and use of materials and equipment. But motion study fundamentals have barely been touched in most plants, and much remains to be done to work out most efficient arrangement of material and most efficient handling methods.

### Bins—Time "Influencers"

This problem of grasping small parts, for example, has been studied by Ralph M. Barnes, Marvin E. Mundel and John M. Mackenzie of the University of Iowa and published as Bulletin 21, "Studies of One and Two-Handed Work." One of the conclusions brought forth here, for instance, is that the type of bin greatly influences the time of grasp. When a bin discharging into a tray was used, permitting a hook "grasp," an average of 30 per cent less time was required than for grasping work direct from a rectangular bin without the tray, requiring what is known as a "pinch" grasp. Total time required to select and grasp a nut from a bin, move the nut to the release station, drop it in a hole in the table top and move the hand back to the bin for the next part was cut 30 per cent merely by changing the type of bin. As to the effect of the type of bin on the time required to pick up the nut, the pinch "grasp" from the rectangular bin was found to require on the average 74 per cent more time than the hook "grasp" from the bin with the tray. Thus type of tray can almost double time required to pick up parts from it. How many manufacturers know the importance of this and similar factors in their work that can be revealed by motion study?

Portable power-driven tools such as screwdrivers, nut runners and the like have long been playing an increasingly important part in assembly operations. Particularly is this true in the automobile, shipbuilding and aircraft industries where power-driven tools have been found extremely useful in speeding production.

Small power-driven tools have kept fully abreast with the stationary metal-removing machine tools. A typical example is the introduc-

tion of the nut runner which permits tightening up a nut or bolt in places inaccessible to an ordinary wrench. Before this unit was developed, an operator had to make 15 to 20 strokes with a ratchet handle for each single turn of the nut or bolt in many instances. This took him from 1 to 1½ minutes per bolt. Using a portable power-driven nut runner with a right-angle head, the same operation is done easily in 1 to 1½ seconds—a speed increase of 60 to 1. Few stationary machines are responsible for similar production increases.

Typical of the wide range of usefulness of modern power tools is the portable screwdriver. Today one company alone is manufacturing over 300 different types and sizes of screwdrivers, nut runners and attachments to meet requirements.

### Reduces Time of Handling

One of the newest devices to make its appearance is a unit especially developed to help solve the troublesome and often time consuming operation of picking up screws and starting them in the hole. The new method sorts, picks up and holds screws for driving. It eliminates those time-wasting hand operations of picking up screws with the fingers, starting or holding the screws in tapped or drilled holes.

This is an important development. Since it takes only a second or two to drive the screw, the time it takes to place the screw in position to be driven is all out of proportion. This waste time paradoxically is greater, the smaller the screw. The reason is, of course, that small screws have a large and comparatively thin head in proportion to their length. Therefore it is difficult to get a good grip for placing them in position to be driven.

Thus the Thor "Pix-Up" finder and Adjusto-Tray, Fig. 2, developed by Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, appears of particular interest. It increases the production possibilities from three to nine times in assembly of such products as clocks, time control mechanisms, refrigerators, radios and the like.

Speed today is the keynote in materials handling operations, and anything that can contribute to production speed is important. This particular solution to the problem of reducing waste time in applying small screws into position to be driven consists of a special chuck or finder attached to the portable power-driven screwdriver and a tray from which the finder picks up the screws in one motion.

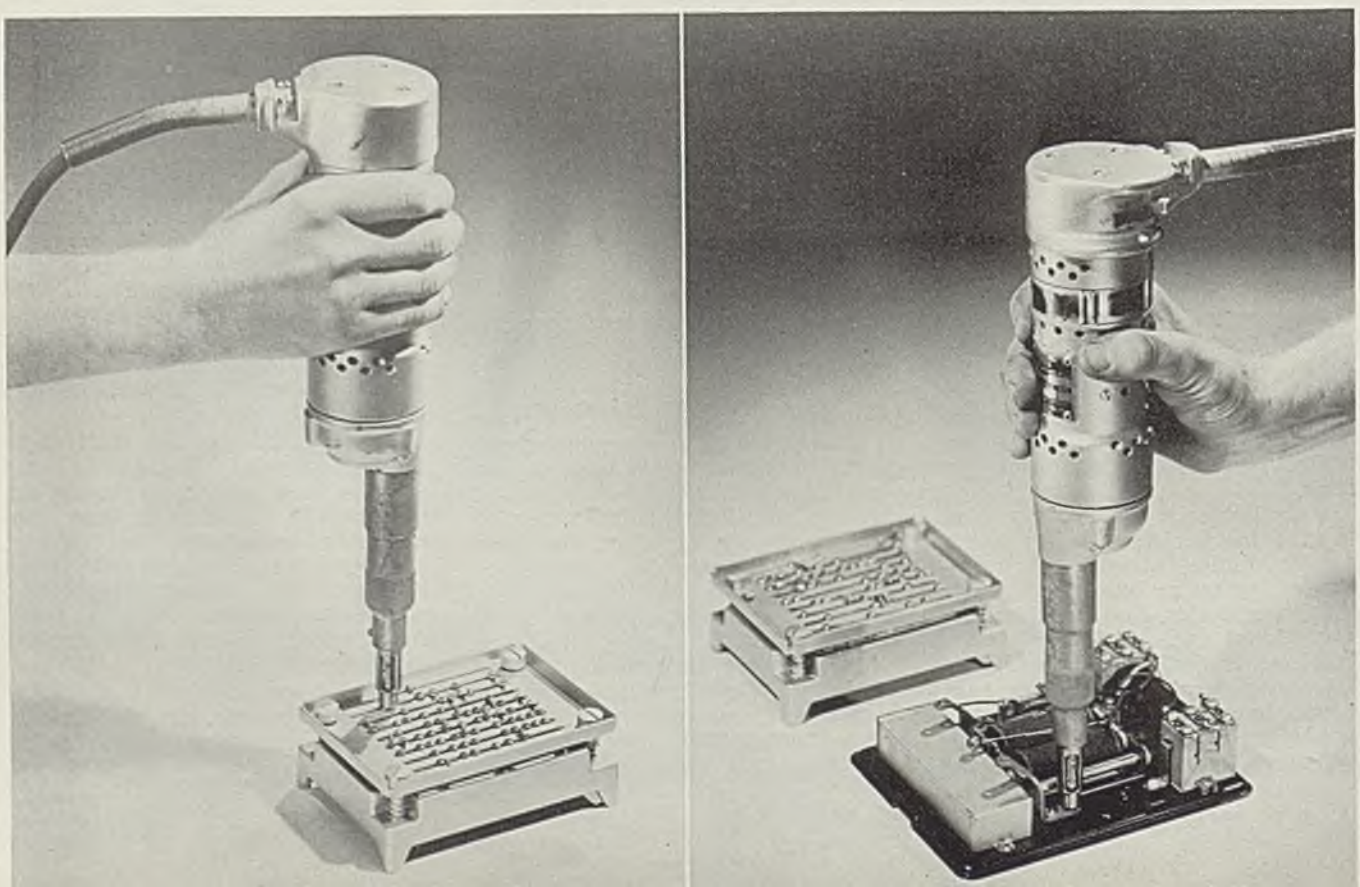
In operation, the worker throws a handful of screws onto the tray, Fig. 1. Then by slightly shaking the tray, the screws are made to fall down into slots where they become suspended by their heads. When the operator presses the end of the tool against the screw head, the finder, Fig. 2, automatically grips the screw and holds it firmly by the head. Screw can then be driven in any direction, Fig. 3. A moment before the screw is driven down to a predetermined tightness, the finder automatically releases the head and the machine is ready to pick up and drive the next screw.

In addition to the finder, the device includes a regular friction attachment having a disengaging clutch held out of engagement with the driving member of the clutch by spring tension. Also a spring-loaded friction clutch adjustable to any desired tension or torque is provided.

The finder itself comprises three main parts or elements—a chuck or finder, a sleeve, and an adjusting ring. The finder is in the form of a hollow cylinder or tube made of spring steel and hardened. The lower part is slotted to form three jaws for gripping and holding screw heads. The slotted end of the finder is recessed on the inside to receive the screw head. This recess has an inclined surface at the outer end to allow the screw head to slip out from the finder when the screw is driven down to

Fig. 2—Giving this tray a shake or two suspends the screws by their heads in the slots. Screw is picked up simply by placing the head of the screwdriver down over the screw and pushing as shown here. The tray depresses a small amount to allow the head to be gripped by the fingers of the pickup device located on the end of the power screwdriver

Fig. 3—Driving a screw becomes one quick continuous operation. Driver is inserted over the screw head, lifted and the screw placed in the hole at the same time it is driven in place. Production speeds increase as much as nine times



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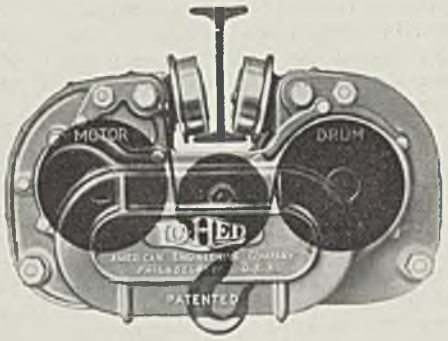


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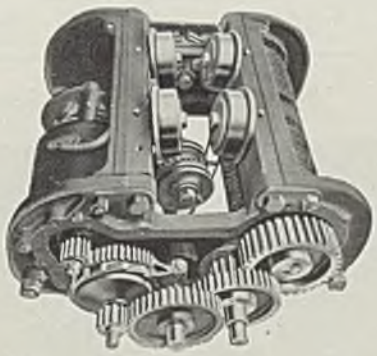

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a point where the end of the finder comes in contact with the surface into which the screw is driven. The outer end of the finder also is countersunk to allow the screw head to spread out the slotted end of the finder and slip into the recess during the pick-up operation.

The sleeve screwed over the finder has an inside diameter only slightly larger than the outside diameter of the lower end of the finder proper. Its function is to protect the slotted portion of the finder by limiting the extent the fingers are allowed to flex. Thus it is impossible for the finder fingers to spread out any further than necessary for entrance of the screw head when picking up a screw. This prevents undue springing and early fatigue failure.

To compensate for gradual loss of spring action and for wearing of the recess, the split portion of the finder is provided with external spiral grooves which accommodate a split spring tension ring. By moving the ring toward end of finder, tension is increased. This affords a long range of gradual adjustments of the finder tension. To facilitate this adjustment, the sleeve is provided with two slot openings.

The finder is adaptable for driving all types and sizes of screws. The method is particularly advantageous for use with screws from Nos. 3 to 8—the small troublesome sizes which consume valuable time because of the difficulty of handling them easily by hand.

The Adjusto-Tray, Fig. 1, is a special screw-holding fixture consisting of a cast iron base plate and a tray of sheet steel, having a number of slots in it to allow the body of the screws to fall through to leave them suspended by their heads. Thus a quantity of screws spilled into the tray will be upended and suspended by their heads by shaking the tray a few times. The tray portion itself is supported by four springs, one on each corner. Four adjusting type screws pass through the tray corners, through springs and into the base plate. These afford a means of adjusting the space between the tray and the base plate according to the length of screws being handled.

**Finder Fingers "Grasp" Screws**

The distance between the tray and the base is adjusted to leave a slight clearance between the end of the screw and the base plate. As the tray is depressed by the tool when picking up a screw, the head lifts above the tray and the screw head is forced into the finder fingers.

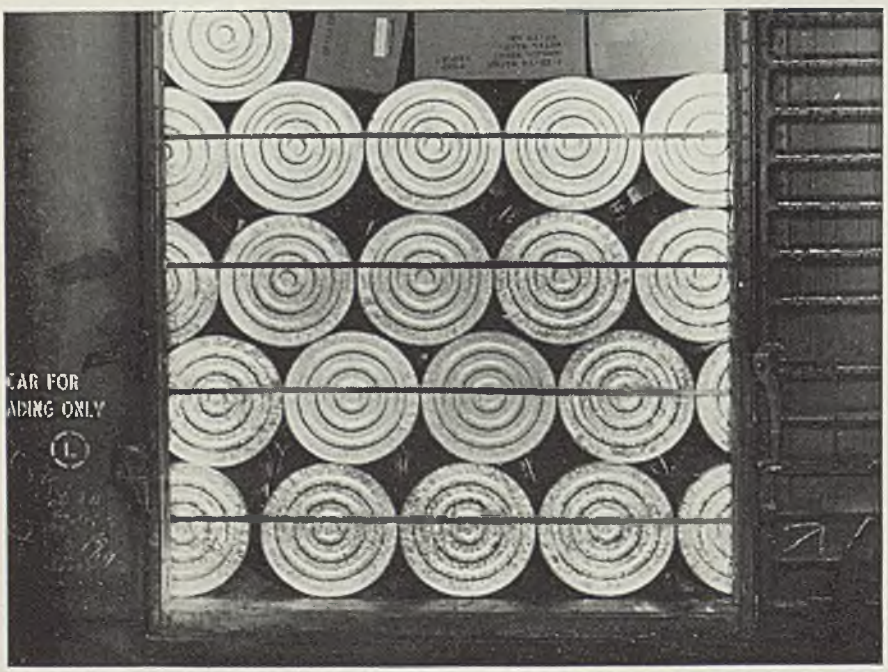
The operation thus is not magnetic but entirely mechanical. The finder being split to act, in effect, as mechanical fingers in picking up and holding the screw.

The value of the finder-tray method of driving screws with a power screwdriver will, of course, be most appreciated in those industries involving the driving of large numbers of screws. The time-saving element of the pickup idea alone is valuable, and when added to the superspeed of power driving, the combination affords a posible increase in production up to nine times that obtainable with other methods.

Of course not only is the method advantageous in reducing the time required to pick up the screw, but in also reducing the time lost by starting the screw at a wrong angle. The latter may not only necessitate picking up and driving a new screw, but may require in some instances rethreading the hole as the threads may easily become badly damaged by driving the screw at the wrong angle with a power tool.

It is entirely possible that this same method of positioning for picking up and grasping the work can also be adapted to many other small parts in assembly operations. For instance, contact elements, small studs, springs and many other elements hard to pick up and position with the fingers could be handled much more easily with some sort of a tool using the system described.

## Steel Strapping for Car Door Bracing




■ Many commodities fabricated from steel, such as the galvanized units illustrated benefit from a steel strapping method of car door bracing introduced by Signode Steel Strapping Co., 2700 North Western avenue, Chicago. The system (Anchor strapping), prevents merchandise from shifting out of its original position, thereby preventing damage from impact in the doorway recess, damage from contact with the permanent car door when it is opened, and prevents freight from falling out of the car when the door is opened. The strap is fabricated with centered, continuously punched holes, making it faster and easier to install

## New Building Product Resists Corrosion

■ Rocan, a newly developed building product featuring longer life and better resistance to corrosion fatigue is announced by Revere Copper & Brass Inc., 230 Park avenue, New York. Its tensile strength as well as its endurance limit in fatigue is substantially higher than that of electrolytic copper.

Revere's technical staff, in checking hundreds of copper roof installations, exploded the theory that copper applied to roofs under certain conditions was not as good as "it used to be." Knowing that the electrolytic process produced a much purer metal than the old fire refining methods, they found in their checking that many instances of failure could only be attributed to corrosion fatigue, and it is especially against this type of failure that the new material is intended to offer greater resistance.

The product is already available in standard stock sizes in sheets, rolls and strips which are applied in the same manner as commercial sheet copper. It sells at a premium of 1 cent a pound over standard rolled and strip copper.

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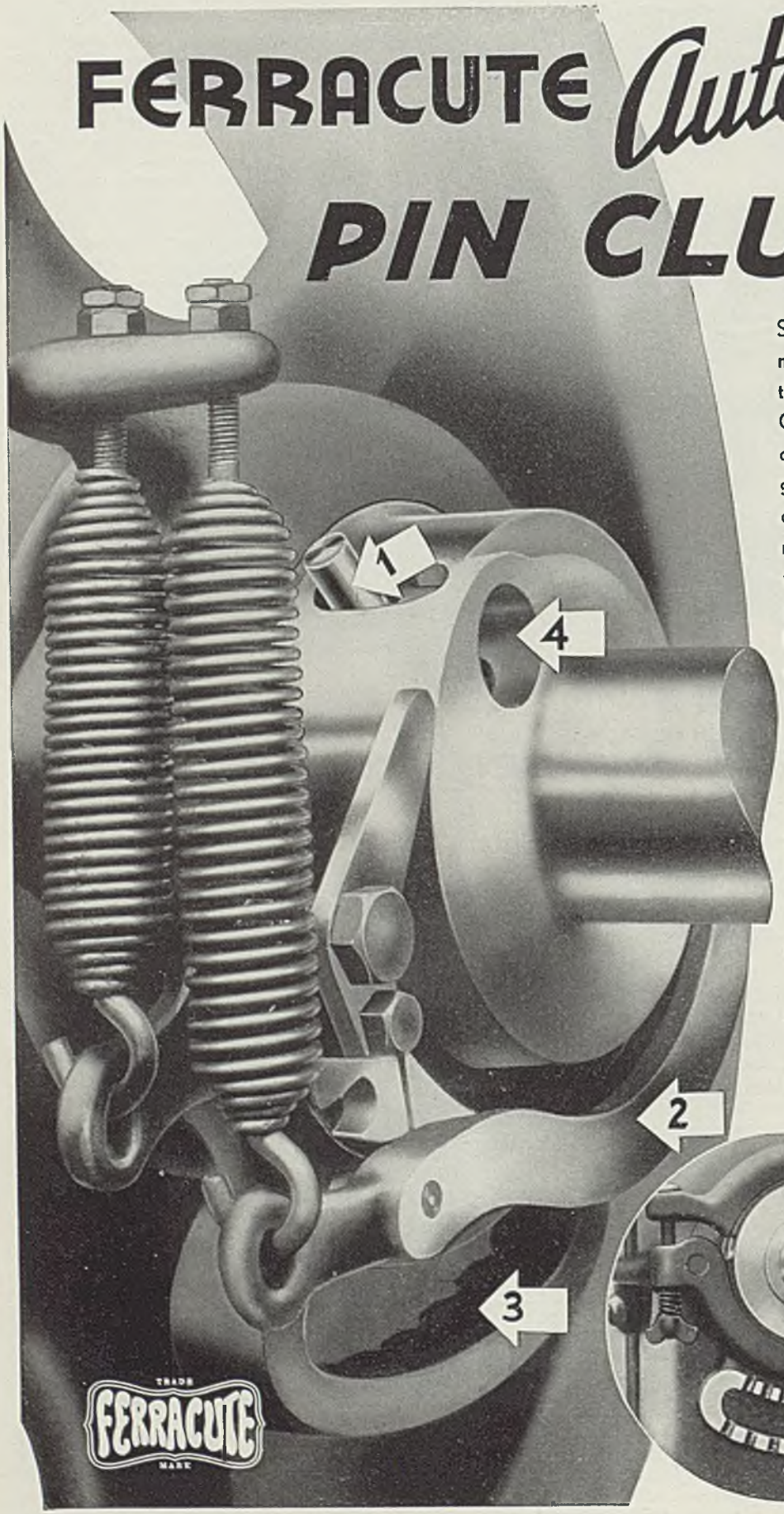


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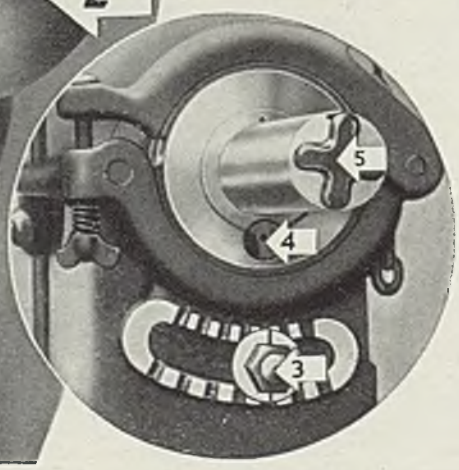
2. Clutch lever carries cam which controls the action of the clutch. Beam and clutch lever are alloy steel, hardened ground.
3. Lower brake with notches for adjusting around the axis of the shaft.
4. Clutch slide or driving dog of a special alloy steel, hardened ground.
5. Lock used when setting dies—prevents accidental tripping of clutch.




Large photograph shows interior construction of the FERRACUTE Automatic Safety PIN CLUTCH, with fly wheel moved out from press. Small photo shows clutch assembly on fly wheel side.

**FERRACUTE MACHINE CO., Bridgeton, New Jersey, U.S.A.**

## Metal Spraying

(*Concluded from Page* 53)

ment now incorporating metal spraying in its production is poston pumps in which the pump rods are metal sprayed. The process is entirely practical and could well be used also by manufacturers of trucks and other heavy automotive equipment on many bearing surfaces; for spraying bearings and throws of crankshafts of heavy diesels and similar engines; on valves, especially very large plug valves 24 inches and thereabouts; on valve stems of diesel and automotive engines where sprayed metal soaked in oil practically eliminates the possibility of sticking; on electric motors, generators and similar revolving electric equipment to give a harder and better bearing at little increase in cost, thus greatly extending the life of such equipment; on all bearings of machine tools, especially horizontal boring spindles, grinder spindles and lathe spindles.

One of the biggest fields for production metal spraying now is on large equipment which it is not practical to heat treat such as exceptionally large axle shafts, gun mounts, hydraulic rams for gun recoils, etc.

**Bearing Surfaces:** Many bearings at the present time are not heat treated because the cost is not warranted. However they can be given a hard wear-resistant surface by metal spraying, the benefits of which will more than pay for the small added cost in most cases. Electric motor repair shops, for example, have found that metal-sprayed shafts have a life two or three times as long as the original shaft. Thus, while it might not be economically desirable to heat treat all the shafts of motors when they were made, it might be well worth while to metallize those bearing surfaces.

**Economy** of the process is one of its important characteristics. Pump and piston rods which must have corrosion resistant characteristics can be made of solid alloy or they can be sleeved. Where hard and wear resistant surfaces are required, any one of several processes may be employed. However, a combination of hardness and corrosion resistance is more difficult and usually more expensive to obtain by ordinary means. But by using the metal-spray gun as a production tool, it is possible to obtain any of the generally required surface characteristics in one operation.

For example, compare the sequence of operations often utilized to carburize a portion of a piece with obtaining the same results by metal spraying. Using a common inexpensive low-carbon steel to obtain a hard wear-resistant bearing surface by carburizing usually requires these operations: Machine to dimensions, handle to next operation, degrease, handle to next operation, copper plate entire surface followed by grinding off surfaces to be carburized or else masking off those surfaces during plating, handle to next operation, pack harden, handle to next operation, sand blast, handle to next operation, straighten, handle to next operation, finish grind.

Compare this sequence of 15 or more operations with the few needed to metal spray the same work. Here the surface is prepared for spraying in the same setup and on the same machine as the rough machining operation followed by metal spraying, also in the same setup. While the work also can be finish ground or finish machined in the same setup, it would require at the most handling to next operation followed by the finish grind or finish machine—some 5 against 15 operations.

**A single setup** can easily be employed to handle all the operations required in metal spraying, speeding the work and lowering costs, because actually there are only two basic operations involved in metal spraying—undercutting to prepare the surface and the spraying itself. The finish turn or finish grind would be required in any case. Cost of these two basic operations can be broken down into labor, oxygen, gas, air and metal sprayed. Based on applying a hard and noncorrosive material, these components are shown on a per hour basis in Table I. It will be seen that a relatively expensive alloy can be applied in any desired thickness at an actual cost of 95 cents per pound.

Table II gives cost per hour to spray other metals based on the above breakdown.

**Lack of heat transfer** in metal spraying is another important advantage as it eliminates the necessity for straightening or subsequent heat treating operations. Metal spraying is what might loosely be termed a "cold process" since there is little heat transferred to the base or parent metal, which rarely attains a temperature greater than

**TABLE I—Cost to Spray Stainless Steel**

| | |
|---|---|
| Labor @ 70c/hour, 85% efficient | $0.83 |
| Acetylene @ $2.50/100 cu. ft.—25 cu. ft. | .63 |
| Oxygen @ $1.00/100 cu. ft.—49 cu. ft. | .49 |
| Compressed Air @ 1c/100 cu. ft.—2100 cu. ft. | .21 |
| Metcoloy No. 2 Stainless Steel @ 59c/lb.—6 lbs. | 3.54 |
| Total cost per hour, excluding overhead and burden | $5.70 |

**TABLE II—Cost to Spray Other Metals**

| Metal | Wire Size Inch | Lbs. Sprayed per Hour | Cost in Dollars per lb. Sprayed |
|---|---|---|---|
| Aluminum | ⅛ | 6.3 | $0.75 |
| Brasses | 0.093 | 13.9 | 0.42 |
| Copper | 0.093 | 11.5 | 0.46 |
| Nickel | 0.093 | 5.7 | 1.07 |
| Metcoloy No. 1* | 0.093 | 5.9 | 1.06 |
| Metcoloy No. 2** | 0.093 | 6.9 | 0.99 |
| Low-Carbon Steel | 0.093 | 6.8 | 0.43 |
| Medium-Carbon Steel | 0.093 | 6.9 | 0.37 |
| High-Carbon Steel | 0.093 | 7.1 | 0.37 |
| Bronzes | 0.093 | 14.5 | 0.56 |
| Iron | 0.093 | 6.8 | 0.46 |
| Monel Metal | 0.093 | 7.1 | 0.89 |
| Acetylene | 15 p.s.i. | | |
| Oxygen | 17 p.s.i. | | |
| Air | 60 p.s.i. | | |

*18-8 Variety Stainless Steel. **High-Chrome High-Carbon Stainless Steel.

**TABLE III—Cost in Cents per Linear Inch for Coating 0.010" Thick on the Radius Diameter of Shaft**

| Metal | 1" | 1¼" | 1½" | 1¾" | 2" | 2½" | 3" | 3½" | 4" | 4½" | 5" | 5½" | 6" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 0.24 | 0.30 | 0.36 | 0.42 | 0.48 | 0.60 | 0.72 | 0.84 | 0.96 | 1.08 | 1.21 | 1.33 | 1.44 |
| Sprababbitt A&B | 1.04 | 1.30 | 1.56 | 1.82 | 2.08 | 2.60 | 3.12 | 3.64 | 4.16 | 4.68 | 5.20 | 5.72 | 6.24 |
| Sprabrass Y | 0.49 | 0.61 | 0.73 | 0.86 | 0.97 | 1.21 | 1.46 | 1.70 | 1.94 | 2.18 | 2.42 | 2.66 | 2.92 |
| Sprabronze A | 0.83 | 1.05 | 1.25 | 1.46 | 1.66 | 2.08 | 2.49 | 2.91 | 3.32 | 3.74 | 4.15 | 4.57 | 4.98 |
| Sprabronze C | 0.53 | 0.66 | 0.79 | 0.93 | 1.06 | 1.32 | 1.59 | 1.85 | 2.12 | 2.38 | 2.64 | 2.90 | 3.18 |
| Sprabronze D | 1.33 | 1.67 | 2.00 | 2.33 | 2.66 | 3.33 | 3.99 | 4.66 | 5.32 | 5.99 | 6.65 | 7.32 | 7.98 |
| Sprabronze M | 0.63 | 0.78 | 0.94 | 1.10 | 1.25 | 1.56 | 1.88 | 2.19 | 2.50 | 2.81 | 3.13 | 3.44 | 3.76 |
| Sprabronze P | 0.65 | 0.79 | 0.98 | 1.11 | 1.30 | 1.63 | 1.95 | 2.28 | 2.60 | 2.93 | 3.25 | 3.58 | 3.90 |
| Sprabronze T | 0.57 | 0.72 | 0.86 | 1.00 | 1.15 | 1.44 | 1.72 | 2.01 | 2.30 | 2.59 | 2.87 | 3.16 | 3.44 |
| Copper | 0.53 | 0.66 | 0.79 | 0.93 | 1.05 | 1.31 | 1.58 | 1.84 | 2.10 | 2.36 | 2.63 | 2.89 | 3.16 |
| Sprairon A | 0.40 | 0.50 | 0.60 | 0.70 | 0.81 | 1.01 | 1.21 | 1.41 | 1.62 | 1.82 | 2.02 | 2.22 | 2.42 |
| Monel | 0.95 | 1.20 | 1.43 | 1.67 | 1.91 | 2.39 | 2.86 | 3.34 | 3.82 | 4.30 | 4.77 | 5.25 | 5.72 |
| Nickel | 1.22 | 1.53 | 1.83 | 2.14 | 2.44 | 3.05 | 3.66 | 4.27 | 4.88 | 5.49 | 6.10 | 6.71 | 7.32 |
| Metcoloy No. 1 | 1.00 | 1.25 | 1.50 | 1.75 | 1.99 | 2.49 | 2.99 | 3.49 | 3.98 | 4.48 | 4.97 | 5.47 | 5.98 |
| Metcoloy No. 2 | 1.11 | 1.40 | 1.67 | 1.95 | 2.23 | 2.79 | 3.34 | 3.90 | 4.46 | 5.02 | 5.57 | 6.13 | 6.68 |
| Sprasteel 10 | 0.41 | 0.50 | 0.61 | 0.71 | 0.82 | 1.02 | 1.23 | 1.43 | 1.64 | 1.84 | 2.04 | 2.24 | 2.46 |
| Sprasteel 25 | 0.42 | 0.53 | 0.63 | 0.74 | 0.84 | 1.05 | 1.26 | 1.47 | 1.68 | 1.89 | 2.11 | 2.32 | 2.52 |
| Sprasteel 40 | 0.44 | 0.55 | 0.66 | 0.77 | 0.87 | 1.09 | 1.31 | 1.53 | 1.74 | 1.96 | 2.18 | 2.40 | 2.62 |
| Sprasteel 80 | 0.45 | 0.55 | 0.67 | 0.78 | 0.90 | 1.12 | 1.34 | 1.57 | 1.80 | 2.02 | 2.24 | 2.46 | 2.70 |
| Sprasteel 120 | 0.49 | 0.60 | 0.73 | 0.85 | 0.98 | 1.22 | 1.47 | 1.71 | 1.96 | 2.20 | 2.44 | 2.68 | 2.94 |

200 degrees Fahr., thus eliminating any possibility of warpage, distortion or change of grain structure.

While this characteristic eliminates various handling and other costly operations, it implies a total lack of fusion with the parent metal and a complete dependence on a mechanical bond. Thus sprayed metal cannot be relied upon to increase tensile strength nor to withstand heavy impact such as on cutting and shearing edges. Similarly, a heavy rolling action such as is experienced by roller bearing races cannot be withstood satisfactorily.

**Bonds Well:** An effective mechanical bond is easily obtained on cylindrical objects immediately following the last rough-turning operation. Figs. 6, 7 and 8 show tools and method employed to obtain consistently high bond strengths. This is a well developed procedure that can be used on production work with assured results. It is not critical at all.

**Bond strength** in terms of direct pull in pounds per square inch has been investigated thoroughly. Normal adhesion to a properly prepared surface will range from 750 to 1500 pounds per square inch. This adhesion to cylindrical surfaces is enhanced by a natural tendency of the sprayed metal to shrink around the parent metal. Failures due to lack of adhesion are practically unknown and are always the result of either misapplication or faulty preparation.

**Avoid Oil:** In this connection, there is one factor that often fails to receive the attention it deserves, and that is the absolute necessity

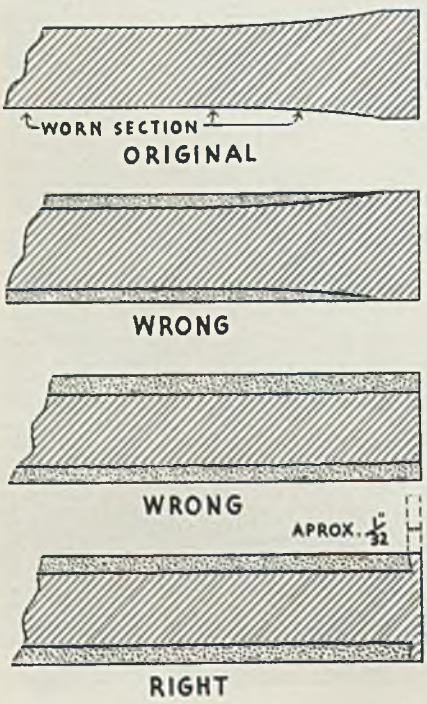



Fig. 4—Wrong and right ways to replace worn metal on a cylindrical object. Feather edge is to be avoided by machining a key as shown in lower view at left

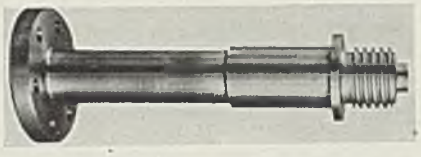


Fig. 3—This is typical of the type of production operation in which depositing a sleeve of metal is not feasible by any other method than by metal spraying because of the flanges or shoulders on each side of shaft portion on which protection is wanted. Shoulder section at right was a 1/8-inch sleeve of sprayed stainless, 25 pounds of metal being applied on this SAE 1045 drop forging for a heavy dredge pump shaft. Sprayed and finish ground in approximately 4.5 hours

of preventing any oil from getting on the prepared surface prior to metal spraying. Even that small amount of oil deposited by contact with the hand is sufficient to cause difficulty. It is lack of appreciation of this factor that has caused many spraying troubles in the past. Since it is impossible to trace down how oil became deposited on the surface prior to metal spraying, the causes of such difficulties often are almost impossible to locate. Only constant care and education of operators will prevent trouble.

**Porosity and low coefficient of friction** are inherent characteristics of sprayed metal that make it exceptionally advantageous for bearing surfaces. Regardless of initial surface hardness, it has been noted that sprayed bearing surfaces greatly outlast the original solid metal counterparts in actual service. Pump plungers, piston rods, lathe spindles, armature and motor shafts, crank shafts and innumerable other parts, when sprayed, always have indicated the presence of a characteristic not found in the original solid metal part.

One investigator studying this feature determined that the inherent porosity of sprayed metals is responsible for the absorption of lubricant and a marked decrease in the coefficient of friction—usually from 20 to 25 per cent. The result is that actual service life is greatly prolonged, seizure loads are extended and wear is reduced. A number of tests were made at a speed of 445 surface feet per minute. An ordinary steel shaft, hardened and ground and lubricated with plain oil, seized at 900 pounds per square inch load and at 1000 pounds per square inch on a second test. The addition of graphite to the oil raised the seizure load to 1300 pounds per square inch. Contrast these results with a sprayed steel shaft which ran successfully with plain oil at 2000 pounds per square inch—the maximum that could be applied with the equipment at hand. In another test, ordinary steel seized at loads from 650 to 750 pounds per square inch, whereas sprayed steel ran at loads from 2540 to 2750 pounds per square inch, or about four times the first values.

To determine how long the shaft would carry its load after oil supply was cut off—simulating what happens when the mechanic forgets to oil the bearing—tests were made with hardened steel shafts at around 300 pounds per square inch load and 261 surface feet per minute. Seizure took place after the oil had been cut off in 3, 2½ and 2¾ hours in three successive tests. In contrast, sprayed steel shafts ran 22½ hours before seizure and after an hour's rest ran again for another 3 hours. In a test now proceeding, a sprayed steel shaft has been running for 190 hours after the graphited oil supply was cut off.

**WHY:** These tests indicate the ability of the sprayed metal to absorb oil and to give exceptional performance on bearing surfaces. One cannot help wondering why manufacturers of original equipment have not seen fit to utilize such desirable bearing character-

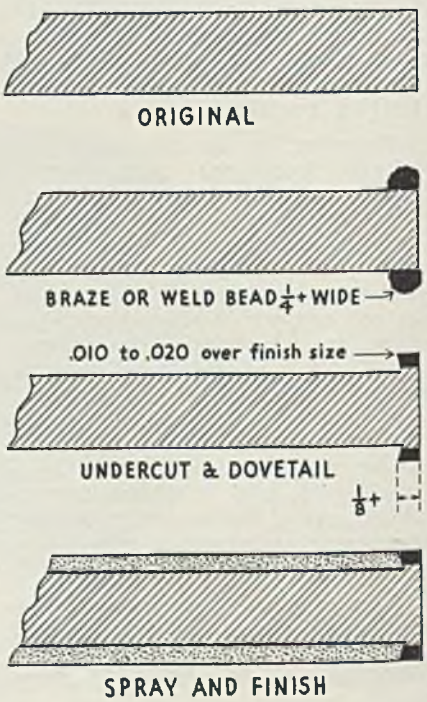
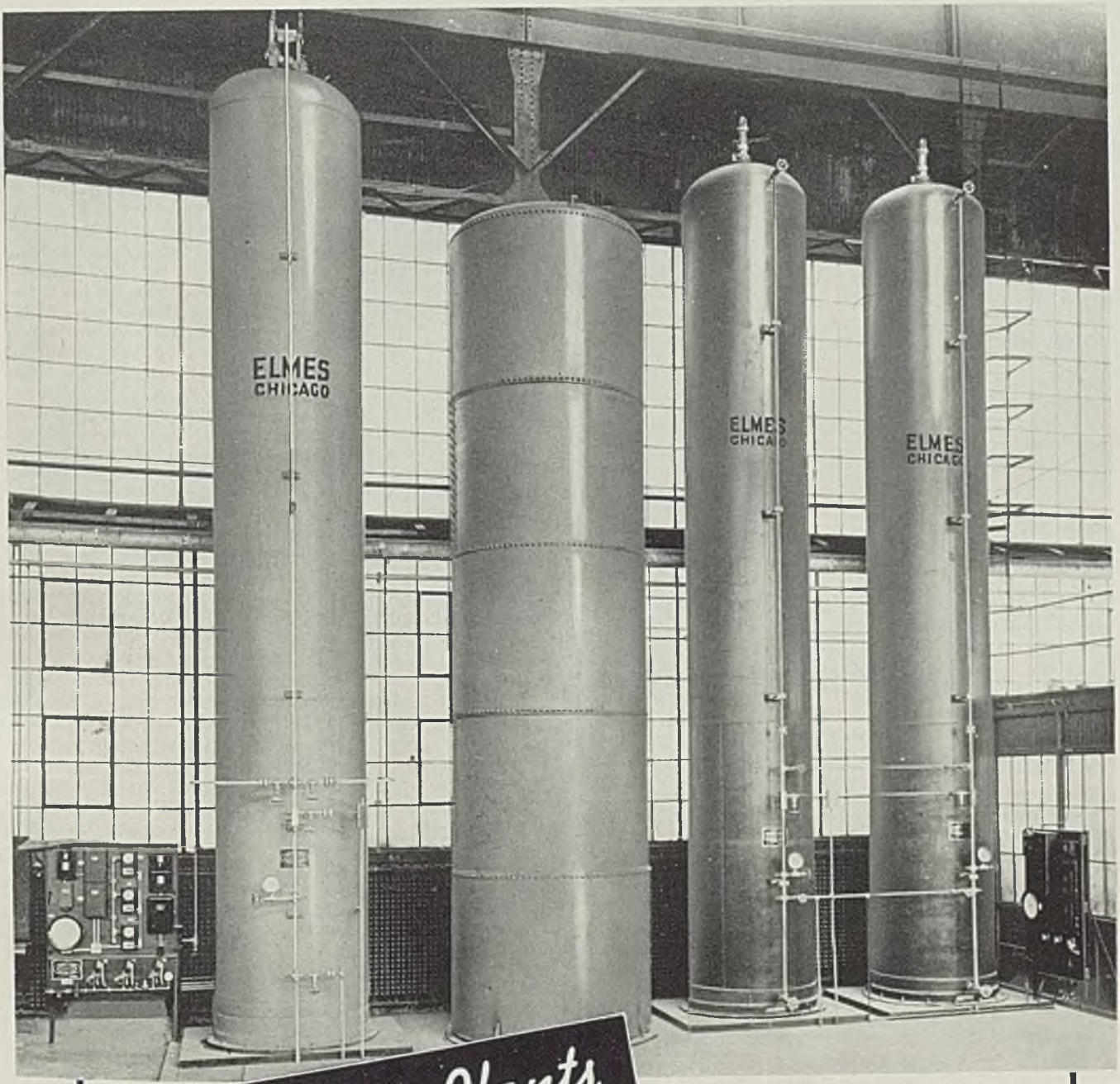



Fig. 5—When original cylindrical surface is worn away at the end so a key cannot be cut, then a bead is brazed or welded as shown at right, this then machined to form the key needed to lock the sprayed metal

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istics in the original machines.

**No size or weight limitations** exist for the process. Where the use of alloys and various heat treating methods may be limited by the size and weight of the piece, metal spraying has no such restrictions as it can be used on the largest as well as the smallest work with equal facility. In fact, the larger the shaft or bearing, the more spectacular the results. Shafts and spindles weighing several tons have had coatings 0.125-inch or more in thickness on the radius applied to bearing surfaces, press fit diameters, and in some cases the entire length. Such coatings can be of monel metal, nickel, nickel-chromium, stainless, high-carbon steels or other metals. Needless to say, such jobs are prepared, sprayed and finish machined on the same original setup.

The great volume of work already done on maintenance of ship propellor shafts (inboard and outboard bearings with 0.062-inch of zinc between bearings), roll necks and journals, diesel and marine engine crankshafts, hydraulic rams, piston rods and accumulator plungers, large lathe and grinder spindles, has permitted much basic cost information to be tabulated. Some of these have already been presented in Tables I and II. Table III shows the cost in cents per linear inch for metal spraying cylindrical surfaces with 0.01-inch of metal on the radius. This table takes into account the varying costs for the different metals.

**Any commercial metal** can be handled in modern metal spraying equipment—at the most requiring only a change of wire nozzles. This feature opens up an exceptionally large field and permits use of the metal best suited to the particular operating conditions to be experienced. Thus a manufacturer of pumps can apply at will nickel, monel metal, nickel-chromium or even tantalum to the packing gland section of impeller spindles. And no special stock, special machining operations or special tools are needed.

Metals have already been developed to produce a particular set of characteristics when sprayed just as a wide variety of welding rods is available for different weld metal requirements. The machining qualities, wear resistance, corrosion resistance and other characteristics of the deposited metal are all predictable as is the analysis of the metal after deposition.

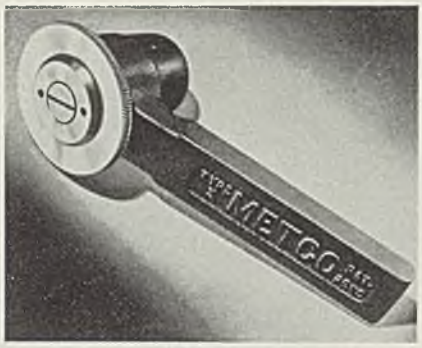



Fig. 6—This is the special abrading tool used to produce the surface to which the sprayed metal keys properly. It also is used to spread the tops of the ridges in Fig. 7 so they form positive locking pockets as shown in Fig. 8

**Thickness** of deposits is no longer a limitation. Often it is not always sufficient to have the desired surface characteristics confined too closely to the outer surface of the finished work. For example, it is easy to account for the maximum permissible wear on a bearing surface before replacement is necessary merely by spraying metal in sufficient thickness to exceed maximum wear by comfortable margin. Coatings up to ¼-inch in thickness are more or less common and can be applied easily by successive passes of the spray gun.

There are two schools of thought as to how much metal can be applied at one pass of the gun. The most acceptable and by far the most widely used is that which limits the thickness per pass to approximately 0.032-inch. Thicker layers can be applied at one pass up to ½-inch but only with extreme care and regard to the characteristics of the base metal.

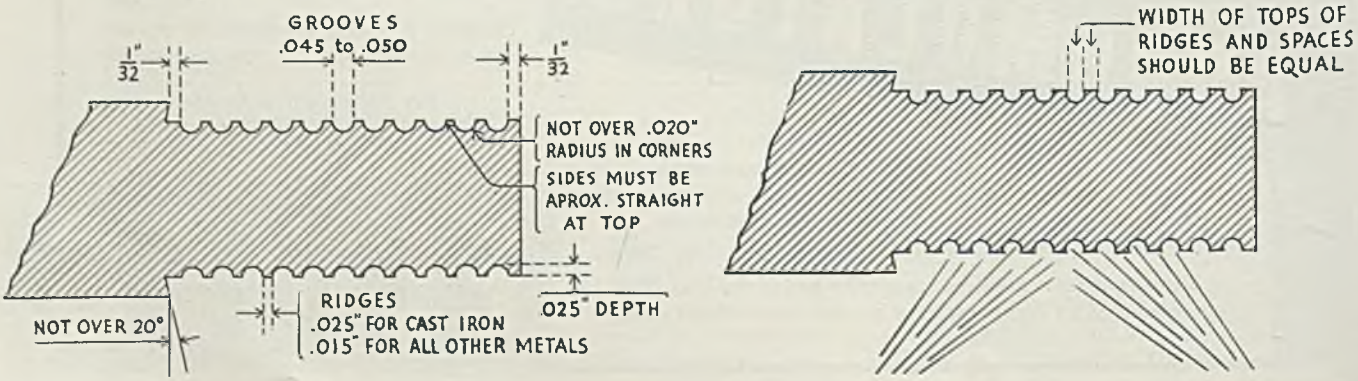
**Simple In Operation:** Skilled labor is not necessary to operate a metal-spray gun with perfect results. As detailed in the first part of this article, the variable factors are largely under automatic control so almost nothing can go wrong once the job is set up if the operator follows instructions. Metal spraying installations in production work today employ girls, common labor, machinist apprentices, lathe hands and welders. The process, so far as production or semiproduction applications are concerned, involves only an understanding of the fundamentals of the metal-spraying equipment itself, the fundamentals of the particular application and the lathe or automatic handling device. The first two requirements are taken care of by an instructor and operation hand books. The department head handles the third. Gun operation is at least semiautomatic. On the average surfacing job, the operator needs only to periodically reverse the lathe carriage.

**Dissimilar** metals can be applied one to another (with due regard to electrolytic action) to offer manufacturing possibilities not found under ordinary circumstances. As a general rule, any metal can be applied to a metallic surface if the surface is properly prepared. Also almost any metal can be applied to many nonmetallic surfaces if these surfaces are of a naturally open grained or porous nature.

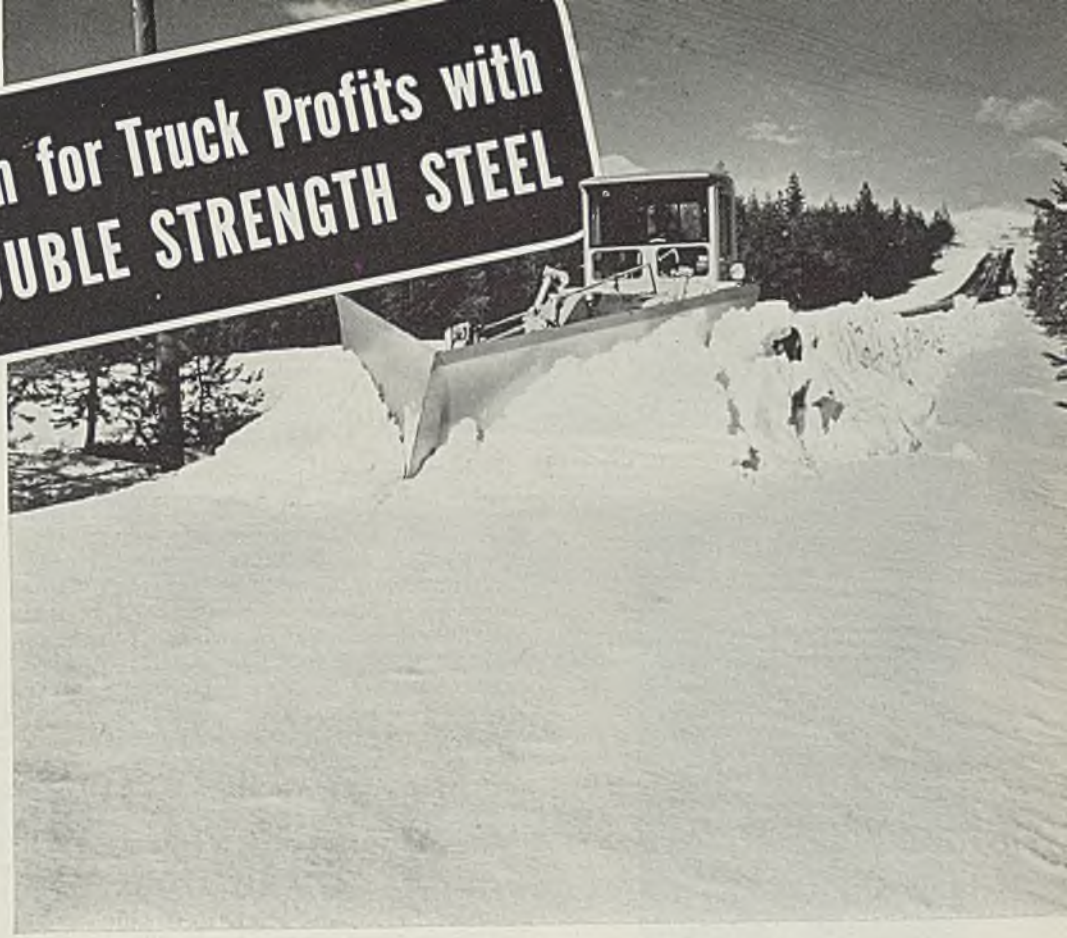
For example, copper, brass and bronze have been applied successfully to paper mill weft and wire rolls where the base or parent metal is usually iron or steel pipe.

Fig. 7—First step in a highly successful surface preparation method is shown below here, at left. Grooves are cut in a lathe using a special grooving tool

Fig. 8—After grooves are cut, right, below, top surfaces are abraded and spread out to form positive interlocking pockets for the sprayed metal as shown here. First few coats of the metal should be sprayed at an angle of 45 degrees as shown at bottom, alternately from one side to the other, to be sure side walls of pockets are built up properly



# Clearing a Path for Truck Profits with REPUBLIC DOUBLE STRENGTH STEEL



### IN THIS EMERGENCY

Paraphrasing an old operatic lyric—"A steelman's lot is not a happy one." When business is at low ebb, the struggle is to get enough tonnage to produce steel economically. When the tide of business swings to the other extreme, the big job we all have is to satisfy the customer who is unable to get all the steel he needs.

Believe me when I say that this is one time when the wheel that squeaks the loudest is not getting the grease. We are doing everything humanly possible to be helpful in this emergency and to be fair in the apportioning of our output—and to assist you further we are constantly setting new records in all our plants in our production of *steel—first line of national defense.*

R. J. Wysor
PRESIDENT

Again, "Double Strength" does double duty. First, its excellent performance, even at sub-zero temperatures, makes it a "natural" for use in this highway snow plow. Second, its high tensile strength permits the use of lighter sections and reduced weight in the construction of trucks which must follow.

Heavy snows may be no longer with us this year but the benefits of easy fabrication, increased pay loads and increased profits are always yours—with Republic Double Strength Steels.

*If you would like to read the interesting story of Republic Double Strength Steels and their advantages to truck and trailer users—ask for Booklet 353.*

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# REPUBLIC DOUBLE STRENGTH STEELS

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# Steelmakers and Blast Furnacemen To Consider Defense Problems

Wm. A. Haven

A. J. Boynton

C. E. Williams

L. F. Reinartz

■ ANNUAL conference of the Open Hearth Steel and Blast Furnace and Raw Materials Committees of the American Institute of Mining and Metallurgical Engineers which is to be held at the Palmer House, Chicago, April 23-25, has been built around the theme: "What the Raw Materials, the Open Hearth, and the Blast Furnace Man in the Steel Industry Can Do for the National Defense."

The general session of the open-hearth group will open at 9:30 a. m. Wednesday, April 23 and will be followed by a joint session of acid and basic furnace operators. Nine questions dealing with the subject of refractories are scheduled for discussion including trends and developments in open-hearth refractories; monolithic door linings; progress in the design of stopper rods, nozzles and in insulation; checker designs; and types of roofs. Wednesday afternoon's session will have for its theme: Strategic Materials in Open Hearth Steel Production: Defense Needs."

Members and guests of the Open Hearth Steel and Blast Furnace and Raw Materials Committees will come together Thursday morning at 9:00 a. m. for a joint discussion of how to make low-silicon, low-sulphur, high temperature, hot metal in the blast furnace, and how to use most efficiently in maximum quantities in open-hearth furnaces. Three papers will be presented at this session: "Effect of Desiliconization of Basic Pig Iron in Open Hearth Furnace Production" by J. R. Brady, assistant superintendent, open-hearth department, Wisconsin Steel Co., Chicago, Ill.; "Desiliconization of Basic Pig Iron by Means of Roll Scale Additions," by P. R. Nichols, assistant superintendent of blast furnaces, Wisconsin Steel Co., S. Chicago, Ill.; and, "The Desulphurization of Molten Iron with Soda Ash and the Effect of Desulphurized Hot Metal on Open-Hearth Practice and Steel Quality," by C. L. Labeka, plant metallurgist, and J. E. Walker, department plant metallurgist, Pittsburgh Steel Co., Monessen, Pa.

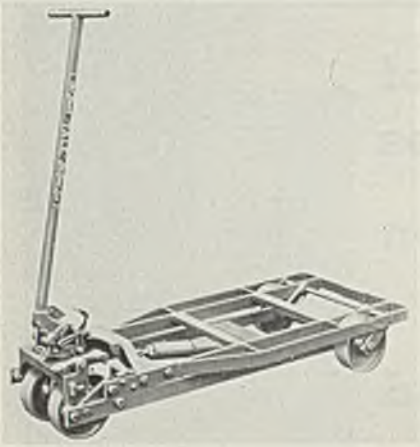
Friday morning's session of the basic open-hearth group will be devoted to the discussion of operating and construction problems, and will deal especially with methods of charging scrap more quickly, automatic control, flame control, atomizing fuel with blast furnace gas, use of blown metal, and of building a balanced furnace.

Following registration, Wednesday, members and guests of the Blast Furnace and Raw Materials groups will convene at 9:30 a. m. to discuss such problems as the use of high-magnesia slag for producing low-manganese pig iron, failures of furnace and stove shells, regulation of dome temperature of hot-blast stoves, practice of blowing-in and other topics. At the afternoon session the following papers are to be presented: "Effects of Scrap in the Blast Furnace Burden," by C. L. T. Edwards, Bethlehem Steel Co., Bethlehem, Pa.; and "Temperature Gradients Through Carbon Blast Furnace Linings," by F. J. Vosburgh, manager new products division, National Carbon Co. Inc., New York, and M. R. Hatfield, research laboratory, National Carbon Co. Inc., Cleveland; and "Blast Furnace Operation When Making High-Sulphur Iron with Lean Slags," by M. Wheldon, superintendent of blast furnaces, and G. Hanna, assistant superintendent of blast furnaces, Pittsburgh Steel Co., Monessen, Pa.

# Industrial

## Hand Lift Truck

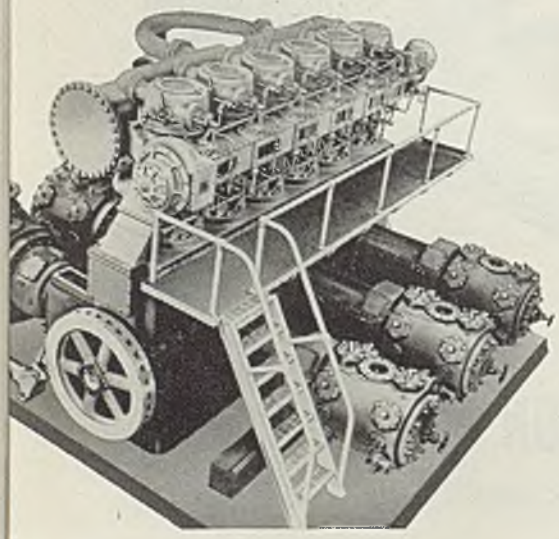
■ Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, announce a new Red Streak hand lift truck with simplified lift for handling 3500-pound loads. Its lift mechanism has fewer moving parts and incorporates safety features to prevent tripping and flying handle. The hand-grip of the handle is larger in diameter to afford a better grip, is chromium-finished to make



it easier on the operator's hands. The hand grip, tubular handle shaft and lower handle casting are welded into a single unit. The truck is capable of a 90-degree lift and full 180-degree steer. All wheels are steel with a smooth face. They embody ball bearings which are sealed against dirt. The front head and steering column are solid steel castings assembled on a fifth wheel (turntable) with a hardened and ground thrust washer. The truck is available in either wide or narrow frame models.

## Angle Compressors

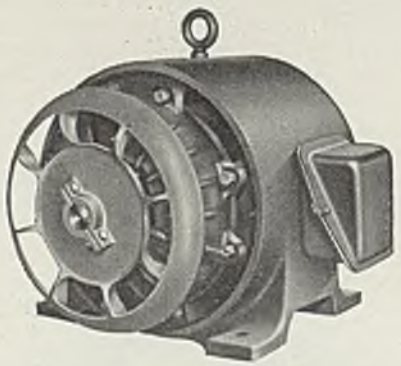
■ Clark Bros. Co. Inc., Olean, N. Y., have developed a line of steam-engine-driven Angle compressors which can be furnished in sizes from



600 to 4000 horsepower. The compressors have three to six power cylinders and a corresponding number of compressor cylinders in practically any arrangement desired. The power ends of these units are equipped with Unaflow steam cylinders and are noted for their economical operation. The particular features of this compressor are small floor space requirements and low foundation and building costs.

## Fan-Cooled Motors

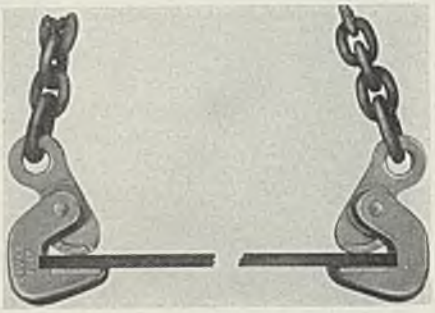
■ Century Electric Co., 1806 Pine street, St. Louis, has introduced a line of improved totally enclosed fan-cooled motors which embody necessary protection when operat-



ing in air, foggy with metal cutting solutions, or where there are abnormal quantities of metallic, abrasive and other dusts in the atmosphere. The design of the motors allows a generous quantity of cooling air to be forced through large air passages by a nonsparking fan. The air intake passages are so designed that a 5/16-inch rod will not pass through them.

## Lifting Clamp

■ Never-Slip Safety Clamp Co., Box 448, New York, has introduced an improved safety lifting clamp, equipped with a replaceable, grooved, hardened steel jaw liner. It is made for either horizontal or vertical lifting of steel plates, sheets or section, and is available in ten styles for handling material weighing up to 12 tons and from ⅛ to 6 inches in thickness. The replaceable plate lines the face of the



jaw and extends the life of the clamp as well as contributing to its lifting and holding qualities.

## Roll Brander

■ M. E. Cunningham Co., 115 East Carson street, Pittsburgh, has introduced a new floating type roll brander which reduces the time of marking mill rolls to a matter of 15 or 30 minutes. Both the roll and roll holder are of one-piece construction to eliminate any possibility of thread or screw failures. The floating feature embodied allows each piece of type to level itself in the roll with no chance of being wedged in an off position. This results in a much clearer branding with every character the same depth. This

same feature eliminates type breakage because the pressure is always on the center line. The type is en-

# Equipment

graved with a background clearance which eliminates chipping of the edges of characters when the branded roll is put in operation. The steel type is inserted and held in place by a new method which eliminates the need for spacers.

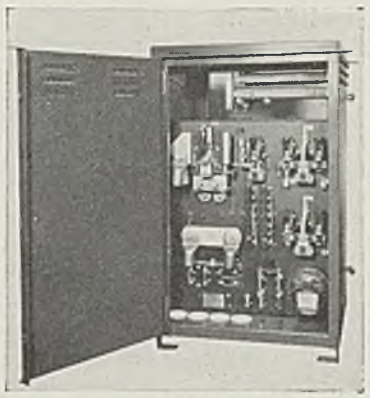
## Vacuum Cleaner

■ Black & Decker Mfg. Co., Towson, Md., announces a super-powered No. 95 Vacker vacuum cleaner for both automotive and industrial use. It is powered by a 1-horsepower motor driving a 3-stage centrifugal fan, has a sealed vacuum pull of 65 inches, and draws 60 cubic feet of air per minute. With both inlet and outlet hose connections it can be used as a vacuum cleaner or a blower. A system of

baffle plates and filters adapts it for wet cleaning and for removing excess moisture after scrubbing upholstery and carpets. The motor and mechanism are completely protected from moisture and are unharmed under such use. It is self-contained, rolls easily over rough floors on ball-bearing swivel casters, and its 15-foot flexible hose easily reaches out-of-the-way corners.

## Sectionalizing Switch

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., announces a new direct-current sectionalizing switch for reducing copper distribution losses, improving mining feeder voltage regulation during normal operation, and sectionalizing faulty sections of the feeder system during fault or overload conditions. It is built in ratings up to



1600 amperes at either 275 or 550 volts direct current. The sectionalizer is applied at the points where the branch circuits are taken from the main feeder. Trouble on one of these branches is quickly isolated so that normal service is undisturbed on the rest of the circuits. The unit is housed in a drip-proof, steel box which can be locked. Front and rear doors permit all parts to be easily inspected. The box is arranged for pole, wall or floor mounting.

## Respirator

■ H. S. Cover, South Bend, Ind., announces that its miniature, Dupor No. 1 nuisance dust respirator has been made lighter in weight by the substitution of molded plastic valves. Its total weight now is reduced to well under one ounce. The respirator is designed to fit over the nose only and is held in place by elastic ear bands. Its nose piece is of soft rubber equipped with a 9-square inch filter pad.

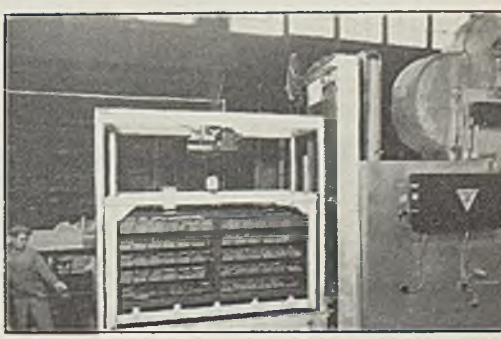
## Conveyor and Feeder

■ Standard Transmission Equipment Co., 416 West Eighth street, Los Angeles, announces a new free-flow vibrating conveyor and feeder which operates on the lift-throw principle with the motion of the trough becoming increasingly horizontal with the progress of each cycle, imparting to the conveyed material a gentle, forward motion. According to the company, this motion is regulated to suspend the mass in the air with only momentary contact with the trough on the

upward period. This suspended float-action minimizes wear from abrasion, and fragile material can be conveyed without fear of breakage. Because the trough is self-cleaning, different materials can be alternately conveyed, or perishables handled without fear of residual contamination. The oscillating arms which actuate the trough are mounted in special rubber bushings, which store the forward and return forces, reducing power con sumption. Self-aligning ball bearings are used throughout. The trough can be had of any desired material, open or enclosed for the handling of hot gaseous or dusty materials. By means of a variable speed control, the rate of oscillation of the trough and volume can be controlled as desired. Material can be conveyed up inclines tilted to 15 degrees.

## Heat Treating Furnace

■ Despatch Oven Co., Minneapolis, announces a new furnace especially suited for the heat treatment of aluminum and magnesium alloys. An interesting sidelight on its performance is the improved results which it obtains. For instance, No. 195 aluminum alloy castings should have a minimum tensile strength of 29,000 pounds and elongation factor of 8 per cent. The castings, however, which were processed in this furnace have a tensile strength up to 33,000 pounds and elongation up to 12 per cent. In addition the furnace cuts off time from the processing cycle. Its interior uniformity is 5 degrees plus or minus when operating at 950 degrees Fahr. This is brought about by the oversize, large volume, high static pressure



fans. Air velocity through the furnace exceeds 20 miles per hour which assures rapid, uniform heat treatment. Heat distributing ducts and the air circulation system are especially adapted for nonferrous metal heat treatment whether castings, sheet or other shapes. The furnace is capable of quenching in about 18 to 20 seconds giving plenty of safety factor. Eight thermocouples are incorporated, four being mounted on each sidewall. A multiple selector switch checks the interior uniformity of the furnace, and a safety limit switch prevents damage to the load if contactors stick or temperature control instrument fails. On preheating of the load and furnace, the full 100 kilowatts are required for the first two hours after which the consumption per hour tapers off to approximately 25 or 30 kilowatts per hour during the stoking period. While this unit is equipped with an electric heating system, it may also be equipped with a gas system to meet individual requirements.

## Explosion-Proof Motors

■ U. S. Electrical Motors Inc., Los Angeles, has recently developed a vertical explosion-proof motor suitable for vertical applications in both class I, group D and class II, group G locations. The first class are those locations in which flammable volatile liquids, highly flammable gases, mixtures or other highly flammable substances are present. The second class includes locations in which combustible dust is present as in flour or feed mills, grain elevators, starch plants, sugar, cocoa and coal pulverizing plants. The unit is fan-cooled and has asbestos protected windings. It is offered with a variety of mounting flanges and, regardless of the design of the machine, a mounting bracket is available to fit it without additional adaptors or plates.

## Welding Torch

■ Victor Equipment Co., 844 Folsom street, San Francisco, has introduced a new Airadiator welding torch designed to overcome the overheating caused when working on light gage metals in confined areas, or on very heavy castings. Aircooled, it is equipped with a radiator-like section, made of aluminum and provided with disk-like fins. This radiating device keeps the tubular section cooler than the ignition temperature of the fuel gas, eliminating preignition and resulting popping or backfiring. The torch handle is kept comfortably cool, an additional advantage particularly in the small aeroplane types of welding torches.

## Metallizing Gun

■ Metallizing Engineering Co. Inc., 21 Forty-first avenue, Long Island City, N. Y., reports a new type 2E Metco metallizing gun for spraying metal. It may be used as a hand tool for coating large structures with zinc, aluminum, lead or other metals, or as a lathe tool for building up worn shafts, rolls plungers, etc., with steel, stainless steel, monel metal, bronze or any other metal obtainable in wire form. In operation, metal wire is fed into the gun automatically at an adjustable speed, where it i

# HELPFUL LITERATURE

## 1. Industrial Cleaner

Spencer Turbine Co.—20-page illustrated bulletin No. 120 is descriptive of line of industrial vacuum cleaner systems and portable vacuum cleaners for use in all types of cleaning operations on floors, pipes, walls, and machinery. Sectional views show typical piping layouts of vacuum systems, as well as details of construction and operation of component parts.

## 2. Tool Steel

Jessop Steel Co.—12-page illustrated bulletin is entitled, "Carbon Tool Steels." Selection, application, tool design, forging, heat treatment, annealing, hardening and tempering are some of subjects dealt with.

## 3. Desuperheater Control

Bailey Meter Co.—16-page illustrated bulletin No. 107-A describes and explains operation of pressure reducing and desuperheating controls. Diagrammatic sketches show typical applications of controls in process, industrial and utility plants.

## 4. Sand Slinger

Beardsley & Piper Co.—8-page illustrated bulletin No. 1020 gives complete data and shows applications of "Speedslinger" which rams foundry molds with up to 4000 pounds of sand per minute. Operator rides with this machine and has finger-tip control over operation.

## 5. Steel Grabs

J-B Engineering Sales Co.—4-page illustrated bulletin No. 154 shows features of "Mansaver" grabs for handling slabs, coils and sheets in steel, paper and brass industries. Designs include manual, automatic and motor operated units.

## 6. Cables

John A. Roebling's Sons Co.—15-page illustrated bulletin No. J-862 describes line of "Parkway" metallic and nonmetallic cables for underground series lighting circuits. Details of construction, advantages, and uses are covered. Tables list conductor sizes, wire dimensions, shipping weights, and current carrying capacities of all types of stranded and solid conductors.

## 7. Multiple Retort Stoker

Combustion Engineering Co.—16-page illustrated catalog No. MR-4 gives details of type MRO multiple retort stoker. Typical installations are shown with cross-sectional drawings. Features of unit are explained and illustrated.

## 8. Metal Products

L. F. Grammes & Sons, Inc.—64-page illustrated catalog No. 66 is descriptive of wide variety of metal stampings and wire formings. Included are such items as badges, tool checks, metal tags, card and ticket holders, hinges, hardware, fasteners, clips, wire forms, washers, nails and rivets, and miscellaneous stampings.

## 9. Transmitting Instruments

Brown Instrument Co.—24-page illustrated catalog No. 9400 explains operation and shows applications of "New-Matic" remote transmission for indicating, recording and control of temperature, pressure, flow and liquid level in hazardous atmospheres.

## 10. Turret Lathe Tools

Bullard Co.—56-page spiral-bound illustrated catalog of "Standard Tools for Vertical Turret Lathes" includes complete description and specifications of tool posts, taper sockets, forged cutters, boring bars, reamers, fixtures, chucking tools and other equipment.

## 11. Grinding

Koebel Diamond Tool Co.—8-page illustrated bulletin, "Meet Joe Green, Grinder Hand," enlarges upon importance of skilled labor through training. Included is 24-page booklet, "For Grinder Men Only", which explains proper wheel dressing. Text is amplified by humorous cartoons.

## 12. Gear Checker

Michigan Tool Co.—4-page illustrated bulletin No. 1127B describes Model No. 1127B gear speeder which duplicates actual gear operating conditions. Closeup view shows details of operation and table enumerates complete specifications.

## 13. Rod Straightener

Taylor-Wilson Manufacturing Co.—8-page illustrated bulletin is descriptive of "Taylor-Wilson" machines for straightening, sizing and burnishing of rod, bar or tubing. Features of machine are explained and complete specifications given for available sizes.

## 14. Alloy Castings

Meehanite Research Institute of America, Inc.—8-page illustrated bulletin No. 12 describes 12 widely varying industrial applications of different types of "Meehanite" castings. Four general classifications under which castings are manufactured are noted. Other available bulletins on specific applications are listed.

## 15. Friction Lining

S. K. Wellman Co. — 40-page plastic-bound illustrated bulletin on "Velvetouch" gives complete information on this friction material for all types of brake and clutch linings. Application of lining to machinery and equipment of various types are shown. Material is made of sintered powdered metals welded to steel. Combinations include copper, tin, lead and other metals.

## 16. Metal Cutting Saws

Peerless Machine Co.—12-page illustrated bulletin No. 50A enumerates advantages of line of metal cutting saws having four-sided saw frames. These saws cut bars, squares, channels, I-beams, web sections, and tubes. Complete dimensional information is included.

## 17. Suction Hose

B. F. Goodrich Co.—4-page illustrated bulletin No. 4600 presents complete data on available types of suction hose for excavating and general utility service. Smooth and rough bore types are described and information is given on available fittings.

## 18. Welding Rod

American Agile Corp.—Illustrated bulletin No. 122 presents complete data and prices on "Yellow" machineable cast iron welding rod for application without preheating. Rod has low striking voltage and is available in 5/32, ⅛ and 3/32-inch diameters.

## 19. Bulk Materials Dryer

Link-Belt Co.—24-page illustrated catalog No. 1911 explains principle of "Roto-Louvre" dryer. Flowsheets, line drawings and photographs show applications, typical installations, and construction details. Tables report complete dimensions.

## 20. Heat Treating Furnaces

Despatch Oven Co.—4-page illustrated bulletin No. 83 is descriptive of "Despatch" tempering and drawing furnaces for machine tools, dies and other parts. Details of these units in gas and electric heated designs are given, and features are outlined.

## 21. Pneumatic Die Cushion

Dayton Rogers Manufacturing Co.—22-page illustrated catalog on "Dayton Rogers" universal pneumatic die cushions explains advantage of these units which may be installed on any punch press. Complete specifications are included on various models, as well as on accessories.

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# «« HELPFUL LITERATURE

(Continued)

### 22. Furnace Resurfacer

Basic Refractories, Inc.—6-page illustrated folder, "How to Increase Steel Production with Basifrit," is descriptive of this open hearth bottom resurfacing material. Time saved in resurfacing operations is shown with columnar charts. Characteristics of material are given.

### 23. Bus Supports

Delta-Star Electric Co.—40-page illustrated bulletin No. 31-C includes full specifications on complete line of unit type bus bar supports, conductor and base fittings and miscellaneous parts. Engineering data section gives information on properties of copper and aluminum conductors.

### 24. Gas Welding

Victor Equipment Co.—48-page illustrated catalog covers comprehensive line of gas welding and cutting apparatus. Sectional three color views of various regulator types and of welding torch trace gas travel, and show design and construction features.

### 25. Hoists & Crane Assemblies

Shaw-Box Crane & Hoist division, Manning, Maxwell, & Moore, Inc.—Two illustrated bulletins, No. 348 and 349, outline features of design and construction of Budget crane assemblies and portable electric hoists. Photographs show typical installations, and tables list prices, dimensions and suggested applications.

### 26. Chemical Products

Monsanto Chemical Co.—48-page booklet lists products of phosphate division. Chemical formulas, commercial names, properties, grades, containers, and principal uses for over 50 industrial chemicals are reported. Tables give district offices, plants, and associated companies and divisions.

### 27. Bronze Bearings

Johnson Bronze Co.—76-page illustrated catalog No. 410 and 24-page price list cover general purpose bronze bearings, oil grooving, cored bronze bars, solid bronze babbitt, graphite bearings, self-oiling bearings, and electric motor bearings. Specifications, dimensions and data on complete line are given.

### 28. Welding Electrodes

Page Steel & Wire division, American Chain & Cable Co.—16-page bulletin No. DH 931 describes advantages of high tensile "C" electrodes and gives detailed operating instructions for their use. Line drawings and tables outline specific procedure for making all types of welds.

### 29. Needle Bearings

Torrington Co.—64-page illustrated bulletin No. 24 discusses needle bearings and their application. Specifications, capacities and dimensions are given for standard needle bearings. Application data are given on automotive, aircraft, power transmission, machine tool, textile, materials handling and machine equipment.

### 30. Friction Materials

Johns-Manville Sales Corp.—12-page illustrated bulletin No. FM-7A is entitled, "Industrial Friction Materials." Comprehensive data are given on lines of industrial brake linings, blocks and clutch facings. Selection of proper friction material is simplified through use of recommendation chart.

### 31. Machining

W. F. and John Barnes Co.—Three 4-page illustrated bulletins, "Introduction to 3 Point Design," "Example of 3 Point Design," and "Because of:" deal with design of drilling, tapping, boring, milling, honing or combination machines. Method of building special machine tools is described.

### 32. Diesel Engines

Caterpillar Tractor Co.—48-page illustrated catalog No. 5850 explains diesel engine design through use of cut-away photographs. Integral engine parts are discussed from design and manufacture standpoint. Complete specifications, dimensions and performance charts are given for engines ranging in size from 22.5 to 105.8 horsepower.

### 33. Refining Process

Koppers Co.—12-page bulletin No. D-2 outlines semi-continuous light oil refining process which takes crude light-oil from stripping-plant and refines it into fore-runnings, motor-fuel, pure benzol, pure toluol pure xylol and solvent naphtha. Flow sheet shows details of process and table lists boiling points of several coke-oven light-oil constituents.

### 34. Gas-Diesel Engines

Worthington Pump & Machinery Corp.—4-page illustrated bulletin No. S-500-B39 is descriptive of convertible gas-diesel engines which permit relatively easy conversion for either fuel oil or gas operation. Spacer ring between cylinder and head permits change.

### 35. Earth Moving Equipment

Osgood Co.—16-page illustrated catalog No. 4102 points out features of Type 80 shovels, cranes, draglines and clamshells with air-operated controls. Hoist clutches, swing clutches, travel clutches, and dipper trip are actuated by air cylinders. Unassembled views show details of design and construction, while action views picture equipment in operation in field.

### 36. Control Instruments

Bristol Co.—Illustrated broadside No. 547 shows complete line of instruments for control of temperature, pressure, flow, liquid level, speed and processes. Integrating, recording, controlling and indicating instruments are described.

### 37. Buckets

Wellman Engineering Co.—44-page illustrated general catalog on "Williams" clamshell and dragline buckets gives complete specifications on entire line which included rehandler, general purpose, heavy duty, dredging, and multiple rope buckets, as well as dragline and steel mill buckets for material handling and excavating.

### 38. Screens

Hendrick Manufacturing Co.—8-page illustrated bulletin, "Hendrick Screens for Sizing and Dewatering", describes machine which incorporates combined shaking and whipping action. Construction and operation of equipment is explained. Specifications and dimensions of standard sizes are included.

### 39. Roller Bearings

Hyatt Bearing division, General Motors Sales Corp.—4-page illustrated quarterly publication, "Hyatt Innerscope", reports pictorially on equipment which uses "Hyatt" roller bearings. Cut-away views, sectionalized drawings and equipment photographs are used with explanatory text.

### 40. Skid Platforms

Union Metal Manufacturing Co.—6-page illustrated folder on "Metal Skid Platforms with Double Currugations," shows features of corrugated metal boxes, platform boxes, box trucks, and skids. Equipment is adaptable to wide variety of materials handling operations.

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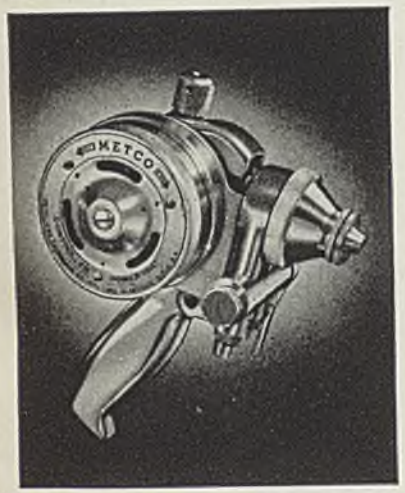
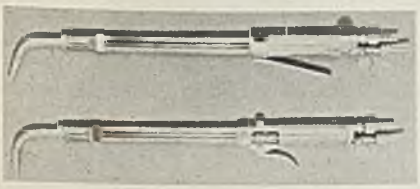
melted by means of a concentrated flame, atomized by compressed air and sprayed. The gun features a controlled power unit which gives uniform and steady wire feed for production service, and a universal gas head which allows the use of acetylene, propane, hydrogen, natural or manufactured gas with balanced pressures. In addition, it is capable of providing fine coatings at production speeds. The incorporation of an improved nozzle and jet reduces gas consumption. The tool is light in weight, weighing only 4¾ pounds. Its gear case is of aluminum alloy and is sealed. Simple 2-piece case construction makes it easy to clean and inspect. Bearing housings constructed of brass are mounted in the case and all parts effecting alignment are assembled with dowel pins or cylindrical fits.




## Cutting Apparatus

■ Air Reduction Sales Co., 60 East Forty-second street, New York, reports a new line of cutting apparatus designed especially for cutting risers. Also used successfully for removing rivets, the apparatus consists of two torches and three tips. The torches, styles 3180 and 9080, are of the straight head type. Both have monel metal heads and stainless steel tubes—both measuring 21 inches in length. Cutting oxygen can be controlled by either a lever or trigger, and the type selected can be placed on top, on either side, or on the bottom of the torch to suit the convenience of the operator. The cutting tips are known as style 187, bent to 75 degrees; style 181, bent to 90 degrees; and style 191 which is a straight tip, 7 inches long. They are designed to permit greater maneuverability in restricted areas and cramped quarters frequently encountered in riser cutting.



## Shows Role of Machine Tools in America

■ Dealing in great measure with the national defense program and its relation to the machine tool industry, the new 72-page catalog issued recently by R. K. LeBlond Machine Tool Co., Department J-L, Hyde Park, Cincinnati, presents by means of words and pictures the challenge facing industrial America. Included also is a complete exposition of the company's lathes, automatics, crankshaft machines and gun boring and rifling machines.

Entitled "America Sings", the publication is divided into sections, each of which is introduced by an airbrush "mural" depicting some phase of the American way of life. Each of these then is followed up by technical information on some portion of the machine tool line, tying it in with the "mural" introducing it, illustrating how our lives, both in time of peace and war, is so basically dependent on machine tools.

# No Material Handling Bottleneck at Steel Improvement & Forge Co.


Baker Truck c
ing a 4-ton loa
forged cranks
hammer to h
treating depart

## Thanks to BAKER TRUCKS!

Three Baker Hy-Lift Trucks are in constant 24 hour service at the busy Steel Improvement & Forge plant in Cleveland —with just a few hours out now and then for charging batteries. Heavy forged parts are carried quickly from hammers to heat-treating, to finishing and to shipping. Trucks also serve hammers with dies weighing up to 2 tons, and make millwright work easier and safer. In spite of the terrific pace set by increased production demands, time out for maintenance is negligible . . . Proof of satisfactory service is the fact that two more Baker Trucks are on order for the company's new plant, now under construction.

Two-hundred foot haul from plant to box car siding quickly made with 2-ton load of gear forgings.

Forgings crated for export loaded into car. Truck also handles loose or bagged forgings.

No loading platform required as forged gear racks are loaded into truck for shipment.

**BAKER INDUSTRIAL TRUCK DIVISION**
*of the Baker Raulang Company*
2167 WEST 25th STREET • • CLEVELAND, OHIO

**Baker INDUSTRIAL TRUCK**

# Some Steel Being Sold For Early 1942 Delivery

*However, no deliveries then are guaranteed. Falling off in sales in many quarters is welcomed. More extras are revised upwards.*

**MARKET IN TABLOID ★**

**Demand**
*Building steel much less active. Orders top output.*

**Prices**
*Extras rise further. New prices depend on wages.*

**Production**
*Unchanged at 98.*

■ SELLING of steel into first quarter of next year was initiated last week. However, such selling is more theoretical than actual or practical. In some cases branch offices are merely filing away such "orders" and not yet turning them into main offices. Producers are warning, too, that priority defense orders may upset schedules and postpone delivery until later quarters.

Generally new business for both mills and warehouses is in lighter volume, which is decidedly welcome. Where orders are increasing it is usually for a company which had refused fourth quarter orders but is now ready to book them, thus releasing a flood of what had been only potential business.

The steel wage and steel price situation is expected to come to a head soon. Since one prominent independent has raised wages 10 cents per hour it is believed that the entire industry must follow. Whether such action would bring about higher base prices remains to be seen.

Nearly each week sees readjusted "extras" imposed, which actually mean higher prices. Last week discounts on 1 to 3-inch galvanized pipe were reduced 3 points to 57½ per cent off list, an increase of $6 per ton. Commodity cold-rolled strip, .071 gage and heavier, on which discounts existed, has been reclassified as merely cold-rolled strip.

Usually a sound reason is behind any change in extras. In the case of galvanized pipe the higher costs of zinc motivated the change. In other cases previous prices did not reflect completely the higher costs of production as compared with the base grade.

On the whole, despite tight conditions, consumers are still being well taken care of as to supplies. Some finished steel consumers have been compelled to slow down operations somewhat. In rare cases foundries have been on the point of closing down because they could not get pig iron, blast furnaces in turn being unable to get coke, and that because of the coal strike.

The price stabilization committee at Washington has liberalized somewhat restrictions on steel scrap prices and dates. Thus where contracts were entered prior to April 3 to deliver scrap at prices above maximums now imposed, an extension of a month has been granted to wind up contracts, or to May 10. Even further extensions are granted where it is impractical to deliver by May 10 upon showing of proper affidavits, as where a potential scrap source is yet to be wrecked, or where material is located where prompt delivery is not possible, as at a port blocked by ice.

Pending better clarification steel scrap markets have been confused and often undefined for several weeks. In some cases dealers have based delivered scrap prices on pig iron prices at various consuming points.

March steel ingot production established a new record of 7,146,372 net tons, equivalent to 100 per cent of rated capacity, according to the American Iron and Steel Institute. The total was 14 per cent above the short February and 63 per cent over March, 1940.

A general priority system for producers and warehouse distributors of nickel-bearing steel has been adopted by the Office of Production Management. Needs will be graded in order of their importance from A to B-8. Controls are more intricate than on any other priority item so far.

Reflecting strikingly the effect of the Ford Motor Co. strike shutdown, are the predictions for automobile production for last week, 99,260 units, a drop of 20,795, the output for a like week of 1940 having been 101,940.

At least one blast furnace has been banked as a precautionary measure against a coke shortage, but such action is a rare exception.

Shipments of steel by United States Steel Corp. in March were 1,720,366 tons, an all-time high. Exports of iron and steel, other than scrap, in February were 525,826 gross tons, a drop of 19 per cent.

The national steel production rate last week was unchanged at 98 per cent. Steel production advanced 2½ points at Cleveland to 98½ per cent of capacity, at Buffalo 2 points to 90½ and at Cincinnati ½ point to 94. Declines were 13 points further at Detroit to 61 and 2 points in New England to 90. Unchanged were Pittsburgh at 102, Chicago at 101½, eastern Pennsylvania at 96, Wheeling at 88, Birmingham at 90, St. Louis at 98 and Youngstown at 97.

The three composite price groups of STEEL are unchanged: Iron and steel at $38.15, finished steel at $56.60 and steelworks scrap at $19.16, the revised figure for the preceding week.

# COMPOSITE MARKET AVERAGES

| | Apr. 12 | Apr. 5 | Mar. 29 | One Month Ago March, 1941 | Three Months Ago Jan., 1941 | One Year Ago Apr., 1940 | Five Years Ago Apr., 1936 |
|---|---|---|---|---|---|---|---|
| Iron and Steel .... | $38.15 | $38.15 | $38.29 | $38.27 | $38.38 | $36.69 | $31.10 |
| Finished Steel .... | 56.60 | 56.60 | 56.60 | 56.60 | 56.60 | 55.90 | 52.20 |
| Steelworks Scrap.. | 19.16 | 19.16 | 20.12 | 20.04 | 20.88 | 16.00 | 14.39 |

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

## Finished Material

| | Apr. 12, 1941 | Mar. 1941 | Jan. 1941 | Apr. 1940 |
|---|---|---|---|---|
| Steel bars, Pittsburgh | 2.15c | 2.15c | 2.15c | 2.15c |
| Steel bars, Chicago | 2.15 | 2.15 | 2.15 | 2.15 |
| Steel bars, Philadelphia | 2.47 | 2.47 | 2.47 | 2.47 |
| Iron bars, Chicago | 2.25 | 2.25 | 2.25 | 2.25 |
| Shapes, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Shapes, Philadelphia | 2.215 | 2.215 | 2.215 | 2.215 |
| Shapes, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Philadelphia | 2.15 | 2.225 | 2.17 | 2.15 |
| Plates, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, hot-rolled, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.00 |
| Sheets, cold-rolled, Pittsburgh | 3.05 | 3.05 | 3.05 | 2.95 |
| Sheets, No. 24 galv., Pittsburgh | 3.50 | 3.50 | 3.50 | 3.50 |
| Sheets, hot-rolled, Gary | 2.10 | 2.10 | 2.10 | 1.95 |
| Sheets, cold-rolled, Gary | 3.05 | 3.05 | 3.05 | 2.90 |
| Sheets, No. 24 galv. Gary | 3.50 | 3.50 | 3.50 | 3.50 |
| Bright bess., basic wire, Pitts. | 2.60 | 2.60 | 2.60 | 2.60 |
| Tin plate, per base box, Pitts. | $5.00 | $5.00 | $5.00 | $5.00 |
| Wire nails, Pittsburgh | 2.55 | 2.25 | 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 9/32-inch, Pitts. | 2.00 | 2.00 | 2.00 | 2.00 |

## Pig Iron

| | Apr. 12, 1941 | Mar. 1941 | Jan. 1941 | Apr. 1940 |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $25.34 | $25.34 | $25.34 | $24.34 |
| Basic, Valley | 23.50 | 23.50 | 23.50 | 22.50 |
| Basic, eastern, del. Philadelphia | 25.34 | 25.34 | 25.34 | 24.34 |
| No. 2 fdry., del. Pgh., N.&S. Sides | 24.69 | 24.69 | 24.69 | 23.69 |
| No. 2 foundry, Chicago | 24.00 | 24.00 | 24.00 | 23.00 |
| Southern No. 2, Birmingham | 20.38 | 20.38 | 19.38 | 19.38 |
| Southern No. 2, del. Cincinnati | 24.06 | 24.06 | 23.06 | 22.89 |
| No. 2X, del. Phila. (differ. av.) | 26.215 | 26.215 | 26.215 | 25.215 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 23.00 |
| Malleable, Chicago | 24.00 | 24.00 | 24.00 | 23.00 |
| Lake Sup., charcoal, del. Chicago | 30.34 | 30.34 | 30.34 | 30.34 |
| Gray forge, del. Pittsburgh | 24.19 | 24.18 | 24.17 | 23.17 |
| Ferromanganese, del. Pittsburgh | 125.33 | 125.33 | 125.33 | 105.33 |

## Scrap

| | | | | |
|---|---|---|---|---|
| Heavy melting steel, Pitts. | $20.00 | $20.75 | $22.15 | $16.45 |
| Heavy melt. steel, No. 2, E. Pa. | 17.75 | 18.65 | 19.31 | 15.50 |
| Heavy melting steel, Chicago | 18.75 | 19.45 | 20.15 | 15.20 |
| Rails for rolling, Chicago | 22.25 | 24.00 | 24.40 | 11.25 |
| Railroad steel specialties, Chicago | 23.75 | 23.55 | 23.95 | 18.05 |

## Coke

| | | | | |
|---|---|---|---|---|
| Connellsville, furnace, ovens | $5.50 | $5.50 | $5.50 | $4.75 |
| Connellsville, foundry, ovens | 6.00 | 6.00 | 6.00 | 5.75 |
| Chicago, by-product fdry., del. | 11.75 | 11.75 | 11.75 | 11.25 |

# STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

*Except when otherwise designated, prices are base, f.o.b. cars.*

## Sheet Steel

**Hot Rolled**

| | |
|---|---|
| Pittsburgh | 2.10c |
| Chicago, Gary | 2.10c |
| Cleveland | 2.10c |
| Detroit, del. | 2.20c |
| Buffalo | 2.10c |
| Sparrows Point, Md. | 2.10c |
| New York, del. | 2.34c |
| Philadelphia, del. | 2.27c |
| Granite City, Ill. | 2.20c |
| Middletown, O. | 2.10c |
| Youngstown, O. | 2.10c |
| Birmingham | 2.10c |
| Pacific Coast ports | 2.65c |

**Cold Rolled**

| | |
|---|---|
| Pittsburgh | 3.05c |
| Chicago, Gary | 3.05c |
| Buffalo | 3.05c |
| Cleveland | 3.05c |
| Detroit, delivered | 3.15c |
| Philadelphia, del. | 3.37c |
| New York, del. | 3.39c |
| Granite City, Ill. | 3.15c |
| Middletown, O. | 3.05c |
| Youngstown, O. | 3.05c |
| Pacific Coast ports | 3.70c |

**Galvanized No. 24**

| | |
|---|---|
| Pittsburgh | 3.50c |
| Chicago, Gary | 3.50c |
| Buffalo | 3.50c |
| Sparrows Point, Md. | 3.50c |
| Philadelphia, del. | 3.67c |
| New York, delivered | 3.74c |
| Birmingham | 3.50c |
| Granite City, Ill | 3.60c |
| Middletown, O. | 3.50c |
| Youngstown, O. | 3.50c |
| Pacific Coast ports | 4.05c |

**Black Plate, No. 29 and Lighter**

| | |
|---|---|
| Pittsburgh | 3.05c |
| Chicago, Gary | 3.05c |
| Granite City, Ill. | 3.15c |

**Long Ternes No. 24 Unassorted**

| | |
|---|---|
| Pittsburgh, Gary | 3.80c |
| Pacific Coast | 4.55c |

**Enameling Sheets**

| | No. 10 | No. 20 |
|---|---|---|
| Pittsburgh | 2.75c | 3.35c |
| Chicago, Gary | 2.75c | 3.35c |
| Granite City, Ill. | 2.85c | 3.45c |
| Youngstown, O. | 2.75c | 3.35c |
| Cleveland | 2.75c | 3.35c |
| Middletown, O. | 2.75c | 3.35c |
| Pacific Coast | 3.40c | 4.00c |

## Corrosion and Heat-Resistant Alloys

*Pittsburgh base, cents per lb.*

**Chrome-Nickel**

| | No. 302 | No. 303 | No 304 |
|---|---|---|---|
| Bars | 24.00 | 26.00 | 25.00 |
| Plates | 27.00 | 29.00 | 29.00 |
| Sheets | 34.00 | 36.00 | 36.00 |
| Hot strip | 21.50 | 27.00 | 23.50 |
| Cold strip | 28.00 | 33.00 | 30.00 |

**20% Ni.-Cr. Clad**

| | |
|---|---|
| Plates | 18.00* |
| Sheets | 19.00 |

**Annealed and pickled*

**Straight Chromes**

| | No. 410 | No. 416 | No. 430 | No. 442 |
|---|---|---|---|---|
| Bars | 18.50 | 19.00 | 19.00 | 22.50 |
| Plates | 21.50 | 22.00 | 22.00 | 25.50 |
| Sheets | 26.50 | 27.00 | 29.00 | 32.50 |
| Hot strip | 17.00 | 18.25 | 17.50 | 24.00 |
| Cold stp. | 22.00 | 23.50 | 22.50 | 32.00 |

## Steel Plate

| | |
|---|---|
| Pittsburgh | 2.10c |
| New York, del. | 2.29c-2.44c |
| Philadelphia, del. | 2.15c-2.30c |
| Boston, delivered | 2.43c-2.57c |
| Buffalo, delivered | 2.33c |
| Chicago or Gary | 2.10c |
| Cleveland | 2.10c |
| Birmingham | 2.10c |
| Coatesville, Pa. | 2.10c |
| Sparrows Point, Md. | 2.10c |
| Claymont, Del. | 2.10c--2.25c |
| Youngstown | 2.10c |
| Gulf ports | 2.45c |
| Pacific Coast ports | 2.65c |

**Steel Floor Plates**

| | |
|---|---|
| Pittsburgh | 3.35c |
| Chicago | 3.35c |
| Gulf ports | 3.70c |
| Pacific Coast ports | 4.00c |

## Structural Shapes

| | |
|---|---|
| Pittsburgh | 2.10c |
| Philadelphia, del. | 2.21½c |
| New York, del. | 2.27c |
| Boston, delivered | 2.41c |
| Bethlehem | 2.10c |
| Chicago | 2.10c |
| Cleveland, del. | 2.30c |
| Buffalo | 2.10c |
| Gulf ports | 2.45c |
| Birmingham | 2.10c |
| St. Louis, del. | 2.34c |
| Pacific Coast ports | 2.75c |

## Tin and Terne Plate

**Tin Plate, Coke (base box)**

| | |
|---|---|
| Pittsburgh, Gary, Chicago | $5.00 |
| Granite City, Ill. | 5.10 |

**Mfg. Terne Plate (base box)**

| | |
|---|---|
| Pittsburgh, Gary, Chicago | $4.30 |
| Granite City, Ill. | 4.40 |

**Roofing Ternes**

*Pittsburgh base, package* 112 *sheets* 20 x 28 *in., coating I.C.*

| | | | |
|---|---|---|---|
| 8-lb. | $12.00 | 25-lb. | $16.00 |
| 15-lb. | 14.00 | 30-lb. | 17.25 |
| 20-lb. | 15.00 | 40-lb. | 19.50 |

## Bars

**Soft Steel**

(*Base,* 20 *tons or over*)

| | |
|---|---|
| Pittsburgh | 2.15c |
| Chicago or Gary | 2.15c |
| Duluth | 2.25c |
| Birmingham | 2.15c |
| Cleveland | 2.15c |
| Buffalo | 2.15c |
| Detroit, delivered | 2.25c |
| Philadelphia, del. | 2.47c |
| Boston, delivered | 2.52c |
| New York, del. | 2.49c |
| Gulf ports | 2.50c |
| Pacific Coast ports | 2.80c |

**Rail Steel**

(*Base,* 5 *tons or over*)

| | |
|---|---|
| Pittsburgh | 2.15c |
| Chicago or Gary | 2.15c |
| Detroit, delivered | 2.25c |
| Cleveland | 2.15c |

| | |
|---|---|
| Buffalo | 2.15c |
| Birmingham | 2.15c |
| Gulf ports | 2.50c |
| Pacific Coast ports | 2.80c |

**Iron**

| | |
|---|---|
| Chicago | 2.25c |
| Philadelphia, del. | 2.37c |
| Pittsburgh, refined | 3.50-8.00c |
| Terre Haute, Ind. | 2.15c |

**Reinforcing**

*New Billet Bars, Base*

| | |
|---|---|
| Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts. | 2.15c |
| Gulf ports | 2.50c |
| Pacific Coast ports | 2.60c |

*Rail Steel Bars, Base*

| | |
|---|---|
| Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm. | 2.15c |
| Gulf ports | 2.50c |
| Pacific Coast ports | 2.60c |

## Wire Products

*Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads*

| | |
|---|---|
| Standard and cement coated wire nails | $2.55 |
| (Per Pound) | |
| Polished fence staples | 2.55c |
| Annealed fence wire | 3.05c |
| Galv. fence wire | 3.40c |
| Woven wire fencing (base C. L. column) | 67 |
| Single loop bale ties, (base C.L. column) | 59 |
| Galv. barbed wire, 80-rod spools, base column | 70 |
| Twisted barbless wire, column | 70 |

**To Manufacturing Trade**

*Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire)*

| | |
|---|---|
| Bright bess., basic wire | 2.60c |
| Galvanized wire | 2.60c |
| Spring wire | 3.20c |

Worcester, Mass., $2 higher on bright basic and spring wire.

## Cut Nails

Carload, Pittsburgh, keg $3.85

## Cold-Finished Bars

| | Carbon | Alloy |
|---|---|---|
| Pittsburgh | 2.65c | 3.35c |
| Chicago | 2.65c | 3.35c |
| Gary, Ind. | 2.65c | 3.35c |
| Detroit | 2.70c | *3.45c |
| Cleveland | 2.65c | 3.35c |
| Buffalo | 2.65c | 3.35c |

*Delivered.

## Alloy Bars (Hot)

*(Base, 20 tons or over)*

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c

Detroit, delivered 2.80c

| Alloy S.A.E. | Diff. | Alloy S.A.E. | Diff. |
|---|---|---|---|
| 2000 | 0.35 | 3100 | 0.70 |
| 2100 | 0.75 | 3200 | 1.35 |
| 2300 | 1.70 | 3300 | 3.80 |
| 2500 | 2.55 | 3400 | 3.20 |

4100 0.15 to 0.25 Mo. 0.55

4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.20

5100 0.80-1.10 Cr. 0.45

5100 Cr. spring flats 0.15

6100 bars 1.20

6100 spring flats 0.85

Cr. N., Van. 1.50

Carbon Van. 0.85

9200 spring flats 0.15

9200 spring rounds, squares 0.40

Electric furnace up 50 cents.

## Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

## Strip and Hoops

*(Base, hot strip, 1 ton or over; cold, 3 tons or over)*

**Hot Strip, 12-inch and less**

| | |
|---|---|
| Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham | 2.10c |
| Detroit, del. | 2.20c |
| Philadelphia, del. | 2.42c |
| New York, del. | 2.46c |
| Pacific Coast ports | 2.75c |
| Cooperage hoop, Young., Pitts.; Chicago, Birm. | 2.20c |
| Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown | 2.80c |
| Chicago | 2.90c |
| Detroit, del. | 2.90c |
| Worcester, Mass. | 3.00c |

| Carbon | Cleve., Pitts. |
|---|---|
| 0.26—0.50 | 2.80c |
| 0.51—0.75 | 4.30c |
| 0.76—1.00 | 6.15c |
| Over 1.00 | 8.35c |

Worcester, Mass. $4 higher.

**Commodity Cold-Rolled Strip**

| | |
|---|---|
| Pitts.-Cleve.-Youngstown | 2.95c |
| Chicago | 3.05c |
| Detroit, del. | 3.05c |
| Worcester, Mass. | 3.35c |

Lamp stock up 10 cents.

## Rails, Fastenings

*(Gross Tons)*

| | |
|---|---|
| Standard rails, mill | $40.00 |
| Relay rails, Pittsburgh 20—100 lbs. | 32.50-35.50 |
| Light rails, billet qual., Pitts., Chicago, B'ham. | $40.00 |
| Do., rerolling quality | 39.00 |

*Cents per pound*

| | |
|---|---|
| Angle bars, billet, mills | 2.70c |
| Do., axle steel | 2.35c |
| Spikes, R. R. base | 3.00c |
| Track bolts, base | 4.15c |
| Car axles forged, Pitts., Chicago, Birmingham | 3.15c |
| Tie plates, base | 2.15c |

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

## Bolts and Nuts

*F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.*

**Carriage and Machine**

| | |
|---|---|
| ½ x 6 and smaller | 68 off |
| Do., ⅜ and ⅝ x 6-in. and shorter | 66 off |
| Do., ¾ to 1 x 6-in. and shorter | 64 off |
| 1⅛ and larger, all lengths | 62 off |
| All diameters, over 6-in. long | 62 off |
| Tire bolts | 52.5 off |

**Stove Bolts**

In packages with nuts separate 73-10 off; with nuts attached 73 off; bulk 81 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

| | |
|---|---|
| Step bolts | 60 off |
| Plow bolts | 68.5 off |

**Nuts**

| Semifinished hex. | U.S.S. | S.A.E. |
|---|---|---|
| ½-inch and less | 66 | 70 |
| ⅝-1-inch | 63 | 65 |
| 1⅛-1½-inch | 61 | 62 |
| 1⅝ and larger | 60 | -- |

**Hexagon Cap Screws**

Upset 1-in., smaller 68 off

**Square Head Set Screws**

| | |
|---|---|
| Upset, 1-in., smaller | 74.0 off |
| Headless set screws | 64.0 off |

## Piling

Pitts., Chgo., Buffalo 2.40c

## Rivets, Washers

*F.o.b. Pitts., Cleve., Chgo., Bham.*

| | |
|---|---|
| Structural | 3.40c |
| ⅞-inch and under | 65-10 off |
| Wrought washers, Pitts., Chi., Phila., to jobbers | |
| and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off | |

## Welded Iron, Steel, Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

**Butt Weld**

| In. | Blk. | Galv. |
|---|---|---|
| **Steel** | | |
| ⅛ | 63½ | 51 |
| ¼ | 66½ | 55 |
| 1—3 | 68½ | 57½ |
| **Iron** | | |
| ¾ | 30 | 10 |
| 1—1¼ | 38 | 16 |
| 1½ | 37½ | 18 |
| 2 | 37½ | 18 |

**Lap Weld**

| | | |
|---|---|---|
| **Steel** | | |
| 2 | 61 | 49½ |
| 2½—3 | 64 | 52½ |
| 3½—6 | 66 | 54½ |
| 7 and 8 | 65 | 52½ |
| **Iron** | | |
| 2 | 30½ | 12 |
| 2½—3½ | 31½ | 14½ |
| 4 | 33½ | 18 |
| 4½—8 | 32½ | 17 |
| 9—12 | 28½ | 12 |

**Line Pipe**

| | Blk. | Galv. |
|---|---|---|
| **Steel** | | |
| 1 to 3, butt weld | 67½ | |
| 2, lap weld | 60 | |
| 2½ to 3, lap weld | 63 | |
| 3½ to 6, lap weld | 65 | |
| 7 and 8, lap weld | 64 | |
| **Iron** | | |
| ⅜ butt weld | 25 | 4 |
| 1 and 1¼ butt weld | 29 | 10 |
| 1½ butt weld | 33 | 12½ |
| 2 butt weld | 32½ | 13 |
| 1½ lap weld | 23½ | 4 |
| 2 lap weld | 25½ | 6 |
| 2½ to 3½ lap weld | 26½ | 8½ |
| 4 lap weld | 28½ | 12 |
| 4½ to 8 lap weld | 27½ | 11 |
| 9 to 12 lap weld | 23½ | 6 |

## Boiler Tubes

*Carloads minimum wall seamless steel boiler tubes, cutlengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.*

**Lap Welded**

| Sizes | Gage | Steel | Charcoal Iron |
|---|---|---|---|
| 1½"O.D. | 13 | $ 9.72 | $23.71 |
| 1¾"O.D. | 13 | 11.06 | 22.93 |
| 2" O.D. | 13 | 12.38 | 19.35 |
| 2¼"O.D. | 13 | 13.79 | 21.68 |
| 2¼"O.D. | 12 | 15.16 | .... |
| 2½"O.D. | 12 | 16.58 | 26.57 |
| 2¾"O.D. | 12 | 17.54 | 29.00 |
| 3" O.D. | 12 | 18.35 | 31.36 |
| 3½"O.D. | 11 | 23.15 | 39.81 |
| 4" O.D. | 10 | 28.66 | 49.90 |
| 5" O.D. | 9 | 44.25 | 73.93 |
| 6" O.D. | 7 | 68.14 | .... |

**Seamless**

| Sizes | Gage | Hot Rolled | Cold Drawn |
|---|---|---|---|
| 1" O.D. | 13 | $ 7.82 | $ 9.01 |
| 1¼"O.D. | 13 | 9.26 | 10.67 |
| 1½"O.D. | 13 | 10.23 | 11.79 |
| 1¾"O.D. | 13 | 11.64 | 13.42 |
| 2" O.D. | 13 | 13.04 | 15.03 |
| 2¼"O.D. | 13 | 14.54 | 16.76 |
| 2¼"O.D. | 12 | 16.01 | 18.45 |
| 2½"O.D. | 12 | 17.54 | 20.21 |
| 2¾"O.D. | 12 | 18.59 | 21.42 |
| 3" O.D. | 12 | 19.50 | 22.48 |
| 3½"O.D. | 11 | 24.62 | 28.37 |
| 4" O.D. | 10 | 30.54 | 35.20 |
| 4½"O.D. | 10 | 37.35 | 43.04 |
| 5" O.D. | 9 | 46.87 | 54.01 |
| 6" O.D. | 7 | 71.96 | 82.93 |

## Cast Iron Pipe

*Class B Pipe—Per Net Ton*

| | |
|---|---|
| 6-in., & over, Birm. | $45.00-46.00 |
| 4-in., Birmingham | 48.00-49.00 |
| 4-in., Chicago | 56.80-57.80 |
| 6-in. & over, Chicago | 53.80-54.80 |
| 6-in. & over, east fdy. | 49.00 |
| Do., 4-in. | 52.00 |

Class A Pipe $3 over Class B Stnd. fittgs., Birm., base $100.00.

## Semifinished Steel

**Rerolling Billets, Slabs**
*(Gross Tons)*

| | |
|---|---|
| Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point | $34.00 |
| Duluth (billets) | 36.00 |
| Detroit, delivered | 36.00 |

**Forging Quality Billets**

| | |
|---|---|
| Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm. | 40.00 |
| Duluth | 42.00 |

**Sheet Bars**

| | |
|---|---|
| Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago | 34.00 |
| Detroit, delivered | 36.00 |

**Wire Rods**

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl. (per 100 lbs.) $2.00

Do., over ⅜ to 11/32-in. incl. 2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

**Skelp**

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt. 1.90c

**Shell Steel**

*Pittsburgh, Chicago, base, 1000 tons of one size, open hearth*

| | |
|---|---|
| 3-12-inch | $52.00 |
| 12-18-inch | 54.00 |
| 18-inch and over | 56.00 |

## Coke

*Price Per Net Ton*

**Beehive Ovens**

| | |
|---|---|
| Connellsville, fur. | $5.00- 5.75 |
| Connellsville, fdry. | 5.25- 6.00 |
| Connell. prem. fdry. | 6.00- 6.60 |
| New River fdry. | 6.50- 7.00 |
| Wise county fdry. | 5.50- 6.50 |
| Wise county fur. | 5.00- 5.25 |

**By-Product Foundry**

| | |
|---|---|
| Newark, N. J., del. | 11.85-12.30 |
| Chicago, outside del. | 11.00 |
| Chicago, delivered | 11.75 |
| Terre Haute, del. | 11.25 |
| Milwaukee, ovens | 11.75 |
| New England, del. | 13.00 |
| St. Louis, del. | 11.75 |
| Birmingham, ovens | 7.50 |
| Indianapolis, del. | 11.25 |
| Cincinnati, del. | 11.00 |
| Cleveland, del. | 11.55 |
| Buffalo, del. | 11.75 |
| Detroit, del. | 11.50 |
| Philadelphia, del. | 11.63 |

## Coke By-Products

*Spot, gal., freight allowed east of Omaha*

| | |
|---|---|
| Pure and 90% benzol | 14.00c |
| Toluol, two degree | 27.00c |
| Solvent naphtha | 26.00c |
| Industrial xylol | 26.00c |

*Per lb. f.o.b. Frankford and St. Louis*

| | |
|---|---|
| Phenol (less than 1000 lbs.) | 13.75c |
| Do. (1000 lbs. or over) | 12.75c |

*Eastern Plants, per lb.*

| | |
|---|---|
| Naphthalene flakes, balls, bbls. to jobbers | 7.00c |

*Per ton, bulk, f.o.b. port*

| | |
|---|---|
| Sulphate of ammonia | $30.00 |

## Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons

| Basing Points: | No. 2 Fdry. | Malleable | Basic | Bessemer |
|---|---|---|---|---|
| Bethlehem, Pa. | $25.00 | $25.50 | $24.50 | $26.00 |
| Birmingham, Ala.§ | 20.38 | ..... | 19.38 | 24.00 |
| Birdsboro, Pa. | 25.00 | 25.50 | 24.50 | 26.00 |
| Buffalo | 24.00 | 24.50 | 23.00 | 25.00 |
| Chicago | 24.00 | 24.00 | 23.50 | 24.50 |
| Cleveland | 24.00 | 24.00 | 23.50 | 24.50 |
| Detroit | 24.00 | 24.00 | 23.50 | 24.50 |
| Duluth | 24.50 | 24.50 | ..... | 25.00 |
| Erie, Pa. | 24.00 | 24.50 | 23.50 | 25.00 |
| Everett, Mass. | 25.00 | 25.50 | 24.50 | 26.00 |
| Granite City, Ill. | 24.00 | 24.00 | 23.50 | 24.50 |
| Hamilton, O. | 24.00 | 24.00 | 23.50 | 24.50 |
| Neville Island, Pa. | 24.00 | 24.00 | 23.50 | 24.50 |
| Provo, Utah | 22.00 | ..... | ..... | ..... |
| Sharpsville, Pa. | 24.00–24.50 | 24.00–24.50 | 23.50–24.50 | 24.50–25.00 |
| Sparrow's Point, Md. | 25.00 | ..... | 24.50 | ..... |
| Swedeland, Pa. | 25.00 | 25.50 | 24.50 | 26.00 |
| Toledo, O. | 24.00 | 24.00 | 23.50 | 24.50 |
| Youngstown, O. | 24.00–24.50 | 24.00–24.50 | 23.50–24.50 | 24.50–25.00 |

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

| Delivered from Basing Points: | | | | |
|---|---|---|---|---|
| Akron, O., from Cleveland | 25.39 | 25.39 | 24.89 | 25.89 |
| Baltimore from Birmingham† | 25.61 | ..... | 25.11 | ..... |
| Boston from Birmingham† | 25.12 | ..... | ..... | ..... |
| Boston from Everett, Mass. | 25.50 | 26.00 | 25.00 | 26.50 |
| Boston from Buffalo | 25.50 | 26.00 | 25.00 | 26.50 |
| Brooklyn, N. Y., from Bethlehem | 27.50 | 28.00 | ..... | ..... |
| Canton, O. from Cleveland | 25.39 | 25.39 | 24.89 | 25.89 |
| Chicago from Birmingham | †24.22 | ..... | ..... | ..... |
| Cincinnati from Hamilton, O. | 24.44 | 25.11 | 24.61 | ..... |
| Cincinnati from Birmingham† | 24.06 | ..... | 23.06 | ..... |
| Cleveland from Birmingham† | 24.12 | ..... | 23.62 | ..... |
| Mansfield, O., from Toledo, O. | 25.94 | 25.94 | 25.44 | ..... |
| Milwaukee from Chicago | 25.10 | 25.10 | 24.60 | 25.60 |
| Muskegon, Mich., from Chicago, Toledo or Detroit | 27.19 | 27.19 | ..... | ..... |
| Newark, N. J., from Birmingham† | 26.15 | ..... | ..... | ..... |
| Newark, N. J., from Bethlehem | 26.53 | 27.03 | ..... | ..... |
| Philadelphia from Birmingham† | 25.46 | ..... | 24.96 | ..... |
| Philadelphia from Swedeland, Pa. | 25.84 | 26.34 | 25.34 | ..... |

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

| | No. 2 Fdry. | Malleable | Basic | Bessemer |
|---|---|---|---|---|
| Saginaw, Mich., from Detroit | 26.31 | 26.31 | 25.81 | 26.81 |
| St. Louis, northern | 24.50 | 24.50 | 24.00 | ..... |
| St. Louis from Birmingham | †24.12 | ..... | 23.62 | ..... |
| St. Paul from Duluth | 26.63 | 26.63 | ..... | 27.13 |

†Over 0.70 phos.

**Low Phos.**

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

| Gray Forge | | Charcoal | |
|---|---|---|---|
| Valley furnace | $23.50 | Lake Superior fur. | $27.00 |
| Pitts. dist. fur. | 23.50 | do., del. Chicago | 30.34 |
| | | Lyles, Tenn. | 26.50 |

**†Silvery**

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; Buffalo, $1.25 higher.

**Bessemer Ferrosilicon†**

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo, is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

## Refractories

*Per 1000 f.o.b. Works, Net Prices*

**Fire Clay Brick**

*Super Quality*

| | |
|---|---|
| Pa., Mo., Ky. | $60.80 |

*First Quality*

| | |
|---|---|
| Pa., Ill., Md., Mo., Ky. | 47.50 |
| Alabama, Georgia | 47.50 |
| New Jersey | 52.50 |

*Second Quality*

| | |
|---|---|
| Pa., Ill., Ky., Md., Mo. | 42.75 |
| Georgia, Alabama | 34.20 |
| New Jersey | 49.00 |

Ohio

| | |
|---|---|
| First quality | 39.90 |
| Intermediate | 36.10 |
| Second quality | 31.35 |

**Malleable Bung Brick**

| | |
|---|---|
| All bases | $56.05 |

**Silica Brick**

| | |
|---|---|
| Pennsylvania | $47.50 |
| Joliet, E. Chicago | 55.10 |
| Birmingham, Ala. | 47.50 |

**Ladle Brick**

*(Pa., O., W. Va., Mo.)*

| | |
|---|---|
| Dry press | $28.00 |
| Wire cut | 26.00 |

**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 | $50.00 |
| Chem. bonded chrome | 50.00 |
| Magnesite brick | 72.00 |
| Chem. bonded magnesite | 61.00 |

## Fluorspar

| | |
|---|---|
| Washed gravel, duty pd., tide, net ton | $25.00-$26.00 |
| Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail | 20.00-21.00 |
| Do. barge | 20.00 |
| No. 2 lump | 20.00-21.00 |

## Ferroalloy Prices

**Ferromanganese, 78-82%,** carlots, duty pd. $120.00; Ton lots 130.00; Less ton lots 133.50; Less 200 lb. lots 138.00; Do., carlots del. Pitts. 125.33

**Spiegeleisen, 19-21% dom.** Palmerton, Pa., spot 36.00

**Ferrosilicon, 50%,** freight allowed, c.l. 74.50; Do., ton lot 87.00; Do., 75 per cent 135.00; Do., ton lots 151.00; Spot, $5 a ton higher.

**Silicomanganese, c.l., 2½** per cent carbon 118.00; 1½% carbon 128.00; Contract ton price $12.50 higher; spot $5 over contract.

**Ferrotungsten, stand., lb.** con. del. cars 1.90-2.00

**Ferrovanadium, 35 to 40%, lb., cont.** 2.70-2.80-2.90

**Ferrophosphorus, gr. ton,** c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

**Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots** 11.00c; Do., ton lots 11.75c; Do., less-ton lots 12.00c; less than 200 lb. lots 12.25c

67-72% low carbon:

| | Carloads | Ton lots | Less ton |
|---|---|---|---|
| 2% carb. | 17.50c | 18.25c | 18.75c |
| 1% carb. | 18.50c | 19.25c | 19.75c |
| 0.10% carb. | 20.50c | 21.25c | 21.75c |
| 0.20% carb. | 19.50c | 20.25c | 20.75c |

Spot ¼c higher

**Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb.** 0.95

**Calcium molybdate, lb.** molyb. cont., f.o.b. mill 0.80

**Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots** $1.23; Do., less-ton lots 1.25; 20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do., less-ton lots 1.40

Spot 5c higher

**Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls** $2.25; Do., less-ton lots 2.30

Spot is 10c higher

**Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill** 0.80

**Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton** $142.50; Do., spot 145.00; Do., contract, ton lots 145.00; Do., spot, ton lots 150.00

**15-18% ti., 3-5% carbon,** carlots, contr., net ton 157.50; Do., spot 160.00; Do., contract, ton lots. 160.00; Do., spot, ton lots 165.00

**Alsifer, contract carlots,** f.o.b. Niagara Falls, lb. 7.50c; Do., ton lots 8.00c; Do., less-ton lots 8.50c

Spot ½c lb. higher

**Chromium Briquets, contract, freight allowed,** lb. carlots, bulk 7.00c; Do., ton lots 7.50c; Do., less-ton lots 7.75c; Do., less 200 lbs. 8.00c

Spot ¼c lb. higher

**Tungsten Metal Powder,** according to grade, spot shipment, 200-lb. drum lots, lb. $2.50; Do., smaller lots 2.60

**Vanadium Pentoxide,** contract, lb. contained $1.10; Do., spot 1.15

**Chromium Metal, 98%** cr., contract, lb. con. chrome, ton lots 80.00c; Do., spot 85.00c

88% chrome, cont. tons 79.00c; Do., spot 84.00c

**Silicon Metal, 1% iron,** contract, carlots, 2 x ⅛-in., lb. 14.50c; Do., 2% 13.00c

Spot ¼c higher

**Silicon Briquets, contract** carloads, bulk, freight allowed, ton $74.50; Ton lots 84.50; Less-ton lots, lb. 4.00c; Less 200 lb. lots, lb. 4.25c

Spot ¼-cent higher

**Manganese Briquets, contract carloads,** bulk freight allowed, lb. 5.50c; Ton lots 6.00c; Less-ton lots 6.25c

Spot ¼c higher

**Zirconium Alloy, 12-15%, contract, carloads,** bulk, gross ton 102.50; Do., ton 108.00

35-40%, contract, carloads, lb., alloy 14.00c; Do., ton lots 15.00c; Do., less-ton lots 16.00c

Spot ¼c higher

**Molybdenum Powder, 99%, f.o.b. York, Pa.** 200-lb. kegs, lb. $2.60; Do., 100-200 lb. lots 2.75; Do., under 100-lb. lots 3.00

**Molybdenum Oxide Briquets, 48-52% molybdenum, per pound** contained, f.o.b. producers' plant 80.00c

# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials*

| | Soft Bars | Bands | Hoops | Plates ¼-in. & Over | Structural Shapes | Floor Plates | Sheets: Hot Rolled | Sheets: Cold Rolled | Sheets: Galv. No. 24 | Cold Rolled Strip | Cold Drawn Bars: Carbon | Cold Drawn Bars: S.A.E. 2300 | Cold Drawn Bars: S.A.E. 3100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boston | 3.98 | 4.06 | 5.06 | 3.85 | 3.85 | 5.66 | 3.71 | 4.48 | 5.11 | 3.46 | 4.13 | 8.88 | 7.23 |
| New York (Met.) | 3.84 | 3.96 | 3.96 | 3.76 | 3.75 | 5.56 | 3.58 | 4.60 | 5.00 | 3.51 | 4.09 | 8.84 | 7.19 |
| Philadelphia | 3.85 | 3.95 | 4.45 | 3.55 | 3.55 | 5.25 | 3.55 | 4.05 | 4.65 | 3.31 | 4.06 | 8.56 | 7.16 |
| Baltimore | 3.85 | 4.00 | 4.35 | 3.70 | 3.70 | 5.25 | 3.50 | .... | 5.05 | .... | 4.05 | .... | .... |
| Norfolk, Va. | 4.00 | 4.10 | .... | 4.05 | 4.05 | 5.45 | 3.85 | .... | 5.40 | .... | 4.15 | .... | .... |
| Buffalo | 3.35 | 3.82 | 3.82 | 3.62 | 3.40 | 5.25 | 3.25 | 4.30 | 4.75 | 3.52 | 3.75 | 8.40 | 6.75 |
| Pittsburgh | 3.35 | 3.60 | 3.60 | 3.40 | 3.40 | 5.00 | 3.35 | .... | 4.65 | .... | 3.65 | 8.40 | 6.75 |
| Cleveland | 3.25 | 3.50 | 3.50 | 3.40 | 3.58 | 5.18 | 3.35 | 4.05 | 4.62 | 3.20 | 3.75 | 8.40 | 6.75 |
| Detroit | 3.43 | 3.43 | 3.68 | 3.60 | 3.65 | 5.27 | 3.43 | 4.30 | 4.84 | 3.40 | 3.80 | 8.70 | 7.05 |
| Omaha | 4.10 | 4.20 | 4.20 | 4.15 | 4.15 | 5.75 | 3.85 | 5.32 | 5.50 | .... | 4.42 | .... | .... |
| Cincinnati | 3.60 | 3.67 | 3.67 | 3.65 | 3.68 | 5.28 | 3.42 | 4.00 | 4.92 | 3.47 | 4.00 | 8.75 | 7.10 |
| Chicago | 3.50 | 3.60 | 3.60 | 3.55 | 3.55 | 5.15 | 3.25 | 4.10 | 4.85 | 3.30 | 3.75 | 8.40 | 6.75 |
| Twin Cities | 3.75 | 3.85 | 3.85 | 3.80 | 3.80 | 5.40 | 3.50 | 4.35 | 5.00 | 3.83 | 4.34 | 9.09 | 7.44 |
| Milwaukee | 3.63 | 3.53 | 3.53 | 3.68 | 3.68 | 5.28 | 3.18 | 4.23 | 4.73 | 3.54 | 3.88 | 8.38 | 6.98 |
| St. Louis | 3.64 | 3.74 | 3.74 | 3.69 | 3.69 | 5.29 | 3.39 | 4.24 | 4.99 | 3.61 | 4.02 | 8.77 | 7.12 |
| Kansas City | 4.05 | 4.15 | 4.15 | 4.00 | 4.00 | 5.60 | 3.90 | .... | 5.00 | .... | 4.30 | .... | .... |
| Indianapolis | 3.60 | 3.75 | 3.75 | 3.70 | 3.70 | 5.30 | 3.45 | .... | 5.01 | .... | 3.97 | .... | .... |
| Memphis | 3.90 | 4.10 | 4.10 | 3.95 | 3.95 | 5.71 | 3.85 | .... | 5.25 | .... | 4.31 | .... | .... |
| Chattanooga | 3.80 | 4.00 | 4.00 | 3.85 | 3.85 | 5.68 | 3.75 | .... | 4.50 | .... | 4.39 | .... | .... |
| Tulsa, Okla. | 4.44 | 4.34 | 4.34 | 4.49 | 4.49 | 6.09 | 4.19 | .... | 5.54 | .... | 4.69 | .... | .... |
| Birmingham | 3.50 | 3.70 | 3.70 | 3.55 | 3.55 | 5.93 | 3.45 | .... | 4.75 | .... | 4.43 | .... | .... |
| New Orleans | 4.00 | 4.10 | 4.10 | 3.80 | 3.80 | 5.75 | 3.85 | .... | 4.80 | 5.00 | 4.60 | .... | .... |
| Houston, Tex. | 3.75 | 5.95 | 5.95 | 3.85 | 3.85 | 5.50 | 4.20 | .... | 5.25 | .... | 6.60 | .... | .... |
| Seattle | 4.00 | 4.00 | 5.20 | 4.00 | 4.00 | 5.75 | 4.00 | 6.50 | 5.25 | .... | 5.75 | .... | .... |
| Portland, Oreg. | 4.25 | 4.50 | 6.10 | 4.00 | 4.00 | 5.75 | 3.95 | 6.50 | 5.00 | .... | 5.75 | .... | .... |
| Los Angeles | 4.15 | 4.65 | 6.45 | 4.15 | 4.15 | 6.40 | 4.30 | 6.50 | 5.25 | .... | 6.60 | 10.55 | 9.80 |
| San Francisco | 3.75 | 4.25 | 6.00 | 3.90 | 3.90 | 5.60 | 3.75 | 6.40 | 5.65 | .... | 6.80 | 10.65 | 9.80 |

| | S.A.E. Hot-rolled Bars (Unannealed): 1035-1050 | 2300 Series | 3100 Series | 4100 Series | 6100 Series |
|---|---|---|---|---|---|
| Boston | 4.28 | 7.75 | 6.05 | 5.80 | 7.90 |
| New York (Mel.) | 4.04 | 7.60 | 5.90 | 5.65 | .... |
| Philadelphia | 4.10 | 7.56 | 5.86 | 5.61 | 8.56 |
| Baltimore | 4.45 | .... | .... | .... | .... |
| Norfolk, Va. | .... | .... | .... | .... | .... |
| Buffalo | 3.55 | 7.35 | 5.65 | 5.40 | 7.50 |
| Pittsburgh | 3.40 | 7.45 | 5.75 | 5.50 | 7.60 |
| Cleveland | 3.30 | 7.55 | 5.85 | 5.85 | 7.70 |
| Detroit | 3.48 | 7.67 | 5.97 | 5.72 | 7.19 |
| Cincinnati | 3.65 | 7.69 | 5.99 | 5.74 | 7.84 |
| Chicago | 3.70 | 7.35 | 5.65 | 5.40 | 7.50 |
| Twin Cities | 3.95 | 7.70 | 6.00 | 6.09 | 8.19 |
| Milwaukee | 3.83 | 7.33 | 5.88 | 5.63 | 7.73 |
| St. Louis | 3.84 | 7.72 | 6.02 | 5.77 | 7.87 |
| Seattle | 5.85 | .... | 8.00 | 7.85 | 8.65 |
| Portland, Oreg. | 5.70 | 8.85 | 8.00 | 7.85 | 8.65 |
| Los Angeles | 4.80 | 9.55 | 8.55 | 8.40 | 9.05 |
| San Francisco | 5.25 | 9.65 | 8.80 | 8.65 | 9.30 |

**BASE QUANTITIES**

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Kansas City and St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

# CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at $4.02½ per Pound Sterling

## Export Prices f.o.b. Port of Dispatch—

*By Cable or Radio*

| | BRITISH Gross Tons f.o.b U.K. Ports | £ s d |
|---|---|---|
| Merchant bars, 3-inch and over | $66.50 | 16 10 0 |
| Merchant bars, small, under 3-inch, re-rolled | 3.60c | 20 0 0 |
| Structural shapes | 2.79c | 15 10 0 |
| Ship plates | 2.90c | 16 2 6 |
| Boiler plates | 3.17c | 17 12 6 |
| Sheets, black, 24 gage | 4.00c | 22 5 0 |
| Sheets, galvanized, corrugated, 21 gage | 4.61c | 25 12 6 |
| Tin plate, base box, 20 x 14, 108 pounds | $ 6.29 | 1 11 4 |

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

## Domestic Prices Delivered at Works or Furnace—

| | | £ s d |
|---|---|---|
| Foundry No. 3 Pig Iron, Silicon 2.50—3.00 | $25.79 | 6 8 0(a) |
| Basic pig iron | 24.28 | 6 0 6(a) |
| Furnace coke, f.o.t. ovens | 7.15 | 1 15 6 |
| Billets, basic soft, 100-ton lots and over | 49.37 | 12 5 0 |
| Standard rails, 60 lbs. per yard, 500-ton lots & over | 2.61c | 14 10 6 |
| Merchant bars, rounds and squares, under 3-inch | 3.17c | 17 12 0†† |
| Shapes | 2.77c | 15 8 0†† |
| Ship plates | 2.91c | 16 3 0†† |
| Boiler plates | 3.06c | 17 0 6†† |
| Sheets, black, 24 gage, 4-ton lots and over | 4.10c | 22 15 0 |
| Sheets, galvanized 24 gage, corrugated, 4-ton lots & over | 4.70c | 26 2 6 |
| Plain wire, mild drawn, catch weight coils, 2-ton lots and over | 4.28c | 23 15 0 |
| Bands and strips, hot-rolled | 3.30c | 18 7 0 |

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

# IRON AND STEEL SCRAP PRICES

**Quotations are those of Price Stabilization Board on grades covered by announcement.**

*Corrected to Friday night. Gross tons delivered to consumers except where otherwise stated; †indicates brokers prices*

### HEAVY MELTING STEEL

| | |
|---|---|
| Birmingham, No. 1 | 17.00 |
| Bos. dock No. 1 exp. | 17.00 |
| New Eng. del. No. 1 | 15.50 |
| Buffalo, No. 1 | 19.25 |
| Buffalo, No. 2 | 18.25 |
| Chicago, No. 1 | 18.75 |
| Chicago, auto, no alloy | 18.25 |
| Cincinnati, dealers | 18.50 |
| Cleveland, No. 1 | 19.50 |
| Cleveland, No. 2 | 18.50 |
| Detroit, No. 1 | 17.85 |
| Detroit, No. 2 | 16.85 |
| Eastern Pa., No. 1 | 18.75 |
| Eastern Pa., No. 2 | 17.75 |
| Los Ang., No. 1 | 14.50 |
| Los Ang., No. 2 | 13.50 |
| N. Y. dock No. 1 exp. | †16.50 |
| Pitts., No. 1 (R. R.) | 21.00 |
| Pittsburgh, No. 1 | 20.00 |
| Pittsburgh, No. 2 | 19.00 |
| St. Louis, No. 1 R. R. | 18.50 |
| St. Louis, No. 1 | 17.50 |
| St. Louis, No. 2 | 16.50 |
| San Fran., No. 1 | 14.50 |
| San Fran., No. 2 | 13.50 |
| Seattle, No. 1 | 14.50 |
| Toronto, dlrs., No. 1 | 12.25-12.50 |
| Valleys, No. 1 | 20.00 |

### COMPRESSED SHEETS

| | |
|---|---|
| Buffalo | 19.25 |
| Chicago, factory | 18.75 |
| Chicago, dealers | 17.75 |
| Cincinnati, dealers | 17.50 |
| Cleveland | 19.50 |
| Detroit | 17.85 |
| E. Pa., new mat. | 18.75 |
| E. Pa., old mat. | 17.50 |
| Los Angeles | 14.50 |
| Pittsburgh | 20.00 |
| St. Louis, No. 1 | 17.50 |
| St. Louis, No. 2 | 15.50 |
| San Francisco, net | 14.50 |
| Valleys | 20.00 |

### BUNDLED SHEETS

| | |
|---|---|
| Buffalo, No. 1 | 18.25 |
| Buffalo, No. 2 | 17.25 |
| Cleveland | 18.50 |
| Pittsburgh | 19.00 |
| St. Louis | 16.50 |
| Toronto, dealers | 10.00-10.50 |

### SHEET CLIPPINGS, LOOSE

| | |
|---|---|
| Chicago | 15.50-16.00 |
| Cincinnati, dealers | 12.50-13.00 |
| Detroit | †13.50-14.00 |
| St. Louis | 12.00-12.50 |
| Toronto, dealers | 9.00 |

### BUSHELING

| | |
|---|---|
| Birmingham, No. 1 | 16.50 |
| Buffalo, No. 1 | 18.75 |
| Chicago, No. 1 | 18.25 |
| Cincin., No. 1 | 18.00 |
| Cincin., No. 2 | 14.00 |
| Cleveland, No. 2 | 15.00 |
| Detroit, No. 1 new | 17.35 |
| Valleys, new, No. 1 | 19.50 |
| Toronto, dealers | 7.00- 7.50 |

### MACHINE TURNINGS (Long)

| | |
|---|---|
| Birmingham | 12.50 |
| Buffalo | 14.75 |
| Chicago | 14.25 |
| Cincinnati | 14.00 |
| Cleveland, no alloy | 15.00 |
| Detroit | 13.35 |
| Eastern Pa. | 14.25 |
| Los Angeles | 10.00 |
| New York | †10.50-11.00 |
| Pittsburgh | 15.50 |
| St. Louis | 13.00 |
| San Francisco | 10.00 |
| Toronto, dealers | †8.75- 9.00 |
| Valleys | 15.50 |

### SHOVELING TURNINGS

| | |
|---|---|
| Buffalo | 15.75 |
| Cleveland | 16.00 |
| Chicago, specl, anal. | 16.25-16.75 |
| Detroit | 14.35 |
| Pitts., alloy-free | 16.50 |
| St. Louis | 14.00 |

### BORINGS AND TURNINGS

*For Blast Furnace Use*

| | |
|---|---|
| Boston district | 11.00 |
| Buffalo | 14.75 |
| Cincinnati, dealers | 14.00 |
| Cleveland | 15.00 |
| Eastern Pa. | 14.25 |
| Detroit | 13.35 |
| New York | †11.00-11.50 |
| Pittsburgh | 15.50 |
| St. Louis | 13.00 |
| Toronto, dealers | †8.75- 9.00 |

### AXLE TURNINGS

| | |
|---|---|
| Buffalo | 17.00-17.50 |
| Boston district | †12.50-13.00 |
| Chicago, elec. fur. | 20.00-20.50 |
| East. Pa. elec. fur. | 19.50-20.00 |
| St. Louis | 15.50-16.00 |
| Toronto | †7.75- 8.00 |

### CAST IRON BORINGS

| | |
|---|---|
| Birmingham | 12.50 |
| Boston dist. chem. | 11.00 |
| Buffalo | 14.75 |
| Chicago | 14.25 |
| Cincinnati, dealers | 14.00 |
| Cleveland | 15.00 |
| Detroit | 13.35 |
| E. Pa., chemical | 17.50-18.00 |
| New York | †11.50-12.00 |
| St. Louis | 13.00 |
| Toronto, dealers | †8.75- 9.00 |

### RAILROAD SPECIALTIES

| | |
|---|---|
| Chicago | 23.50-24.00 |

### ANGLE BARS—STEEL

| | |
|---|---|
| Chicago | 23.50-24.00 |
| St. Louis | 21.50-22.00 |

### SPRINGS

| | |
|---|---|
| Buffalo | 25.00-25.50 |
| Chicago, coil | 24.75-25.25 |
| Chicago, leaf | 23.50-24.00 |
| Eastern Pa. | 23.75 |
| Pittsburgh | 26.75-27.25 |
| St. Louis | 23.25-23.75 |

### STEEL, RAILS, SHORT

| | |
|---|---|
| Birmingham | 21.00 |
| Buffalo | 23.75 |
| Chicago (3 ft.) | 22.75 |
| Chicago (2 ft.) | 23.25 |
| Cincinnati, dealers | 22.50 |
| Detroit | 21.85 |
| Pitts., 2 ft. and less | 24.50 |
| St. L. 2 ft. & Less | 22.00 |

### STEEL RAILS, SCRAP

| | |
|---|---|
| Birmingham | 19.00 |
| Boston district | 17.50 |
| Buffalo | 21.50 |
| Chicago | 20.75 |
| Cleveland | 21.50 |
| Pittsburgh | 22.00 |
| St. Louis | 19.50 |
| Seattle | 16.50 |

### PIPE AND FLUES

| | |
|---|---|
| Chicago, net | 14.50-15.00 |
| Cincinnati, dealers | 13.25-13.75 |

### RAILROAD GRATE BARS

| | |
|---|---|
| Buffalo | 14.50-15.00 |
| Chicago, net | 14.00-14.50 |
| Cincinnati, dealers | 12.75-13.25 |
| Eastern Pa. | 20.50-21.00 |
| New York | †13.00-13.50 |
| St. Louis | 15.00-15.50 |

### RAILROAD WROUGHT

| | |
|---|---|
| Birmingham | 16.00 |
| Boston district | †11.75-12.25 |
| Eastern Pa., No. 1 | 20.50-21.00 |
| St. Louis, No. 1 | 14.25-14.75 |
| St. Louis, No. 2 | 16.50-17.00 |

### FORGE FLASHINGS

| | |
|---|---|
| Boston district | †13.50-14.00 |
| Buffalo | 19.00-19.50 |
| Cleveland | 18.50-19.00 |
| Detroit | †16.50-17.00 |
| Pittsburgh | 20.00-20.50 |

### FORGE SCRAP

| | |
|---|---|
| Boston district | †12.75-13.00 |
| Chicago, heavy | 24.00-24.50 |

### LOW PHOSPHORUS

| | |
|---|---|
| Buffalo | 24.25 |
| Cleveland, crops | 24.50 |
| Detroit | 22.85 |
| Eastern Pa., crops | 23.75 |
| Pitts., billet, bloom, slab crops | 25.00 |
| Toronto, dealers | 13.50-14.00 |

### LOW PHOS. PUNCHINGS

| | |
|---|---|
| Buffalo | 24.25 |
| Chicago | 23.75 |
| Cleveland | 24.50 |
| Eastern Pa. | 23.75 |
| Pittsburgh | 25.00 |
| Seattle | 19.50 |

### RAILS FOR ROLLING

*5 feet and over*

| | |
|---|---|
| Birmingham | 20.50 |
| Boston | 19.00 |
| Chicago | 22.25 |
| New York | †19.00-19.50 |
| Eastern Pa. | 22.25 |
| St. Louis | 21.00 |

### STEEL CAR AXLES

| | |
|---|---|
| Birmingham | 18.00 |
| Boston district | †20.00-20.50 |
| Chicago, net | 26.00-26.50 |
| Eastern Pa. | 27.50-28.00 |
| St. Louis | 25.50-26.00 |

### LOCOMOTIVE TIRES

| | |
|---|---|
| Chicago (cut) | 23.50-24.00 |
| St. Louis, No. 1 | 20.00-20.50 |

### SHAFTING

| | |
|---|---|
| Boston district | †19.75-20.00 |
| New York | †21.00-21.50 |
| Eastern Pa. | 26.00 |
| St. Louis, 1¼-3¾" | 19.75-20.25 |

### CAR WHEELS

| | |
|---|---|
| Birmingham iron | 18.00 |
| Boston dist., iron | †16.50-17.00 |
| Buffalo, steel | 24.50-25.00 |
| Buffalo iron | 21.50-22.00 |
| Chicago, iron | 20.50-21.00 |
| Chicago, rolled steel | 23.00-23.50 |
| Cincin., iron deal. | 19.50-20.00 |
| Eastern Pa., iron | 23.50-24.00 |
| Eastern Pa., steel | 26.50-27.00 |
| Pittsburgh, iron | 22.00-22.50 |
| Pittsburgh, steel | 26.75-27.25 |
| St. Louis iron | 21.75-22.25 |
| St. Louis, steel | 22.50-23.00 |

### NO. 1 CAST SCRAP

| | |
|---|---|
| Birmingham | 19.50 |
| Boston, No. 1 mach. | †19.00-19.50 |
| N. Eng., del. No. 2 | 19.25-19.50 |
| N. Eng. del. textile | 22.00-23.00 |
| Buffalo, cupola | 20.50-21.00 |
| Buffalo, mach. | 22.50-23.00 |
| Chicago, agri. | 22.00 |
| Chicago, auto | 22.00 |
| Chicago, railroad | 22.00 |
| Chicago, mach. | 22.00 |
| Cincin., mach. deal. | 21.50-22.00 |
| Cleveland, mach. | 24.00-24.50 |
| Detroit, cupola, net | †19.00-19.50 |
| Eastern Pa., cupola | 26.00-26.50 |
| E. Pa., No. 2 | 23.00-23.50 |
| E. Pa., yard fdry. | 23.00-23.50 |
| Los Angeles | 16.50-17.00 |
| Pittsburgh, cupola | 22.50-23.00 |
| San Francisco | 14.50-15.00 |
| Seattle | 14.00-15.00 |
| St. L., agri. mach. | 20.00-20.50 |
| St. L., No. 1 mach. | 22.00-22.50 |
| Toronto No. 1 mach., net dealers | 17.75-18.00 |

### HEAVY CAST

| | |
|---|---|
| Boston dist. break. | †18.00-18.25 |
| New England, del. | 20.00-20.50 |
| Buffalo, break. | 18.00-18.50 |
| Cleveland, break, net | 18.50-19.00 |
| Detroit, auto net | †19.50-20.00 |
| Detroit, break. | †17.50-18.00 |
| Eastern Pa. | 24.00 |
| Los Ang., auto, net. | 13.00-14.00 |
| New York break. | †17.00 |

### STOVE PLATE

| | |
|---|---|
| Birmingham | 13.50 |
| Boston district | †15.50 |
| Buffalo | 18.00-18.50 |
| Chicago | 17.00 |
| Cincinnati, dealers | 13.00-13.50 |
| Detroit, net | †13.00-13.50 |
| Eastern Pa. | 20.50-21.00 |
| New York fdry. | †17.50 |
| St. Louis | 17.00-17.50 |
| Toronto dealers, net | 14.00-14.25 |

### MALLEABLE

| | |
|---|---|
| New England, del. | 22.00-23.00 |
| Buffalo | 24.00-24.50 |
| Chicago, R. R. | 24.50-25.00 |
| Cincin. agri., deal. | 18.00-18.50 |
| Cleveland, rail | 25.00-25.50 |
| Eastern Pa., R. R. | 23.00-23.50 |
| Los Angeles | 12.50 |
| Pittsburgh, rail | 26.00-26.50 |
| St. Louis, R. R. | 21.50-22.00 |

## Ores

### Lake Superior Iron Ore

*Gross ton, 51½%*

*Lower Lake Ports*

| | |
|---|---|
| Old range bessemer | $4.75 |
| Mesabi nonbessemer | 4.45 |
| High phosphorus | 4.35 |
| Mesabi bessemer | 4.60 |
| Old range nonbessemer | 4.60 |

### Eastern Local Ore

*Cents, unit, del. E. Pa.*

| | |
|---|---|
| Foundry and basic 56-63%, contract | 10.00 |

### Foreign Ore

*Cents per unit, c.i.f. Atlantic ports*

| | |
|---|---|
| Manganiferous ore, 45-55% Fe., 6-10% Mang. | Nom. |
| N. African low phos. | Nom. |
| Spanish, No. African basic, 50 to 60% | Nom. |
| Chinese wolframite, net ton, duty pd. | $23.50-24.00 |
| Brazil iron ore, 68-69%, ord. | 7.50c |
| Low phos. (.02 max.) | 8.00c |

F.O.B. Rio Janeiro.

| | |
|---|---|
| Scheelite, imp. | 23.50-24.00 |
| Chrome ore, Indian, 48% gross ton, clf. | $43.00-46.00 |

### Manganese Ore

*Including war risk but not duty, cents per unit cargo lots.*

| | |
|---|---|
| Caucasian, 50-52% | ..... |
| So. African, 48% | 65.00-67.00 |
| Brazilian, 46% | 60.00-62.00 |
| Chilean, 47% | 65.00 |
| Cuban, 50-51%, duty free | 67.50 |

### Molybdenum

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

# Scrap

Scrap Prices, Page 106

Extension from April 10 to May 10 of deadline on deliveries of scrap contracted before April 3 at prices above the new ceiling was announced Wednesday night by Leon Henderson, commissioner of the price stabilization division.

This followed strong representations by the scrap industry that great hardship and severe financial losses would result from insistence on the former date.

The amendment to the original announcement extends the date to May 10 and provides two exceptions to the rule that the dealer must have taken physical possession of the scrap before April 3. If the scrap originated from demolition operations begun but not finished before April 3 or if the scrap was bought before April 3 and accumulated at a point of shipment but not delivered because of lack of transportation facilities and the dealer cannot get possession in time to complete his contract by May 10 he may apply to the price stabilization division for further extension, enclosing affidavits to support his petition.

This announcement removed the greatest obstacle to compliance with the price regulation announced ten days ago. Until the matter was cleared dealers sought by every means to deliver as much as possible of the scrap contracted above ceiling prices and paid little attention to other business.

Some confusion still prevails on prices of grades not included in the original schedule. The task of relating them to differentials named for major grades probably will not be completed until some time this week. Trade is not seriously hampered by this situation as future buying is light. Most attention is being paid to delivery and consumers are taking in heavy tonnages.

Scarcity of cast grades is general and in some localities where users must ship in their supply from other centers freight rates have been found a bar to obtaining sufficient material as a higher price can be obtained by shipment elsewhere, nearer the point of origin.

Among many questions still unsettled is one involving purchase of scrap at Detroit for loading into steel company boats for shipment down the lakes. Apparently such scrap must be priced on the basis of Detroit dock as the consuming point. Otherwise the buyer might pay the maximum delivered price at lower lake port to pre-empt the material and charge dock and freight costs to profit and loss.

Bethlehem Steel Co. last week deided to pay the government ceiling at Steelton but 50 cents less at Bethlehem and Sparrows Point. It will pay, for No. 1 heavy melting steel, $18.75 delivered at Steelton and $18.25 delivered at Bethlehem and Sparrows Point. It will pay $1 less for No. 2 melting steel delivered at these points. Reason is that both Bethlehem and Sparrows Point are in a more favorable position than other Eastern mills with reference to scrap transportation costs, so that if the full government price were to be paid other mills would have difficulty in obtaining needed tonnage.

Scrap movement on the Great Lakes has started, indicating large accumulations ready to be moved by water. Last week two cargoes of about 3000 tons each moved from Detroit to Buffalo, the first loaded craft to enter that harbor. At least a dozen ships are now engaged in loading and transporting scrap on the lakes.

## Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 103

Specifications this month are at a greater rate than March, marking an unbroken series of continually brisker months. Buying is in ex-

cess of production, though the latter has been increased considerably. Makers have more trouble in getting raw materials, though there is no shortage yet. Increasing proportion of orders is for defense projects.

# Sheets, Strip

**Sheet & Strip Prices, Pages 102, 103**

Hot-rolled sheet consumers are being pinched through inability to obtain material in desired quantities since mills for most part are heavily booked through third quarter. Coverage now is sufficient to meet requirements through second and in some instances through third quarter. Deliveries are being parceled out to meet immediate needs, in line with mill policy to prevent inventory accumulation at some points while shortages may be present at others. Automotive users in particular are being held to small part of tonnage on order, but sufficient to maintain operation.

Inequality in distribution has developed in some cases, due to inability of construction to keep up with steel supply and this has allowed changes in schedules, relieving pressure on other products to some extent.

Cold-rolled sheets are in relatively easier position than hot-rolled but producers are unwilling to divert material from cold-rolling mills since demand for this grade is sufficient to support active operations.

Shortage of zinc supply, as indicated by cessation of galvanized sheet production by some mills, has caused discussion of possible price advance in this product. Deliveries offered on galvanized sheets vary widely, in accord with current zinc supplies. Shipment promises are about eight to nine months and in some cases longer. One supplier with ample zinc supply is able to offer four months delivery, though output is restricted by sheet supply and a limit is placed on the size of orders accepted.

A movement is on foot for rolling of light plates on continuous strip-sheet mills. Already some sheet mills have been rolling plates, but only in isolated cases and usually where this has been the practice before the present emergency. Most larger mills have not produced any such plates.

An effort is being made by refrigerator and washing machine manufacturers to use enameled iron sheets and enameled cast iron for certain parts of their products to relieve pressure on strategic materials, of which supply has been shortened by defense needs. Other products in which similar substitution is being considered include stoves, cooking utensils, water heating tanks and roofing sheets.

Makers of commodity cold-rolled strip announce that this classification on .071 gage and heavier will be eliminated and be classified as cold-rolled strip. Previously a discount had prevailed on this description and its elimination is tantamount to a price advance.

As a contribution to the general effort to save aluminum for defense several steel drum manufacturers have substituted gray paint for aluminum and a sheet steel producer is marking his product with red paint. A steel scaffolding manufacturer has been authorized by the government to use a substitute on a contract calling for aluminum finish.

Export restrictions on steel drums have stimulated demand for wooden barrels and kegs, resulting in some good business for steel hoops. Stampings producers are specifying sheets and strip more heavily, and some are operating three eight-hour shifts, aircraft production taking much of this production. Some important sheet fabricators are said to be operating with unusually low inventories which threaten curtailment of operations, but no interruptions have yet occurred.

Follansbee Steel Corp., Follansbee, W. Va., is operating its cold strip mills 20 turns per week. The company recently achieved a shipment record, moving out in one day a total of 30 cars of finished and semifinished steel.

# Plates

**Plate Prices, Page 102**

Most plate sellers are covered for the remainder of the year, especially where set allocations for regular customers are included. Where ship work is on books producers are covered well into 1942. Increased programs of naval and cargo vessel construction will bring heavier demands for plate delivery and may defer shipment for other purposes. Other defense needs are expected to take increasing proportion of output.

Present delivery situation offers miscellaneous plate users only small lots before the end of the year. In numerous cases civilian projects are being postponed because of heavy demand for prompt delivery of plates for various defense purposes. Plates appear to enter more largely into armament work than any other form of steel.

Car builders are making a particular drive for tonnage as they are behind on delivery schedules, in some cases due to their own delay in placing orders. This class of consumers has long had a certain preferential treatment which is seriously disturbed by the present priority situation. Shapes have been in much better supply than plates, which have lagged, thus disturbing the balance and delaying completion of car work.

Shipyard specifications are heavy and additional buying is being done as the ship program expands. The oil industry is taking a fair volume and small tanks account for considerable tonnage of light plates.

One eastern mill has been selling at $3 above the market and others now advocate an advance in plates in view of increased labor costs.

## Plate Contracts Placed

Unstated, repairs to Interstate bridge, Multnomah county, Oregon, Berkmeier & Saramel, Portland, general contractors.

Unstated tonnage, 100,000-gallon elevated steel water tank, Drew Field, Tampa, Fla., to R. D. Cole Mfg. Co., Newnan, Ga., $13,800; bids April 2 to U. S. engineer, Tampa.

# Bars

**Bar Prices, Page 102**

Merchant bar demand is heavy but consumer needs are being accommodated more fully than in some other products, such as plates and sheets. Deliveries on some sizes extend into fourth quarter and average about four months on commoner grades of carbon material. Mills find difficulty in scheduling orders to meet delivery requirements. In some instances bar mills are sold completely through the year.

Shell steel requirements are becoming more insistent and some large orders are believed to be imminent. A specific purchase, not yet released, is said to cover 10,000,000 shells of 37-millimeter size, requiring about 6000 tons of steel. Other purchases are said to be developing. Report of a 600,000-ton order appears to be exaggerated but heavy tonnages are certain to come out soon. Use of cold-finished bars for shells permits important savings in machining and also gives better fragmentation in explosive shells.

Defense work also includes army requirements for 105 and 155 millimeter gun carriages, which will take an important bar tonnage. An eastern steelmaker has put on shell steel production a mill formerly busy on automotive work, in an effort to meet defense requirements.

Warehouses find demand greater than they can meet and are forced to turn down considerable tonnage because of lack of supplies in various products.

Important public utilities in the East, which usually cover mainte-

nance requirements for a year at a time, are in the market for 1942 needs. Producers are hesitant about contracting so far in advance and some effort has been made to obtain material from jobbers, also with little success. One important producer is said to be willing to accept specifications until August of next year from regular customers, at prices ruling at delivery. Most bar sellers, however, although booked into November on even ordinary grades are unwilling to book tonnage for 1942, except in special cases involving principally alloy and heat treated bars.

Small arms production in New England is bringing larger inquiry for carbon and alloy bars and alloy forging billets for aircraft parts, forging plants increasing operations and bringing idle hammers into use.

# Pipe

Pipe Prices, Page 103

Mill deliveries of steel pipe, which have not been as extended as in other steel products, are slightly easier in the case of some producers. In some areas demand for merchant steel pipe has improved as construction work has increased seasonally. In other cases demand is quieter as pressure for defense housing has lessened, in conformity with lighter pressure for structural material.

Line pipe inquiry is active and many producers refuse to quote on many projects, as books are well filled. In casing pipe there are many evidences of building up stocks by consumers. They are making firm offers for delivery at mill convenience, which is too attractive for mills to refuse.

Resale merchant pipe is firm in the East, after a long period of weakness. Resellers apparently believe they will pay more for replacements. Demand for residential and apartment construction is bringing in a fair tonnage in that section.

Seasonal buying of cast iron pipe is somewhat less than in recent years, partially offset by army camp and airfield needs. Most foundries are on a five-day schedule, with small and medium-sized orders predominating.

The differential between black and galvanized pipe has been adjusted to the extent of 3 points, or $6 per ton, making 1 to 3-inch galvanized discount 57½ per cent. The rise was due to the higher cost of zinc. No new cards will be issued.

## Cast Pipe Placed

1300 tons, 6 to 12-inch, Long Beach, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

500 tons, estimated, approximately 22,000 feet, 6 to 30-inch, Worcester, Mass., to R. D. Wood Co., Florence, N. J., $35,997; bids April 1.

## Cast Pipe Pending

2500 tons, 4 to 8-inch, East Bay municipal utility district, Oakland, Calif., bids April 9.

670 tons, 6 to 20-inch, South Gate, Calif.; bids April 7.

521 tons, pipe and castings, Metropolitan District commission, Boston; bids April 17.

350 tons, various sizes, Phinney Bay district, Bremerton, Wash.; Soule & Walters, Elma, Wash., general contractor.

100 tons, 2 to 8-inch, San Bruno, Calif.; bids April 9.

100 tons, 6 and 8 inch, for Fort Lewis, Wash., hospital; bids opened April 8.

100 tons, 4 to 8-inch, Innis-Arden district, near Richmond Beach, Wash.; bids soon; Morford & Mowry, Seattle, engineers.

Unstated, 2 to 12 inch, for Shelton, Wash.; bids April 3.

# Wire

Wire Prices, Page 103

Wire buying is heavy and exceeds shipments, with fourth quarter capacity on some items being rapidly filled. Spring wire is in heavier demand. Agricultural areas are buying heavily of fencing, nails and miscellaneous products as the season advances.

Adoption of substitutes for alu-

minum paint is increasing, a large electric company now using gray paint on its cable reels, which involves considerable material.

# Rails, Cars

Track Material Prices, Page 103

Steel buying for railroad use, through carbuilders and for repair, has been heavy and promises to require considerable more tonnage over the remainder of the year. Cars placed in 1940 numbered about 66,000 and in first quarter this year close to 30,000 have been ordered. It is indicated that 75,000 will have been awarded during 1941. If defense needs limit supply to railroads, as no priorities have been granted steel for cars, locomotives and repair work, there may be some curtailment in building late in the year.

Effort to keep existing rolling stock in condition is causing large repair programs which involve many forms of steel, as well as specialties produced in foundries and elsewhere. Suppliers of the latter class also may feel a pinch in materials. Plates, a leading material in car work, are also in heavy demand for shipbuilding and other defense uses and should priorities limit the supply for other purposes railroads would be hard hit.

## Car Orders Placed

Aliquippa & Southern, 50 100-ton low side gondolas, to its own shops.

Atchison, Topeka & Santa Fe, 1750 freight cars; 1500 fifty-ton box cars to Pullman-Standard Car Mfg. Co., Chicago; 200 fifty-ton mill type gondolas to General American Transportation Corp., Chicago; and 50 steel caboose cars, to own shops; 22 passenger cars, including 14 storage mail cars, five combination mail baggage cars, two diners and one lunch counter diner, to E. G. Budd Mfg. Co., Philadelphia.

Bethlehem Steel Co., twelve 100-ton flat cars, to own shops.

Central of Georgia, 100 fifty-ton box and 100 fifty-ton automobile cars to Pullman-Standard Car Mfg. Co., Chicago.

Chicago, Rock Island & Pacific, 25 covered hoppers, to General American Transportation Corp., Chicago, on lease-purchase plant.

Illinois Central, 2300 freight cars; 1000 hoppers to Pullman-Standard Car Mfg. Co., Chicago, for erection at Bessemer, Ala.; 500 box, 200 refrigerator and 100 covered hopper cars to General American Transportation Corp., Chicago; and 500 box cars to the St. Louis plant of American Car & Foundry Co., New York; 100 flat cars are yet to be placed.

Lake Superior & Ishpeming, 100 ore cars, to Bethlehem Steel Co., Bethlehem, Pa.

Montour Railway, 300 hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

New York Central, 1000 50-ton box cars, cars, and 1000 fifty-ton gondolas to Despatch Shops Inc., East Rochester, N. Y., a subsidiary.

Wheeling & Lake Erie, 500 hopper cars, to American Car & Foundry Co., New York.

## Car Orders Pending

Chicago, Rock Island & Pacific, seven stainless steel coaches, diners and baggage cars; court permission given.

Erie, 1600 freight cars, bids asked.

Kansas City Southern, 200 comprising 100 50-ton box cars, 50 70-ton gondola cars and 50 fifty-ton automobile cars, pending.

Missouri Pacific, 100 fifty-ton automobile box cars; bids asked.

Union Pacific, 100 steel sheathed caboose cars, bids asked.

## Locomotives Pending

Chicago, Rock Island & Pacific, three 2000-horsepower diesel-electric; court permission given.

## Buses Booked

A.c.f. Motors Co., New York: 10 for Worcester Street Railway Co., Worcester, Mass.; eight, Community Traction Co., Toledo; five, Southeastern Greyhound Lines, Lexington, Ky.; four, Burlington Rapid Transit Co. Inc., Burlington, Vt.; four, Fitchburg & Leominister Street Railway Co., Fitchburg, Mass.; three, Penn-Ohio Coach Lines Co., Youngstown, O.; three, Rapid Transit Inc., Saugus, Mass.; one, J. Safianow, Elizabeth, N. J.; one, Jersey City & Lyndhurst Bus Co., Rutherford, N. J.; one, Cooke Street Lines, Waterbury, Conn.; and two air-conditioned motor coaches, Safeway Trails, Washington.

# Shapes

Structural Shape Prices, Page 102

It continues evident that most defense industrial housing projects have been erected or ordered, reducing orders and inquiries. In view of Washington's plan to decentralize ammunition and aircraft plants, a greater proportion of live projects are in the Middle and Far West. One such is the TNT plant at Sandusky, O., preliminary estimates ranging from 10,000 to 18,000 tons of fabricated structural steel.

Fabricators state that they have never seen prices of fabricated structurals, erected, firmer than now. Invariably the first offered price is the final price. Consumers shop around for prompt delivery rather than bargain prices. A principal award of the week was 6200 tons for an aircraft assembly plant at Omaha, Neb. Deliveries are about five months on an average, with four months about minimum.

## Shape Awards Compared

| | Tons |
|---|---|
| Week ended April 12 ..... | 41,148 |
| Week ended April 5 ..... | 26,214 |
| Week ended March 29 .... | 35,067 |
| This week, 1940 ..... | 7,960 |
| Weekly average, 1941 ..... | 34,335 |
| Weekly average, 1940 ..... | 28,414 |
| Weekly average, March 1941 | 20,157 |
| Total to date, 1940 ..... | 265,088 |
| Total to date, 1941 ..... | 515,032 |

Includes awards of 100 tons or more.

## Shape Contracts Placed

11,000 tons, army warehouses, Atlanta, Ga., to Bethlehem Steel Co., Bethlehem, Pa.; A. Farnell Blair, Decatur, Ga., contractor.

6700 tons, additions, branch mill, Celanese Corp. of America Inc., Narrows, Va., 4900 tons of Virginia Bridge Co., Roanoke, Va., and 1800 tons, Ingalls Iron Works, Verona, Pa.; George F. Hazelwood Co., Cumberland, Md., contractor.

6100 tons, bomber assembly plant, Omaha, Neb., Peter Kiewit Sons Co. and George W. Condon Co., Omaha, Neb., and Woods Bros. Construction Co., Lincoln, Neb., joint contractors, divided as follows: 1500 tons to Omaha Steel Works, Omaha, Neb.; 1300 tons to Pittsburgh-Des Moines Steel Co., Pittsburgh; 1300 tons to Des Moines Steel Co., Des Moines, Iowa; 900 tons to St. Joseph Structural Steel Co., St. Joseph, Mo.; 300 tons to Paxton & Vierling Iron Works, Omaha, Neb.; and 300 tnos to Gate City Iron Works, Omaha, Neb.; bids March 6.

4300 tons, mill buildings, Bridgeport Brass Co., Indianapolis, to American Bridge Co., Pittsburgh, through Stone & Webster Co., Boston.

1800 tons, buildings, York Safe & Lock Co., York, Pa., to Bethlehem Steel Co., Bethlehem, Pa., through James E. Stewart Co., New York.

1700 tons, miscellaneous aeronautical buildings, navy, Oakland, Calif., to Columbia Steel Co., San Francisco.

827 tons, highway bridge, Eau Claire, Wis., L. G. Arnold, Eau Claire, Wis., contractor, to Worden-Allen Co., Milwaukee.

800 tons, plant, Fleetwings Inc., Bristol, Pa., to Belmont Iron Works, Philadelphia.

700 tons, building, National Carbide Co., Ivanhoe, Va., to Bethlehem Steel Co., Bethlehem, Pa.

700 tons, additional bays, aeronautical materials storehouse, Oakland, Calif., for navy, to American Bridge Co., Pittsburgh.

508 tons, bridge spans, Illinois Central railroad, Memphis, Tenn., to Virginia Bridge Co., Roanoke, Va.

500 tons, steel structures, Coulee power plant switchyard, to Bethlehem Steel Co., Seattle.

500 tons, retaining wall, highway project, Hartford, Conn., to Truscon Steel Co., Youngstown, O.; Mariani Construction Co., New Haven, contractor.

450 tons, apartment, L. Victor Weil, New York, to American Bridge Co., Pittsburgh.

450 tons, addition to power plant, unit 6, Western United Gas & Electric Co., Aurora, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.; bids March 28.

450 tons, forge and heat treating plant, Rock Island arsenal, Rock Island, Ill., for government, Priester Construction Co., Davenport, Iowa, contractor, to Rock Island Bridge & Iron Works, Rock Island, Ill.; bids March 29.

380 tons, grade crossing, Middle River, Md., to American Bridge Co., Pittsburgh, through A. S. Wikstrom, Bound Brook, N. J.

350 tons, warehouse, sheet and tube division, Republic Steel Corp., Cleveland, to Truscon Steel Co., Youngstown, O.

253 tons, addition to smelter, New Jersey Zinc Co., Depue, Ill., to Belmont Iron Works, Philadelphia.

200 tons, rebuilding bridge 1696, Hoovers, Ind., for Chesapeake & Ohio railway, to American Bridge Co., Pittsburgh.

200 tons, overpass, Chicago, Rock Island & Pacific railroad, Pulaski county, Arkansas, state highway commission, to Ft. Smith Structural Steel Co., Ft. Smith, Ark.

180 tons, beam spans, Chicago, Burlington & Quincy railroad, Diamond Bluff, Wis., to Bethlehem Steel Co., Bethlehem, Pa.; bids Feb. 8.

150 tons, oil house and garage, Curtis Aeroplane division, Curtis-Wright Corp., Cheektowaga, N. Y., to the R. S. McMannus Steel Construction Co. Inc., Buffalo.

140 tons, grade crossing elimination, Madison, N. J., for state, to American Bridge Co., Pittsburgh.

135 tons, storage racks building, Buffalo Bolt Co., North Tonawanda, N. Y. to Buffalo Structural Steel Co., Buffalo.

125 tons, addition, Northwest Steel Rolling Mills plant, Seattle, to Isaacson Iron Works, Seattle.

125 tons, additional buildings, Sand Point, Seattle, air base, to Pacific Car & Foundry Co., Seattle; the Austin Co., contractor.

125 tons, grade crossing elimination, Danforth Road, Madison, N. J., to American Bridge Co., Pittsburgh; F. F. Baker, Montclair, N. J., contractor, $69,994.66; bids Mar. 21, Trenton.

100 tons, addition, R. & H. Chemical Division, E. I. du Pont de Nemours Co., Niagara Falls, N. Y., to Ernst Iron Works, Buffalo.

Unstated, 50-ton drydock crane, Pearl Harbor base, to Star Iron & Steel Co., Tacoma, Wash., low at $278,378.

Unstated tonnage, steel plant, near Houston, Tex., for Sheffield Steel Corp., divided among Stupp Bros. Bridge & Iron Co., St. Louis; also Mosher Steel Co., Alamo Iron Works and Commercial Iron Works, all of Houston, Tex.

## Shape Contracts Pending

10,000 to 15,000 tons, TNT plant, Sandusky, O.; bids to be asked for soon.

4800 tons, five hangars, Washington National airport, Gravelly Point, Va.; John McShain Inc., Philadelphia low, $2,028,200, bids April 3, Washington.

3700 tons, building, Chase Brass & Copper Co., Cleveland; previously estimated as 10,000 tons.

2115 tons, Ohio state highway bridges, as follows: 400 tons Scioto county, 500 tons Wood county, 500 and 350 tons Richland county, 365 tons Lake county.

1900 tons, state bridge, Salt river, West Point, Ky.

1400 tons, viaduct, East River Drive, New York; Lynn Construction Co., New York, low.

1043 tons, Slauson avenue bridge and bridge, Pacific Electric Railroad, Los Angeles, improvement of Los Angeles River between Atlantic and Randolph streets, Los Angeles; bids opened.

800 tons, storage sheds, Columbus, O., for government.

800 tons, bridge, Queens, Tri-borough Bridge Authority, New York; Leopold & Co., New York, low.

800 tons, shapes and bars, buildings and utilities, veterans' hospital, Ft. Howard, Maryland; Henry Dattners, Detroit, low, $850,000; bids March 31.

750 tons, plant addition, Allegheny Ludlum Steel Co., Dunkirk, N. Y.

674 tons, three bridges, Illinois Highway Commission; bids April 11.

652 tons, Kootenia River bridge, Kootenais county Montana; bids April 5, Public Roads administration.

651 tons, 938-foot bridge, Lincoln county, Montana; bids to Public Roads Adm., Missoula, Mont., April 16.

600 tons, state bridge, Lebanon county, Pennsylvania.

600 tons, pattern shop, navy yard, Philadelphia; also 200 tons reinforcing bars; Barclay White Co., Philadelphia, contractor.

575 tons, bridge, Southern Pacific Co., Lathrop, Calif.; bids April 10.

550 tons, bulkhead gates, Shasta dam, specification 1500-D, Coram, Calif., for bureau of reclamation.

525 tons, air corps warehouse, units 6, 7 and 8, Middletown, Pa., for government.

500 tons, grade crossing elimination, CB-41-1, Queens, New York.

500 tons, building, Cleveland Hobbing Machine Co., Euclid, O.; bids in.

475 tons, production machine shop, Edgewood arsenal, Maryland, for war department.

450 tons, hospital, Manhattan, New York, for city.

350 tons, poles, extensions and beams, for Philadelphia Electric Co., Philadelphia.

350 tons, grade crossing elimination, New York Central Railroad, Miller Avenue, Buffalo, Bouley Co., Auburn, N. Y., contractor.

340 tons, state bridge, Parsons, W. Va.

335 tons, 5 bridges, Missouri Highway Commission; bids April 10.

300 tons, drydock crane, Hunters Point drydock, San Francisco; bids opened.

250 tons, building, Great Lakes Carbon Co., North Tonawanda, N. Y.

250 tons, building Ridge Tool Co., Elyria, O.; bids in.

225 tons, bridge, Falling creek, Norfolk, Va., Seaboard Air Line railway.

210 tons, maintenance platform, Wil-

liamsburg bridge, New York.

200 tons, bridge, inv. 9848, Military Junction, Colo., for government.

200 tons, warehouse, army airport, Middletown, Pa.; bids April 16.

185 tons, machine shop addition, Athens, Pa., Ingersoll-Rand Co.

170 tons, five steel stringer state bridges, Yakima county, Washington; bids to Olympia, April 22.

165 tons, state bridge, Tuscarawas river, Zoarville, O.

150 tons, six bridges in Alaska for Alaska Road Commission; Worden-Allen Co., Milwaukee, low.

140 tons, women's dormitory, West Virginia university, Morgantown, W. Va., for state.

130 tons, addition, Eclipse Machine division, Bendix Aviation Corp., Elmira, N. Y.

125 tons, hosiery mill, Hatfield, Pa.; bids April 16.

120 tons, store 92, G. C. Murphy Co., Butler, Pa.

110 tons, jib cranes, for General Electric Co., Pittsfield, Mass.

100 tons, plant addition, Curtis Screw Co., Buffalo.

Unstated, three story, 102 x 98 feet steel frame building, Puget Sound navy yard; bids soon; spec. 10379.

Unstated, control towers, Pendleton, Oreg., airport; bids to U. S. engineer, Portland, April 14.

Unstated, portal frames, three units Coulee dam, Odair, Wash.: bids to Denver April 9; spec. 1497-D.

Unstated, radial gate and hoists, Deschutes project; bids to reclamation bureau, Bend, Oreg., April 16.

Unstated, steel frame warehouse and shops Bonneville dam; Drake, Wyman & Voss, Portland, contractor, low at $112,000.



# Reinforcing

**Reinforcing Bar Prices, Page 103**

Private business is taking a larger share of reinforcing bar business so far this year than during 1940, due in part to inability of contractors to secure structural material for non-defense jobs. Deliveries vary from four weeks upward, depending on specifications and locations. Philadelphia reports that several thousand tons remain to be placed for the quartermaster department warehouse there and in that district prices are generally steady, although occasional concessions surprisingly appear on the more attractive jobs.

## Reinforcing Steel Awards

6000 tons, ammunition depot, Wingate, N. Mex., for government, Allison-Smith-Fellows Armstrong, contractors, to Ceco Steel Products Corp., Omaha, Nebr.

3500 tons, Glenn L. Martin bomber assembly plant, Omaha, Nebr., for government, Peter Kiewit Sons Co. and George W. Condon Co., Omaha, Nebr., and Woods Bros. Construction Co., Lincoln, Nebr., joint contractors, to Ceco Steel Products Corp., Omaha, Nebr.

2500 tons, aircraft assembly plant, Fort Crook, Neb., to Ceco Steel Products Co., and Construction Products Co.

1800 tons, dam, Norfork, Ark., to Sheffield Steel Corp., Kansas City, Mo., through U. S. engineer's; Utah Construction and Morrison-Knudson companies, contractors.

1500 tons, warehouse, quartermaster depot, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; Wark & Co., contractors.

1000 tons, additions, branch mill, Celanese Corp. of America Inc., Narrows, Va., to Truscon Steel Co., Youngstown, O.; George F. Hazelwood Co., Cumberland, Md., contractor.

1000 tons, army warehouses, Atlanta, Ga., to Southern General Fireproofing Co., Atlanta; A. Farnell Blair, Decatur, Ga., contractor.

560 tons, superstructure, airplane engine parts plant, Studebaker Corp., Ft. Wayne, Ind., Consolidated Construction Co., Chicago, contractor, to Trus-

## Concrete Bars Compared

| | Tons |
|---|---|
| Week ended April 12 ..... | 22,833 |
| Week ended April 5 ..... | 13,940 |
| Week ended March 29 ..... | 12,628 |
| This week, 1940 ..... | 15,866 |
| Weekly average, 1941 ..... | 11,712 |
| Weekly average, 1940 ..... | 9,661 |
| Weekly average, Mar., 1941 | 12,486 |
| Total to date, 1940 ..... | 125,102 |
| Total to date, 1941 ..... | 175,685 |

Includes awards of 100 tons or more.

con Steel Co., Youngstown, O., bids March 28.

500 tons, bridge approach, Hartford, Conn., to Truscon Steel Co., Youngstown, O.; Mariani Construction Co., contractor.

400 tons, Jamaica sewage treatment plant addition, contract 10, New York, to Carroll-McCreary & Co., Brooklyn, N. Y.; Caye Construction Co., New York, contractor.

400 tons, plant, Jackson county, Missouri, for Remington Arms Co., to Sheffield Steel Corp., Kansas City, Mo.; Walbridge-Aldinger & Foley Bros., contractors.

360 tons, reinforced apron and turnouts, MacDill field, Florida, to Florida Steel Products Co., Tampa; Eberbach Construction Co., Tampa, contractor.

360 tons, Colonial National Park building, near Williamsburg, Va., to Bethlehem Steel Co., Bethlehem, Pa. through Virginia Steel Co.

320 tons, utility power plant, Devon, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

305 tons, housing project, Jordan park, St. Petersburg, Fla., to Ceco Steel Products Corp., Birmingham, Ala.; I. E. Millstone Construction Co., St. Louis, contractor; 60 tons structurals to Decatur Iron & Steel Co., Decatur, Ala.

275 tons, housing projects, Tindall Homes and Charles Bowden Homes, Macon, Ga., to Southern General Fireproof Co., Atlanta; Chalker & Lund Co., West Palm Beach, Fla., contractor; Taylor Iron Works, Macon awarded 31 tons, structural steel.

250 tons, army base, Fort Richardson, Anchorage, Alaska, to Bethlehem Steel Co., Seattle, by U. S. engineer.

200 tons, E. I. du Pont de Nemours & Co., powder plant, Charlestown, Ind., George F. Hazelwood, contractor, to Truscon Steel Co., Youngstown, O.

190 tons, building, Bell Telephone Co., Flint, Mich., to Truscon Steel Co., Youngstown, O.

176 tons, state procurement office, treasury department, New York, to Carroll-McCreary Co., Brooklyn, direct bids.

160 tons, plant, Coca Cola Bottling Co., Brighton, Mass., to Truscon Steel Co., Youngstown, O.; M. S. Kelliher Co., contractor.

160 tons, proj. 2, Columbiana county, Ohio, to Bethlehem Steel Co., Bethlehem, Pa.; Carly Myers, Campbellsburg, Ind., contractor; George B. and Cletus Patterson, sub-contractors, Wellsville, O.

130 tons, prison cell blocks, Dannemora, N. Y., to Truscon Steel Co., Youngstown, O.; Thos. C. Brown Co., contractor.

129 tons, building, Pabst Brewing Co., Milwaukee, Selzer-Ornst Co., Milwaukee, contractor, to Ceco Steel Products Corp., Milwaukee; bids Feb. 14.

124 tons, Camp McCoy, Wisconsin, inv. 988-64, to the Cook & Brown Lime Co., Milwaukee; bids direct April 4.

120 tons, Bureau of Reclamation, inv. 16228-A, Buford, N. Dak., to Sheffield Steel Corp., Kansas City, Mo.

110 tons, state highway project 13, Trumbull county, Ohio, to Truscon Steel Co., Youngstown, O.; Horvitz Co., contractor.

104 tons, bridge, FAP 2E1, Hartford, Conn., to Truscon Steel Co., Youngstown, O.; D. V. Frione & Co., contractors.

100 tons, state highway project, Eastford, Conn., to Truscon Steel Co., Youngstown, O.; M. A. Gammino, contractor.

100 tons, addition to Bayside station, Wisconsin Public Service Corp., Green Bay, Wis., C. R. Meyer & Son, Oshkosh, Wis., contractor, to Cook & Brown Co., Oshkosh, Wis.

Unstated tonnage, housing and army air base facilities, Bangor, Me., to Truscon Steel Co., South Boston, Mass.; T. W. Cunningham Inc., Winchester, Mass., contractor.

## Reinforcing Steel Pending

800 tons, Valencia Housing project, San Francisco; bids opened.

750 tons, plant, Reynolds Metal Co., Longview, Wash.; the Austin Co., Seattle, contractor.

550 tons, airplane propeller plant, Curtis Wright Corp., Beaver county, Pennsylvania.

400 tons, grain elevator, Great Falls, Mont.

335 tons, Blue Mountain dam, Waveland, Ark.; bids U. S. engineer's office, Little Rock, Ark., April 26.

320 tons, FWA inv. CR-43, Costa Rica; bids April 11.

313 tons, U. S. engineer, inv. 1097-41-214, Porto Rico; bids April 11.

230 tons, grade elimination, PSCC 6589, Herkimer, N. Y.; bids April 23.

200 tons, addition, Thompson Products Co., Cleveland.

200 tons, addition, Glenwood housing project, Philadelphia; bids April 24.

200 tons, Indianapolis Water Co., Indianapolis.

176 tons, flood control, sec. 1, Elmira, N. Y.

150 tons, two Washington state road projects; Henry Hagman, Cashmere, and Norris Bros., Burlington, contrac-

# Behind the Scenes with STEEL

### Salesman's Life

■ Some of the lads around Detroit are amusing themselves these days, when the life of a salesman ain't what it used to be, by grinding out various kinds of hot doggerel on current events and such. Some is printable; some isn't. A sample of the former variety is the following little ditty:

*Keep your temper, gentle sir,*
*Writes the manufacturer,*
*Though your goods are overdue,*
*For a month or maybe two.*
*We can't help it, please don't swear,*
*Labor's scarce and metals rare.*
*Can't get steel, can't get dies,*
*These are facts, we tell no lies.*

*Harry's drafted, so is Bill,*
*All our work is now uphill,*
*So your order, we're afraid,*
*May be still a bit delayed.*
*Still you'll get it, don't be vexed.*
*Maybe this month, maybe next.*
*Keep on hoping, don't say die,*
*We'll fill your order bye and bye.*

### False Optimism

■ Personally we would like to feel a bit more optimistic than that, but we just heard the other day that an optimist is a man who thinks his wife has given up cigarettes just because he finds cigar butts around the house.

### Expanding

■ Business is good, though. The panhandler up the street is holding out two hats now. He says he got so rushed he had to open up a branch.

### Simple Solution

■ We were deluged with one answer to the preacher puzzle last week and it was wrong. The catch, of course, is that he couldn't have a funeral scheduled three weeks in advance.

### Get One

■ It will be well worth a penny post card and a minute's time if you write to ask the Elliot Addressing Machine Co., 143 Albany St., Cambridge, Mass., for a copy of "The Story of a Father and Son, or Unscrewing the Inscrutable." It is one of the most interesting stories of a business we've ever heard.

### Available

■ And while you're in the penny post card file, dig out another one and send it to STEEL's Readers' Service Dept. if you'd like any extra copies of the Financial Analysis of the Steel Industry in last week's issue. No charge.

### Revere Award

■ There is no Nobel Prize or Modern Pioneer award for laboring men; but since early January the Revere Award has furnished an equivalent. Sponsored by Revere Copper & Brass, $10,000 in prizes are available to productive workers in the metalworking industries, for suggestions covering new devices and methods to speed up production. The contest closes April 30.

### Rev. R. J. Cowan

■ You may recall the story we told here early in February of the metallurgical engineer who left his job with one of the leading heat treating furnace manufacturers to preach the gospel of good will and peace on earth as a Methodist preacher in a small Ohio town. We called it "Farewell to Arms." This week we heard again from Rev. R. J. Cowan and with his letter he sent us a reprint of a recent radio address he delivered at the request of his ministerial association. In it he said: "The men of business and industry have been called upon in the present crisis to do some fast thinking upon fundamental manufacturing problems, and they have gone directly to the heart of their problem without regard to precedent, former methods, customs or habits. As Christian men and women, we must respond to our problems in like manner." It is an excellent talk, calling for a regeneration of personal religion and prayer. Its title: *National Re-armament.*

SHRDLU.

tors.

150 tons, superstructure, bridge Mississippi river, Dubuque, Iowa-East Dubuque, Ill., for Dubuque bridge commission; bids April 11.

126 tons, approaches to 938-foot span, Lincoln county, Montana; bids to Public Roads Administration, Missoula, Mont., April 16.

120 tons, highway project, section of bypass, Wethersfield-Hartford, Conn., Patterson & Rossi, Hartford, low, $208,750.27; bids March 31, Hartford.

102 tons, state highway, contr. 2154, Huntington, Ind.

100 tons, pier, navy yard, South Boston, Mass.; J. F. Fitzgerald Construction Co., Boston, contractor.

Unstated, 730-foot pier, Puget Sound navy yard; bids soon; spec. 10363.

Unstated, state underpass, Kootenai county, Idaho; bids at Boise, April 16.

Unstated, warehouse, garage and shop building, Bonneville dam; Drake, Wyman & Voss, Portland, contractors.

Unstated, 4-story, 110 x 120-foot plant addition, Crown-Willamette Paper Co., Camas, Wash.; bids opened at Portland, April 7.

Unstated, Oregon state viaduct and concrete bridges in Clackamas and Grant counties; Frank Watt Construction Co., Portland, and A. Milne, Portland, low.

# Pig Iron

Pig Iron Prices, Page 104

Pig iron demand is heavy, principally for third quarter and later, but producers limit bookings to second quarter and prices for that delivery have not been formally announced, pending outcome of coke costs under new coal prices.

Most melters appear to be well covered for current requirements and no instances of curtailment because of lack of iron have come to light. In most cases makers are limiting sales to established customers and in some cases contracts must have approval of the main office before being made firm. Deliveries against contracts are being maintained in most cases at schedule, although frequently behind the rate desired by melters. Under present circumstances foundries are not able to add to stocks.

No relief in pressure for pig iron by foundries is expected to result from lower scrap prices, as scarcity of cast grades has been intensified by this move.

Southern producers accept business only subject to confirmation and from regular customers, shipments being at about the usual rate. These suppliers are also limiting sales to second quarter at prices prevailing at time of delivery.

The principal difficulty at present its to obtain specific grades on short order as furnace stocks are not sufficiently diversified to meet all such requirements.

Strike action is awaited at Alan Wood Steel Co. iron ore mine near Dover, N. J., following vote by work-

ers to walk out unless a wage increase is allowed. Actual walkout awaits approval by national union headquarters. Meanwhile Alan Wood has shut down one Swedeland, Pa., blast furnace for relining, which may require 60 days.

Some curtailment has been made in the Pittsburgh district, Edgar Thomson works of Carnegie-Illinois Steel Corp. having taken off one blast furnace because of a shortage of coke. Other furnaces at this plant are operating on beehive coke. Coke handlers in the Connellsville district who are members of the mine workers union are on strike, interfering with beehive coke deliveries.

Everett, Mass., blast furnace remains in blast well beyond its original schedule and probably will continue until repairs force a shutdown. Ore and coke supplies are ample with arrivals of Lake Superior awaited. Another cargo of British coke arrived last week but one shipload destined for Boston has been lost enroute.

British Iron & Steel Corp., New York, is said to be inquiring for 150,000 tons of bessemer pig iron for export.

## Tin Plate

Tin Plate Prices, Page 102

Tin plate buying is still active, though most needs have been covered and delivery now is most important. All mills, except scattered hot mills, are operating at capacity, with the national rate estimated at 85 per cent. This is believed the peak as capacity has been increased substantially to provide cold-rolled plate for all consumers. It is believed productive capacity exceeds probable consumption, on an annual basis, as under normal conditions production varies seasonally and if continuous operation were attained an excess would be produced.

Heavy consumption in general line cans continues, accounting for most current tonnage. Much tin plate is going into stock as plate and as finished cans, preparatory to the canning season. This is a protective measure to assure supply when needed as crops mature, in face of possible defense demand.

Government buying of canned foods has increased but has not become heavy. Enlargement of armed forces will cause an increase and accumulation of preserved food may be undertaken on a large scale. Substitutes for tin plate were developed as a matter of economy in the depression years and no new move along this line has been undertaken as protection against tin shortage. This may come later if tin supplies become tighter.

## Pacific Coast

**Seattle** — Industrial activity is highest since 1918. Shipbuilding, airplane production, expansion of the Puget Sound navy yard and general construction are at top levels. Small machine and metal shops are at maximum capacity, with many subcontracts from larger plants. Rolling mills and structural fabricators are booked full for second quarter and are not interested in new commitments. Difficulty in obtaining prompt delivery of materials is a problem.

Heavy tonnages of plates are moving from the East to Pacific coast shipyards. Shops report a good volume of small orders but hesitate to bid on larger contracts because of uncertainty of obtaining materials.

Demand for cast iron pipe is brisk, several important projects to be up for figures soon. Cantonment and airport projects and housing contracts are increasing the volume.

The warehouse situation is active. Prices are firm. Stocks have been materially reduced and dealers report increased difficulty in ob-

taining replacements. While all items are moving freely sheets are apparently in strongest demand, although dealers are unable to guarantee deliveries.

Foundry operations are active, many smaller shops having recently reopened after a long period of idleness. Consumption of pig iron and coke has more than trebled in recent months. Columbia iron remains at $22 base. However, this price is subject to immediate revision without notice and buyers have no protection as heretofore when the price was effective for the quarter.

Interest has centered in the scrap market, following establishment of maximum prices. This ceiling fixes No. 1 melting steel at $14.50 gross and No. 2 at $13.50. This is 50 cents under what rolling mills have been paying for several months.

## Ferroalloys

Ferroalloy Prices, Page 104

Ferroalloy shipments continue at the high rate of March, with the movement limited only by the ability to produce. While facilities are being expanded this has not yet reached a point where it is accounting for an appreciable gain in output, and may not for several weeks.

Prices are unchanged, with ferromanganese holding at $120, duty paid, Atlantic and Gulf ports, and spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa.

# Canada

**Toronto, Ont.** — Demand for finished and semifinished steel is gaining as the Canadian government expands war production efforts. To meet this new demand for steel, plans are underway which will lead to substantial increase in capacity, the greater part of which will be financed through the Department of Munitions and Supply, Ottawa.

Sheet buying is heavy and mills are booked almost solid to the end of third quarter, with new contracts running into fourth quarter.

The shipbuilding program is to be speeded up, with special attention to merchant vessels of 10,000 tons. All yards equipped to build this type of vessel will receive contracts, and many yards will be substantially enlarged. This indicates greater expansion in plate requirements, and it is also stated that the government is arranging to take all Canadian plate output. Plate mills are heavily booked, with orders on hand sufficient to absorb all output to the end of the year.

Business is brisk in merchant pig iron, with current interest largely centered around second quarter contracts. Blast furnace operators report second quarter booking well in excess of that for first quarter, with enlargement in spot delivery sales.

Announcement has been made of formation of the Canadian Institute of Secondary Materials, to provide an even and steady flow of iron and steel scrap to mills and foundries; to eliminate profiteering and to hold prices at an even level and prevent wide fluctuations. The first action has been to announce new fixed prices to consumers in cast scrap and stove plate. The new prices, f.o.b. consuming points, are as follows: No. 1 machinery cast, $21.50; No. 2 cast, $19.50; stove plate, $17.75 per net ton. Against these prices dealers have reduced their buying prices to the following new levels delivered yards: No. 1 machinery cast, $18; No. 2 cast, $16; stove plate, $14.25.

# Steel in Europe

Foreign Steel Prices, Page 105

**London**—(*By Cable*)—Iron and steelworks in Great Britain are producing close to capacity and second quarter war requirements insure full operation. The Easter holidays will bring little interruption. All steel products are fully active except structural steel for building purposes. Light castings continue dull. Raw material supplies are satisfactory and export demand for coke has developed. Tin plate exports have revived temporarily under a recent government release of part of plates in stock.

## Stainless Loses Out For Army, Navy Cutlery

Heavy orders for mess flatware, knives, forks and spoons, for the army and navy, taking hundreds of tons of strip, have specified stainless steel with an alternate on nickel silver. Most orders have been for the latter. Deliveries have been a vital factor and nickel silver has been most prompt.

One of three New England fabricators sharing heavily has filled all orders with nickel silver with the exception of knives. Deliveries usually asked are 30 days, with Sewalls Point, Va., and Jeffersonville, Ind., as destination. Because immediate needs have been well covered, delivery on the last group of contracts is somewhat more extended. Shops fabricating knives have not been able to make

satisfactory deliveries as a rule on stainless.

## Institute May Simplify Pig Iron Classification

**New York** — Primarily to afford greater simplification, a new method of classifying and grading pig iron is under consideration by a technical committee of the American Iron and Steel Institute. In addition to reducing the number of grades, the proposed method, if adopted, may also result in dropping certain such terms as No. 1x, No. 2x, No. 2 foundry and so forth, although not necessarily eliminating the grades themselves.

## Nonferrous Metals

**New York**—Delays in setting up and perfecting nationwide federal control over nonferrous metal markets has tended to retard activity, especially in the movement of scrap and secondary ingots. Since the establishment of priorities and maximum prices for secondary aluminum, producers have been able to book very little new business because they were offered only negligible tonnages of scrap. Copper and brass scrap prices dropped ¾ to 1 cent last week in view of conferences being held in Washington on devising means of stabilizing primary copper at the 12-cent level. Subsequently an increased volume of business was done in the brass ingot market on the carlot basis of 13.00c to 13.25c for 85-5-5-5 ingot.

**Copper**—About 60,000 tons of Latin American copper are being distributed this month to consumers unable to get enough domestic copper to cover their requirements. Of this total about 35,000 tons has been imported by the Metals Reserve Co. and about 25,000 tons has been acquired from the original French purchasers who failed to take it out of this country. Mine purchasers continued to allocate tonnages on the basis of 12.00c, Connecticut.

**Lead**—Consumers absorbed all metal offered at the firm price level of 5.85c, New York. The steady advance in freight rates has made it more difficult to import lead profitably at present levels. However, the price stabilization division has requested producers not to advance the domestic price further.

**Zinc**—Holders of scrap and secondary zinc, which had been acquired and sold in good faith before March 31 but had not been delivered before April 3, now are able to make delivery at contract prices, even though they are above the official maximum prices now in effect, upon proper authorization from the price stabilization division.

## Nonferrous Metal Prices

| Apr. | Copper: Electro, del. Conn. | Copper: Lake, del. Midwest | Copper: Casting, refinery | Straits Tin, New York: Spot | Straits Tin, New York: Futures | Lead N. Y. | Lead East St. L. | Zinc St. L. | Aluminum 99% | Antimony Amer. Spot, N.Y. | Nickel Cathodes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 12.00 | 12.00 | 12.25 | 51.75 | 51.00 | 5.85 | 5.70 | 7.25 | 17.00 | 14.00 | 35.00 |
| 7 | 12.00 | 12.00 | 12.25 | 51.87½ | 51.12½ | 5.85 | 5.70 | 7.25 | 17.00 | 14.00 | 35.00 |
| 8 | 12.00 | 12.00 | 12.25 | 51.62½ | 50.87½ | 5.85 | 5.70 | 7.25 | 17.00 | 14.00 | 35.00 |
| 9 | 12.00 | 12.00 | 12.25 | 51.62½ | 50.87½ | 5.85 | 5.70 | 7.25 | 17.00 | 14.00 | 35.00 |
| 10 | 12.00 | 12.00 | 12.25 | 51.75 | 51.25 | 5.85 | 5.70 | 7.25 | 17.00 | 14.00 | 35.00 |

11—Holiday.

*F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper*

**Sheets**

| | |
|---|---|
| Yellow brass (high) | 19.48 |
| Copper, hot rolled | 20.87 |
| Lead, cut to jobbers | 9.10 |
| Zinc, 100 lb. base | 12.50 |

**Tubes**

| | |
|---|---|
| High yellow brass | 22.23 |
| Seamless copper | 21.37 |

**Rods**

| | |
|---|---|
| High yellow brass | 15.01 |
| Copper, hot rolled | 17.37 |

**Anodes**

| | |
|---|---|
| Copper, untrimmed | 18.12 |

**Wire**

| | |
|---|---|
| Yellow brass (high) | 19.73 |

**OLD METALS**

*Nom. Dealers' Buying Prices*

**No. 1 Composition Red Brass**

| | |
|---|---|
| New York | 9.00-9.25 |
| Cleveland | 9.00 |
| Chicago | 8.75-9.00 |
| St. Louis | 9.00 |

**Heavy Copper and Wire**

| | |
|---|---|
| New York, No. 1 | 10.00-10.25 |
| Cleveland, No. 1 | 10.00 |
| Chicago, No. 1 | 9.75-10.00 |
| St. Louis | 10.00 |

**Composition Brass Turnings**

| | |
|---|---|
| New York | 8.75-9.00 |

**Light Copper**

| | |
|---|---|
| New York | 8.00-8.25 |
| Cleveland | 8.00 |
| Chicago | 7.75-8.00 |
| St. Louis | 8.00 |

**Light Brass**

| | |
|---|---|
| Cleveland | 4.50 |
| Chicago | 6.25-6.50 |
| St. Louis | 5.00 |

**Lead**

| | |
|---|---|
| New York | 4.85-5.00 |
| Cleveland | 4.50-4.75 |
| Chicago | 4.55-4.80 |
| St. Louis | 4.50 |

**Old Zinc**

| | |
|---|---|
| New York, del., buyer's plant | 5.10 |
| Cleveland, del., buyer's plant | 5.10 |
| St. Louis, del., buyer's plant | 5.10 |

**Aluminum**

| | |
|---|---|
| Mis., cast | 11.00 |
| Borings, No. 12 | 9.50 |
| Other than No. 12 | 10.00 |
| Clips, pure | 13.00 |

**SECONDARY METALS**

| | |
|---|---|
| Brass ingot, 85-5-5-5, l.c. | 13.25-13.50 |
| Standard No. 12 aluminum | 16.00 |

Prime western held firm at 7.25c, East St. Louis.

**Tin** — Sales increased rather sharply while prices remained firm at about 51.75c. Increased concern was revealed over the possibility of a Japanese move against the Far Eastern tin producing region.

# Equipment

**Seattle** — Road and construction machinery and electrical equipment lead a strong demand for a diversified volume. As in other lines deliveries present a problem. General Electric Co., low at $287,377, has the contract for an electrical distribution system at Puget Sound navy yard, Cooper-Bessemer Corp., Washington, to furnish generating equipment at $75,816. U. S. engineer, Portland, opened bids April 9 for pumps, power cabinet, switches and transformers for the Pendleton air corps cantonment. Bonneville project, Portland, Oreg., opened bids April 3 for conductors and accessories, Chehalis-Longview line.

## Reorganize Priorities Division, Increase Staff

*WASHINGTON*

■ Several changes within the Priorities Division, OPM, as well as the addition of key personnel to the staff, were announced last week by E. R. Stettinius Jr., director.

The Minerals and Metals Group will now have four branches, one for iron and steel, one for nonferrous metals, one for ferrous minerals and alloys, and one for aluminum and magnesium.

Dr. Ernest M. Hopkins, head of the Minerals and Metals Group, will serve as chairman of the Nonferrous Priority Committee and of the Aluminum and Magnesium Priority Committee. Arthur D. Whiteside, who will continue as head of the Commercial Aircraft Group, will also serve as senior consultant in the Minerals and Metals Group and will be chairman of the Iron and Steel Priority Committee and the Ferrous Minerals and Alloys Committee.

The new Ferrous Minerals and Alloys Branch will handle problems concerning iron ore, iron and steel scrap, chrome, manganese, tungsten, vanadium, molybdenum, nickel and the ferroalloys. D. A. Uebelacker, an engineer, of Ford, Bacon & Davis Inc., New York, will serve as staff expert.

R. L. Suhl, manager of the nickel sales department of the International Nickel Co. Inc., New York, will be producers' representative on the priority committee of the Ferrous Minerals and Alloys Branch, and H. G. Batcheller, president, Allegheny-Ludlum Steel Corp., Pittsburgh, has been appointed to the committee as the industrial users' representative.

Mr. Stettinius announced that the Tools and Equipment Group, headed by Dr. Dexter S. Kimball, will have two branches, one for machine tools and a new unit for general equipment. Dr. Kimball will be chairman of both.

The General Equipment Branch will handle problems in connection with engines, boilers and power plant equipment. The priority committee for this group will include F. A. Schaff, president, Superheater Co., New York, as producers' representative, and J. C. Parker, vice president, Consolidated Edison Co., New York, as industrial users' representative.

New personnel added to the staff recently includes:

L. E. Scriven, managing director of the British subsidiary of the A. C. Nielsen Co., Chicago, and vice president of the parent company, who will serve as deputy assistant director of the Priorities Division, in charge of liaison with other government departments and foreign government.

E. A. Locke Jr., Chase National Bank, New York, who will work in close association with Mr. Scriven as principal liaison officer of the liaison unit.

Geoffrey S. Smith, assistant general counsel, Office of Production Management, has been assigned as head of the legal staff of the Priorities Division.

L. K. Straus, sales manager of the New York branch of the Shaw-Walker Co., will serve as secretary of the division, succeeding Dr. W. S. A. Pott, who has returned to his post as president of Elmira College.

## Eddy Corp. Takes Over Whiting Stokers

■ Whiting Corp., Harvey, Ill., is discontinuing manufacture of industrial and domestic coal stokers, to concentrate and expand its production of foundry equipment, cranes, pulverizers, evaporators and heavy machinery.

Eddy Stoker Corp., 4717 West North avenue, Chicago, will take over the manufacture of Whiting's stokers. A new company, the Whiting Stoker Co., has been formed to act in a sales capacity for the Whiting stokers. George W. Graham, president of the Eddy company, also heads the new sales organization.

Eddy corporation plans to erect a one and two-story 60 x 85-foot factory and office addition to cost $30,000. Whiting corporation recently completed a shop addition, 81 x 325 feet, at a cost of over $100,000.

## 2,700,000 More Workers Under Social Security

■ Nearly 2,700,000 more workers were employed in occupations covered by the old-age and survivors' insurance system during the last three months of 1940 than in the comparable months of 1939, according to the Bureau of Old-Age and Survivors Insurance of the Social Security Boards, Washington.

Taxable payrolls for the last quarter of last year were $1,100,000,000 greater than for the period of 1939. These figures reflect improvement in general business, stated Paul V.

McNutt, Federal Security Administrator.

The number of employes increased from 27,400,000 in third quarter, 1939, to 31,017,000 for fourth quarter of 1940.

# DIED:

■ **James M. Milliken,** identified with the steel industry more than half a century, April 2, at his home in Philadelphia. Born in Pittsburgh, Mr. Milliken joined Carnegie Steel Co. in 1888, at Homestead, Pa. Later he was transferred to the Duquesne works, and for the past 26 years was with Midvale Steel & Ordnance Co. and The Midvale Co. The last 18 years he was treasurer and a director of the latter company.

♦

**Frank Gause,** 71, organizer and secretary, Four Wheel Drive Auto Co., Clintonville, Wis., April 2, in that city.

♦

**Fred H. Ramsdell,** 44, the past five years traffic manager, New Departure Division, General Motors Corp., Bristol, Conn., April 1, in that city.

♦

**Raymond J. Alton,** 52, the past five years salesman for Peninsular Steel Co., Detroit, and well known in steel circles of eastern Michigan, in Detroit, April 2.

♦

**Norman K. Schaller,** secretary-treasurer, Superior Steel Corp., Pittsburgh, April 3, in that city.

♦

**H. H. Neel,** 53, member of the New York sales staff of Alan Wood Steel Co., Conshohocken, Pa., in Brooklyn, N. Y., recently.

♦

**Richard Morris Barwise,** 73, founder and treasurer, R. M. Barwise Inc., New York, maker of chain drives for power transmission, at Daytona Beach, Fla., April 7.

♦

**James F. Cox,** 76, since 1920 personnel manager, New Departure Division, General Motors Corp., Bristol, Conn., April 5, at his home there.

♦

**Frederick C. Bryan,** 77, general traffic manager, Allis-Chalmers Mfg. Co., Milwaukee, in that city, April 7. He became traffic manager for Allis-Chalmers in 1911, and eight years ago was named chairman, machinery division, National Shippers' Advisory Committee.

♦

**Harry Wilson Sr.,** who for 65 years was continuously employed by Jessop Steel Co., Washington, Pa., and its one-time parent company, Jessop of Sheffield, at his home in Washington, Pa., April 4, at the age of 76. Mr. Wilson served as night superintendent of the sheet mills from 1905 to 1938.

## Canada May Build Martin Bombing Planes

(*Concluded from Page* 46)

Marie, Ont., will start building extensions to its plant at a cost of $4,000,000 immediately, it was reported by C. D. Howe, minister of munitions and supply. Dominion Steel & Coal Corp. Ltd., Sydney, N. S., will install a new open hearth furnace, at a cost of $1,500,000 to be completed in eight months.

Department of Munitions and Supply last week reported 1716 contracts, with aggregate value of $13,056,855. The orders:

**Aircraft:** Boeing Aircraft of Canada Ltd., Vancouver, B. C., $5,000,000; National Steel Car Corp. Ltd., Malton, Ont., $6780.

**Shipbuilding:** Hunter Boats, Orillia, $170,000; Honey Harbor Navigation Co., Midland, $170,000; Midland Shipyards Ltd., Midland, $1,180,000; Mac-Craft Corp., Wallaceburg, $170,000.

**Instruments:** Canadian Westinghouse Co. Ltd., Hamilton, $444,977.

**Munitions:** Dominion Arsenals, Ottawa, $259,200.

**Metals:** Canada Wire & Cable Co. Ltd., Toronto, $49,718; Atlas Steels Ltd., Welland, $28,859.

**Electrical equipment:** Northern Electric Co., Ottawa, $9089; Outboard Marine & Mfg. Co., Peterborough, $37,757.

**Machinery:** A. R. Williams Machinery Co., Toronto, $5462.

**Fire fighting equipment:** C-O-Two Fire Equipment Co., Toronto, $81,850; La France Fire Engine & Foamite Ltd., Toronto, $12,218; Fyr-Fyter Co., Hamilton, $7505.

**Capital expenditure:** Frost & Wood Co. Ltd., Smith's Falls, Ont., $199,560; Canadian Elevator Equipment Co., Toronto, $61,270; DeHavilland Aircraft of Canada, Toronto, $263,265; Gutta Percha & Rubber Co., Toronto, $30,074.

**Miscellaneous:** Canadian Comstock Co. Ltd., Toronto, $63,000; Canadian Locomotive Co., Kingston, $38,435; Dominion Foundries & Steel Ltd., Hamilton, $333,057; B. F. Goodrich Rubber Co., Kitchener, $47,685; W. C. Brennan, Hamilton, $73,258.

# Construction and Enterprise

### Ohio

CINCINNATI—Cincinnati Shaper Co., Harry Robinson, secretary-treasurer, will build an addition covering 15,000 square feet. General contract has been given Ferro Concrete Construction Co., Cincinnati.

■ **Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 111 and Reinforcing Bars Pending on page 113 in this issue.**

CINCINNATI—King Machine Tool Co., E. A. Muller, president, has let general contract to Ferro-Concrete Construction Co. for new plant containing 120,000 square feet floor space for manufacture of vertical boring and turning machines.

CLEVELAND—Buckeye Forging Co., 10004 Harvard avenue, in addition to office building and loading dock previously reported, will build one-story machine shop addition 41 x 111 feet. James W. Baxter is president. Christian, Schwartzenberg & Gaede, 1836 Euclid avenue, are architects.

CLEVELAND—Harshaw Chemical Co., 113 John street, is taking bids through H. E. Cowser, company engineer, 1945

East Ninety-seventh street, for a warehouse addition as part of its expansion program.

CLEVELAND—Ferro Steel Products Co. has been incorporated to manufacture steel products by William B. Miller, 2078 Baxterly avenue, an official of Armenite Co., 9002 Madison avenue, Cleveland.

CLEVELAND — Addressograph-Multigraph Corp., J. E. Rogers, president, manufacturer of business machines, has let general contract to H. K. Ferguson Co. for a plant addition to cost about $750,000.

CLEVELAND — Clark Controller Co., 1146 East 152nd street, is building plant addition, with loading dock, first floor 116 x 157 feet, second story 70 x 116 feet. J. L. Hunting Co., Ninth-Chester building, is contractor.

DAYTON, O.—Acme Pattern & Tool Works Inc., 232 North Findlay street, will build a foundry 130 x 300 feet, costing $300,000. R. Yount, Third National building, is engineer.

ELYRIA, O.—Fox Furnace Co., division of American Radiator & Standard Sanitary Corp., Bessemer building, Pittsburgh, is building an addition 35 x 249 and 30 x 69 feet.

PETROLEUM, O. — Petroleum Iron Works will build a machine shop addition 20 x 50 feet. C. F. Owsley, 211 North Champion street, Youngstown, O., architect, is handling bids.

WILLOUGHBY, O.—Willoughby Ornamental Iron Works has been formed by Louis Baxter of Collinwood Ornamental Iron Works, and will build 20 x 40-foot plant on Vine street. Mr. Baxter's headquarters are at 718 East 163rd street, Cleveland.

### Connecticut

BERLIN, CONN.—New Britain Machine Co., 140 Chestnut street, New Britain, Conn., will build a one-story 90 x 280-foot plant addition costing about $75,000.

NEW HAVEN, CONN.—New England Auto Body Works, 190 Wooster street, plans erection of a steel shop building to cost over $40,000.

NORWICH, CONN.—Board of water commissioners, M. Kane, city hall, plans construction of a filter plant at Deep River, costing about $15,000. Busch, Siefert & Jost, 112 East Ninteenth street, New York, are engineers.

### Massachusetts

FRAMINGHAM, MASS. — Hodgman Rubber Co., Herbert street, will let contracts soon for a two-story 100 x 135-foot plant addition on plans by I. Richmond, architect, 248 Boylston street, Boston, at cost of about $100,000.

GREENFIELD, MASS. — Production Machine Co. is building a one-story addition, costing about $60,000.

WAVERLY, MASS.—McLean Hospital, Pleasant street, is building a three-story 50 x 50-foot water purification plant to cost about $30,000. Weston & Sampson, 14 Beacon street, Boston, are engineers.

### Rhode Island

PROVIDENCE, R. I.—Brown & Sharpe Mfg. Co., machine tool manufacturer, Bath and Promenade streets, will let contracts soon for a one-story 132 x 245-foot monitor type plant, Unit No. 11, to cost about $125,000.

### New Jersey

BLOOMFIELD, N. J.—Newark Porcelain & Enameling Co. Inc., 265 Walsessing avenue, will build a one and two-story addition 32 x 150 feet. General contract has been given to Torchia & Amato, 247 Hoffman boulevard, East Orange. Cost estimated at more than $40,000. (Noted March 24.)

CALDWELL, N. J.—Wright Aeronautical Corp., 132 Beckwith avenue, Paterson, N. J., will build an all-metal hangar at the airport, costing about $1,000,000.

NEWARK, N. J.—American Transformer Co., 172 Emmett street, will build a one-story electric appliance factory addition at cost of $144,000, with equipment.

TRENTON, N. J.—American Bridge Co., H. L. Rankin, plant manager, South Warren and Federal streets, will build a plant addition costing $400,000.

### Pennsylvania

BEAVER, PA.—Work will start soon on Curtiss-Wright airplane propeller plant here; first unit to be one-story office and factory building 600 x 600 feet, followed by boiler plant. Albert Kahn Inc., New Center building, Detroit, is architect.

CALLERY, PA.—Mine Safety Appliances Co., G. H. Deike, treasurer, 201 North Braddock avenue, Pittsburgh, will let contract soon for a three-story 55 x 57-foot plant and a one-story 33 x 36-foot boiler plant. Prack & Prack, 517 Martin building, Pittsburgh, are architects.

HATBORO, PA.—Brensler Aeronautical Corp., 2701 Bridge Plaza, Long Island City, N. Y., has let general contract for a one-story 502 x 703-foot assembly plant to George A. Fuller Co., 12 South Twelfth street, Philadelphia. Cost with equipment about $5,000,000.

IRVINE, PA.—National Forge & Ordnance Co., J. Harrington, president, will build a one-story 60 x 200-foot plant and one-story 42 x 518-foot scrap storage, costing about $100,000. General contract has been let to E. G. Smith, Bellevue, Pa. H. Schwartzfager, Irvine, Pa., is engineer.

NEW CASTLE, PA.—Forney Machine Co. will build a one-story plant on Elm street, to cost about $40,000.

PHILADELPHIA—Bureau of water supply, J. H. Meson, director, city hall annex, will take bids soon for waterworks improvements at six pumping stations, to cost about $10,000,000.

### Michigan

ROCHESTER, MICH.—National Twist Drill Co. has given contract for design and construction of addition to its new plant, in three sections, 80 x 140 feet, 80 x 300 feet and a powerhouse 40 x 60 feet. Installation will include three oil-fired full automatic high pressure boilers to provide steam for drop hammers and processing. Tree-form welded sawtooth design will be followed.

### Illinois

BATAVIA, ILL.—Lindgren Foundry Co. has let general contract to Adolph Swanson & Sons, for a one-story foundry addition 65 x 80 feet, to cost about $40,000, including equipment.

CHICAGO—Pheoll Mfg. Co., 5700 West Roosevelt road, manufacturer of bolts, nuts, etc., is building a two-story 68 x 69-foot factory and warehouse addition costing about $25,000.

CHICAGO—Natural Gas Pipe Line Co. of America, 20 North Wacker Drive, plans laying second line of pipe paralleling its original line from Oklahoma to Chicago.

CHICAGO—Illinois Gear Co., 2108 North Natchez avenue, has let general contract to A. S. Hedstrom Construction Co., 4647 West Lake street, for a one-story 120 x 150 foot plant addition to cost about $55,000. Rapp & Rapp, 230 North Michigan avenue, are architects.

LINCOLN, ILL.—Knox Glass Associates Inc. will let contract soon for first unit of glass manufacturing plant for production of food containers. Cost estimated at about $380,000.

### Indiana

ANDERSON, IND.—Guide Lamp Corp., Twenty-fifth street and Dunlap avenue, plans erection of a 200 x 500-foot plant,

to cost over $100,000, with equipment.

COLUMBUS, IND.—Richey Machine Co. Inc., has been incorporated to manufacture machinery, with 250 shares $100 par, by Russell W. Richey and associates.

FORT WAYNE, IND.—General Electric Co., South Broadway, will build a generator equipment plant, costing over $60,000, with equipment.

TERRE HAUTE, IND.—Compressed Steel & Salvage Corp., 1901 South First street, has been incorporated with 1000 no-par shares to deal in salvage materials, by Morris D. Cohen and associates. David E. Rosenfeld, 401 Sycamore building, is agent.

### Maryland

SPARROWS POINT, MD.—Rheem Mfg. Co., 30 Rockefeller Plaza New York, has let general contract for a one-story 162 x 322-foot additional unit to Brown & Matthews, 122 East Forty-second street, New York. Cost estimated at $150,000, with equipment.

### Kentucky

BARBOURVILLE, KY.—Pine Mountain Fuel Gas Co. is laying about 18 miles of natural gas pipe line from Himar field to Middlesboro, at cost of about $400,000. Flori Pipe Co., 5700 Bulwar avenue, St. Louis, is engineer.

DALE, KY.—Kentucky-West Virginia Gas Co., with headquarters at Ashland, Ky., will build gas compression station here at cost of about $500,000, including equipment and accessories, and about $100,000 for similar improvements at other points.

### Mississippi

HINTONVILLE, MISS.—G. L. Reasor, 135 South LaSalle street, Chicago, plans erection of tung oil extraction plant with capacity of 50 tons of tung nuts daily, at cost of about $75,000, including equipment.

### Tennessee

CHATTANOOGA, TENN. — Southern Chemical Co., Alton Park, will build a steam power plant costing $200,000.

### West Virginia

WEIRTON, W. VA.—Weirton Steel Co., subsidiary of National Steel Corp., Grant building, Pittsburgh, has asked federal permission for pump house expansion on Ohio river, including intake screens and pipe bridge for oil and steam lines for unloading oil barges.

### Missouri

BOURBON, MO. — Crawford Electric Co-operative Inc., R. L. Mook, president, has let contract for 325 miles of rural transmission line to Allied Contracting Co., Eau Claire, Wis.

KANSAS CITY, MO.—Benson Mfg. Co., Arthur J. Benson, president, will build plant addition at Eighteenth street and Agnes avenue, one story, 100 x 135 feet, doubling capacity. Plans are by Boillot & Lauck, 1012 Baltimore street.

ST. LOUIS—Production Tool & Supply Co., 2832 Easton avenue, has let general contract for a one and two-story plant addition 25 x 100 feet, second story 25 x 55 feet to Ed Farrel Construction Co., 2832 Easton avenue, costing $40,000, with equipment.

ST. LOUIS—Dixie Machinery Co., 4206 Goodfellow Boulevard, will build a one-story 60 x 90-foot plant addition. General contract has been given to W. G. Haryig Construction Co., 722 Chestnut street. Cost estimated at about $40,000, with equipment. F. R. Nauman, 2700 North Grand Boulevard, is architect.

### Arkansas

HELENA, ARK.—Manganese Co-operative Producers Association, with headquarters here, plans construction of a manganese recovery processing plant here. H. A. Brassert & Co., 210 South Michigan avenue, Chicago, are consulting engineers.

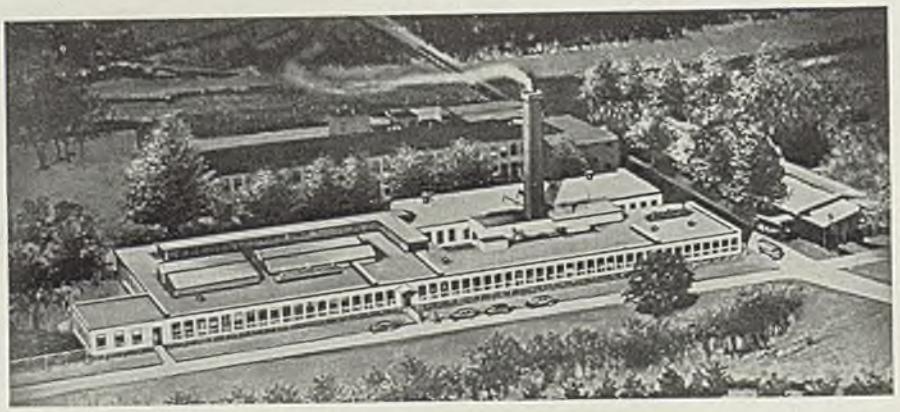
### Wisconsin

AMERY, WIS.—City, F. A. Sylvester, clerk, has been allotted $22,886 by WPA to aid construction of a sewage disposal plant. Herman T. Hagestad, River Falls, Wis., is consulting engineer.

KENOSHA, WIS.—Kenosha Boiler &



## Grinding Machine Company Doubles Floor Space



■ Gardner S. Gould, president, Fitchburg Grinding Machine Corp., has announced the purchase by his company of this modern one-story factory building on Falulah road, Fitchburg, formerly occupied by Simonds Saw & Steel Co.'s file manufacturing department.

All Fitchburg's departments will be in full operation at the new location May 1. Floor space will be doubled, all operations will be on the ground floor, and immediate increases in output should result.

The move marks the thirty-fifth year of continuous operation by the Fitchburg corporation and its direct predecessors.

Bulk of present orders are for special equipment for automatic multiple precision grinding on mass production work. While this equipment is built on special bases it utilizes standard Bowgage head grinding wheel units. These units are interchangeable and can be removed and adapted to other work at any time. In addition the company produces equipment for plain cylindrical grinding, spline grinding and gear grinding.

It also manufactures the Bath grinder, a universal machine for tool room and small lot work.

Structural Co. has let general contract to Larson Bros. for a one-story shop and office 20 x 133 feet.

MANITOWOC, WIS.—Heresite & Chemical Co., manufacturer of cast resins and coatings, will build a plant addition. Frederick W. Raeuber is architect.

MILWAUKEE—Wrought Washer Mfg. Co. has let general contract to Klug & Smith, 111 East Wisconsin avenue, for one-story storage building, 160 x 262 feet, on Bay treet.

NEENAH, WIS.—Neenah Foundry Co., Winneconne avenue, has given general contract to Knepke Construction Co., Appleton, Wis., for a foundry addition 49 x 83 feet.

RACINE, WIS.—George Gorton Machine Co., manufacturer of die-cutting and engraving machinery, has given general contract to Johnson & Hendrickson for one-story plant addition. Frank J. Hoffman is architect.

RACINE, WIS.—Wright Rubber Products Co., manufacturer of rubber floor tiling, is taking bids on a one-story addition 60 x 80 feet. Frank J. Hoffman is architect.

RACINE, WIS.—S. C. Johnson & Son Inc., manufacturer of polishing wax, etc., has given general contract to Johnson & Hendrickson for a one and two-story addition 104 x 165 feet, with five-story tower. Lockwood-Greene Engineers Inc., 10 Rockefeller Plaza, New York, is engineer.

WEST BEND, WIS.—Gehl Mfg. Co., manufacturer of agricultural implements and coal stokers, is taking bids on a two-story plant addition 60 x 60 feet. Verner H. Esser, 757 North Broadway, Milwaukee, is architect.

### Minnesota

ST. PAUL, MINN.—Northern States Power Co. has given general contract to C. F. Rule Construction Co. for an addition to High Bridge steam plant to house 67,000-horsepower generating unit.

HASTINGS, MINN.—War department, Major J. W. Moreland, district engineer, 615 Commerce building, St. Paul, will take bids soon for a second lock, 110 x 600 feet, at dam No. 2, near Hastings.

### North Dakota

LISBON, N. DAK.—Voters have approved bond issue for $240,000 for municipal light and power plant. W. R. Sandager is city auditor. (Noted March 24.)

LISBON, N. DAK.—Citizens have approved $240,000 bond issue for construction of an electric light and power plant. W. R. Sandager is auditor. (Noted March 24.)

### South Dakota

HURON, S. DAK.—City, M. F. Walt, auditor, has estimates on construction of sewage disposal plant, by Alvord, Burdick & Howson, 20 North Wacker drive, Chicago, at cost of about $20,000.

MITCHELL, S. DAK.—Davison county, Henry Herman, auditor, is building a one-story highway machinery shop 70 x 140 feet to house welding equipment, lathes and other equipment.

### Nebraska

HASTINGS, NEBR.—City, Raymond L. Crosson, clerk, has received WPA approval of project for improvement of sewage disposal plant at cost of about $235,000.

OMAHA, NEBR.—Socony-Vacuum Oil Co., J. K. Durfee, district manager, plans construction of lubricating oil compounding plant to cost about $300,000.

SEWARD, NEBR.—C. McGrew, city clerk, will receive bids until about May 1 for 250,000-gallon steel water tank on tower, to cost about $25,000. Probably will be double ellipsoidal type. Paulette & Wilson, 1006 Kansas avenue, Topeka, Kans., are consulting engineers.

### Iowa

GARNER, IOWA—City, H. V. Reed, clerk, will receive bids April 23, postponed date, for sewage disposal plant, piping, appurtenances. Currie Engineering Co., Webster City, Iowa, is consulting engineer. (Noted March 3.)

MALLARD, IOWA—Voters have approved bond issue for construction of municipal light and power plant. A. H. Stell is town clerk. K. R. Brown, Valley Bank building, Des Moines, Iowa, is engineer. (Noted March 24.)

### Colorado

DENVER, COLO.—Stearns-Roger Mfg. Co. is considering plans for 1500-mile pipe line from Corpus Christi, Tex., oil fields to New York and other cities, costing about $8,000,000. Application has been made to Federal Power Commission.

### California

BURBANK, CALIF.—Lockheed Aircraft Corp. is building an assembly and storage plant at 1705 Victory place, at cost of about $18,000.

LOS ANGELES—Union Hardware & Metal Co., 411 East First street, will build a warehouse 180 x 212 feet, costing about $100,000, at 150 North Central avenue.

LOS ANGELES—U. S. Spark Plug Corp. has been organized with $1,000,000 capital by C. F. and A. J. Parr and J. B. Lowe. Charles S. Hardy, 639 South Spring street, is representative.

LOS ANGELES—L. Shonman, ornamental iron manufacturer, 3223 Ramona boulevard, is building a plant addition 25 x 55 feet, costing about $2500.

### Oregon

THE DALLES, OREG.—City plans major improvements and development of its water system and will retain a consulting engineer to make a survey.

### Washington

SEATTLE—Local interests headed by E. A. Schrimpf, 1611 Edgewood avenue, are erecting buildings near Hoodsport, Wash., and will install equipment for extraction of manganese from extensive deposits in the Olympic peninsula by electrolytic process. Capacity is planned for 30 tons of metal per day.

### Canada

SAULT STE. MARIE, ONT.—Algoma Steel Corp. Ltd., Wilde avenue, is having plans made for additions to cost $4,000,000, to be financed by the government. Includes blooming mill enlargement and expansion in other departments.

WESTON, ONT.—Moffats Ltd., 23 Dennison road East, stoves and electrical equipment, has let general contract to W. B. Sullivan, 30 Bloor street East, Toronto, Ont., for a plant addition costing $30,000, exclusive of equipment. Prack & Prack, 36 James street South, Hamilton, Ont., are architects.

SYDNEY, N. S.—Dominion Steel & Coal Corp. Ltd. plans installation of new open-hearth furnace here, to cost about $1,500,000, to be financed by the government.

MONTREAL, QUE.—Montreal Locomotive Works Ltd., Longue Pointe, Que., has let general contract for plant addition superstructure to L. G. Ogilvie & Co. Ltd., 1440 St. Catharine street, West, to cost about $1,000,000.

MONTREAL, QUE.—Aluminum Co. of Canada Ltd., 1133 Metcalfe street, Montreal, Que., is having plans prepared for an addition to cost $1,000,000, including equipment. J. H. Alger is vice president and secretary.

SHAWINIGAN FALLS, QUE.—Canadian Industries Ltd., Montreal, has let general contract to Fraser Brace Engineering Co. Ltd. for coal fire boiler plant. 50 x 70 feet, to house three boilers.

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Height of tower—minimum 75 ft.
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18" Canton Portable Alligator Shears
12" ram x 15' stroke Hydraulic Accumulator, 1500 lbs. pressure
500 Ton Bethlehem Steel Shell Presses
6x12" HPM Vertical Triplex Pump, 700 lbs. pressure, 200 GPM, NEW. Class JJJ Pump.

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Ventilating fans and roof ventilators.

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TREASURE ISLAND (San Francisco)

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36 Years' Experience
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"*Anything* containing IRON or STEEL"
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1 only #12 Baley Plexiform Fan, in good condition.

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End Mills—Saws—Hack Saw Blades
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Browning Locomotive Crane
50 ft. boom and 1 yard clam
In good condition. Located near Detroit, and ready for shipment.

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HORIZ. MILL, 3-3/8" bar Detrick-Harvey
POST MILL, 5-1/2" bar Niles, R.P.T., M.D.
DIE SINKERS, E-3 and E-4 Keller, M.D.
GEAR PLANERS, 54" Gleason, bevel, M.D. (2)
GEAR CUTTER, 84" Newark, M.D.
LEVELLER, Plate, 84" Bertsch, 7 Rolls, M. D.
PRESS, Stoll 79-D, Bed 72"x26", M.D.
PLATE SHEAR, 10' x 3/8" United, M.D.

**LANG MACHINERY COMPANY**
28th St. & A. V. R.R. Pittsburgh, Pa.

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One — one ton Steam Tilting Hammer. State Name, Weight, Condition and Price. P. O. Box 654, Pittsburgh, Pa.

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**HAYWARD ELECTRIC BUCKET**

1 yard capacity, with controller arranged for 220 volt direct current. Good operating condition. Immediate delivery.

**NIXON-HASSELLE COMPANY, INC.**
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Motor Generator Set—500 AMP, Chalmes, 125 V. DC Compound, Motor 75 HP—900 RPM—220 V. A.C. 3 phase.
5 ton Whitcomb Gas Locomotive 36" gauge.
Goulds Water Pump—5" x 8" geared with 10 HP Motor, D. C.

Alliance College, Cambridge Springs, Pa.

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**THE WEST STEEL CASTING CO.**, Cleveland. Fully equipped for any production problem. Two 1½ ton Elec. Furnaces. Makers of high grade light steel castings, also alloy castings subject to wear or high heat.

PENNSYLVANIA

**NORTH WALES MACHINE CO., INC.**, North Wales. Grey Iron, Nickel, Chrome, Molybdenum Alloys, Semi-steel. Superior quality machine and hand molded sand blast and tumbled.

## Positions Wanted

**OPENING IN SMALL OR MEDIUM ORGANIZATION** by graduate mechanical engineer thoroughly experienced in purchasing, handling, working and assembling sheet metal. Am able to handle both plant and product engineering. Have actually installed, maintained and operated presses, shears, spot welders and tools. Have made special studies of sheet and tubing fabrication by gas and electric arc welding. Proven ability to handle help. Address Box 450, STEEL, Penton Bldg., Cleveland.

**ADVERTISING MAN WANTS POSITION** with manufacturer or agency handling industrial accounts. Thorough knowledge of and ability to create and produce trade paper advertising, booklets, catalogs, house organs, publicity material, etc. Twenty years experience with three manufacturers, seven years on heat treating equipment. Available at once. Salary requirements modest. Can submit samples and recommendations. Reply Box 439, STEEL, Penton Bldg., Cleveland.

**WELDER—SPECIALIZING IN TOOL AND** die steels, reclaiming of worn dies, seeks connection. Reply Box 456, STEEL, Penton Bldg., Cleveland.

**METALLURGIST, FORTY - FIVE, NOW HOLDING RESPONSIBLE POSITION WITH ONE OF LARGEST AUTOMOBILE MANUFACTURERS WOULD LIKE TO MAKE A CHANGE. ADDRESS BOX 457, STEEL, PENTON BUILDING, CLEVELAND.**

**ROLL EXECUTIVE DESIRES CHANGE.** Experienced in all branches of roll manufacture. Sales experience including many personal contacts. Address Box 458 STEEL, Penton Bldg., Cleveland.

**MANUFACTURERS' AGENT COVERING** the Central and Northern part of Indiana representing a cold drawn bar mill—wants other steel products and allied lines. Well acquainted with industrial accounts in this district. Address Box 455, STEEL, Penton Bldg., Cleveland.

## Help Wanted

**WANTED — SALES REPRESENTATION** for Cleveland, Chicago, St. Louis and Milwaukee Districts wanted by nationally known manufacturer specialized industrial quality lubricants, including kinds unobtainable elsewhere, for steel, brass, forging, cement, railroads, ships, airplanes, docks and locks, lumber, glass, textile, paper, printers, lithographers, etc. operations. Sales large users only. Practical operating or engineering experience desirable. Remuneration based on sales will include franchise, embodying exclusive field. Remuneration liberal percentage with engineering field assistance and high type advertising support. Address Box 454, STEEL, Penton Bldg., Cleveland.

**ROLLER AND ASSISTANT ROLLER FOR** 12" Rerolling Mill, acquainted with production of miscellaneous Shapes. Location Central States. Address Box 449, STEEL, Penton Bldg., Cleveland.

# ADVERTISING INDEX

**Where-to-Buy Products Index carried in first issue of month.**

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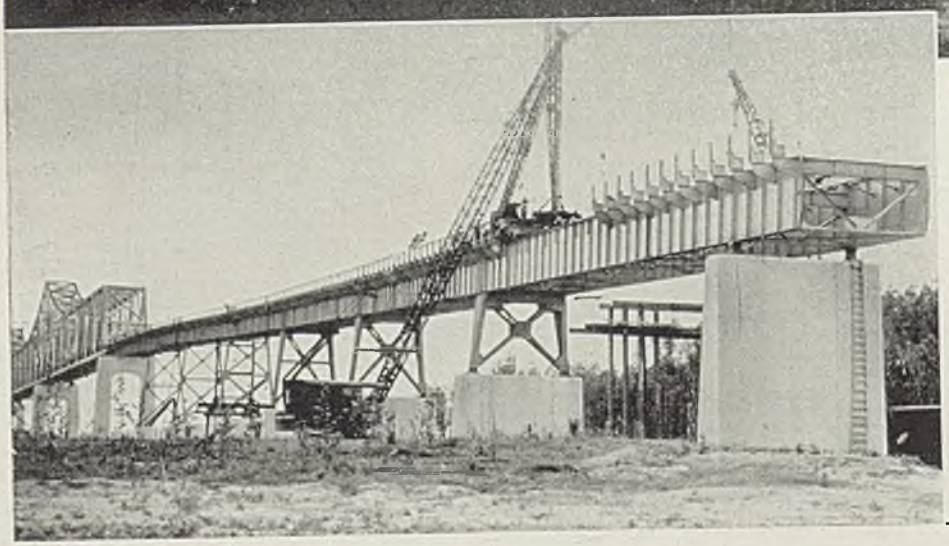
# *New Gateway to the West . . .*
# *the* Ben Humphreys Bridge



**THE 3-SPAN CANTILEVER** *unit over the Mississippi River comprises two 640½-feet anchor spans and an 840-foot main span which includes a suspended span of 462 feet.*

**APPROACH** *viaducts consist of plate-girder deck spans supported on steel and concrete bents. Girder span lengths are: two of 218½ feet, two of 146 feet, twelve of 180 feet, sixty-two of 75 feet, and five varying from 53½ to 63½ feet. Cement for concrete roadway, was manufactured by the Universal Atlas Cement Co.*

The Ben Humphreys Bridge was built for the City of Greenville, Mississippi. Milton C. Smith, Mayor. Ash-Howard-Needles & Tammen, Kansas City, Missouri, were the designing and supervising engineers.

TRANSCONTINENTAL motorists via U. S. Highway No. 82, no longer need ferry over the Mississippi between Greenville, Mississippi and Lake Village, Arkansas. Nor will they be concerned during high water, for the new Ben Humphreys Bridge will afford a 65-foot clearance over the highest flood level of this mighty stream.

Rising from road grade on either bank, this modern steel structure, two miles long, accomplishes the crossing of the river by means of a 2121-foot cantilever structure of 3 spans. Flanking this cantilever unit, plate-girder deck-span viaducts extend to the levee lines on each bank. These approaches, with maximum grades of 4 per cent and horizontal curves up to 2 degrees, have respective lengths of 1958 and 6360 feet on the Arkansas and Mississippi sides.

The superstructure carries a 24-foot reinforced concrete roadway with bent steel plate sidewalk curbs 18 inches wide. Some 10,700 tons of fabricated steel, including steel railings, entered into this construction. American Bridge Company not only furnished and erected all steelwork but contracted as well for the finished concrete roadways.

## AMERICAN BRIDGE COMPANY

*General Offices:* Frick Building, Pittsburgh, Pa.

Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit · Duluth
Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

## UNITED STATES STEEL