

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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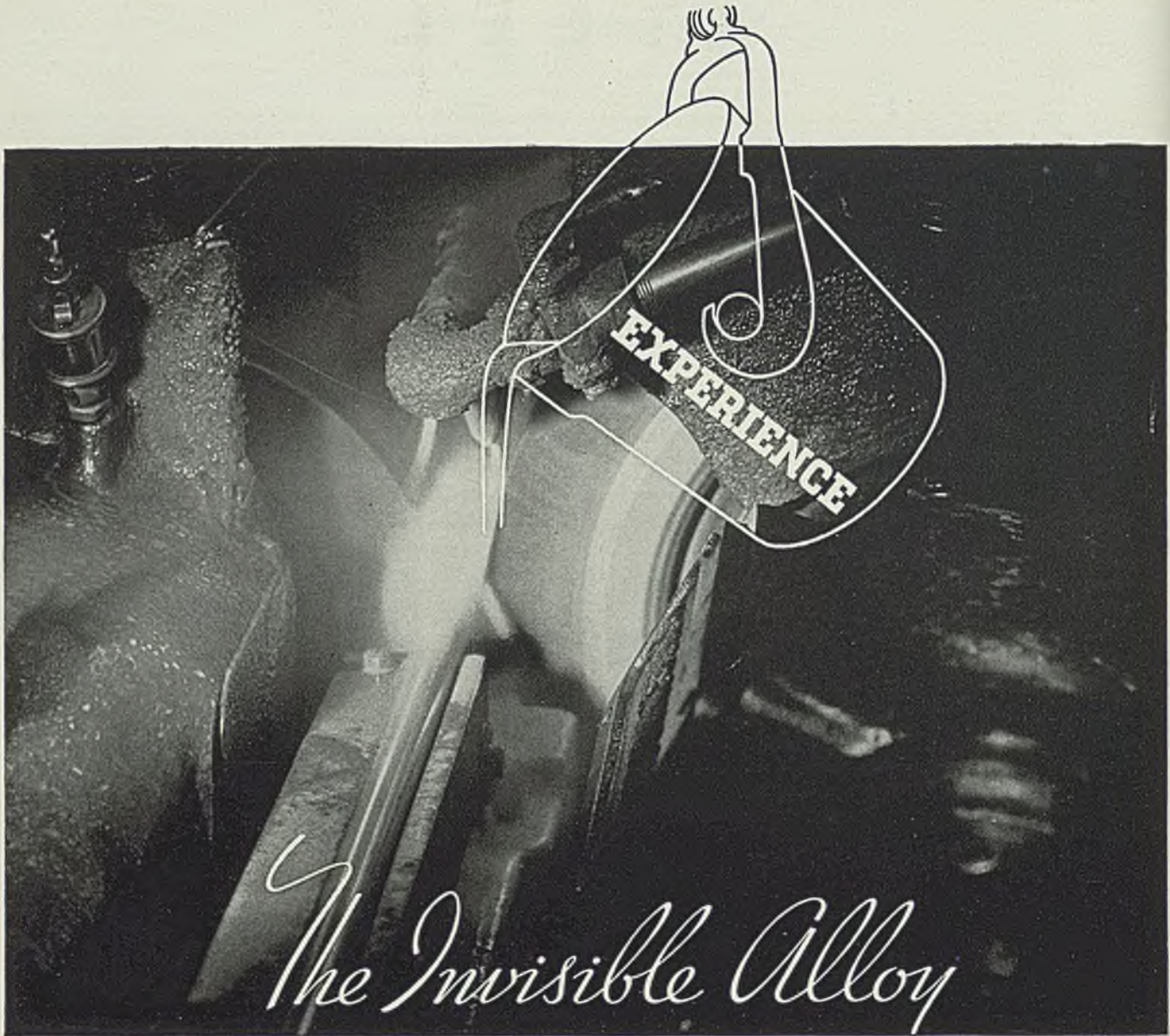
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STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

LAST week the chairman of one of the world's largest industrial corporations, in accounting to his stockholders for his stewardship, used two significant phrases. He referred to a new spirit of aggressiveness in his company as a "renaissance in the corporation's life" and to drastic changes in its executive roster as "refreshing its personnel". It would be difficult to conceive of objectives of good management that are more important or more appropriate under present conditions than the action connoted by these quotations. "Renaissance" and "refreshing" represent the key to the door of future opportunity, yet scores of company executives do not yet appreciate the fact.

Persons who read the accounts of stockholders' meetings are noticing that executives are taking more pains to explain their administrative policies in language understandable to laymen. Some of the statements issued in recent annual meetings are models for frankness and detail. Also they convey the idea that a well-managed company (p. 29) takes its obligation to the public, employes and stockholders more seriously than some politicians consider their obligations to their constituents. We wonder whether a politician, if required to account for his acts in the way management accounts to its owners, could make as good a case.

Evidence of expanding activity in industry stands out prominently in the news of the week. Steelworks are operating at 66.5 per cent of capacity (p.18), which is the highest rate since June, 1930. Automobile assemblies, totaling 112,818 for the week ending April 11 (p.23), exceed those of any week since August, 1929. These and other indicators of activity have carried STEEL's index up to 96.6 (p.30), which means

that the average of activity currently lacks only a few points of equalling the level of the year 1926. Activity generally through the metalworking industries now is about on a par with that of June, 1930, when the trend was downward. Today the trend is distinctly upward, with every assurance that April will establish new post-depression records. Encouraging also is a new wave of purchasing in the heavy equipment lines.

So few manufacturing plants have been built during the depression years that industry has had little opportunity to observe the changes in ideas of architecture, layout, construction and appointments which have occurred during that time. What are the unusual features of a modern plant? What have we learned about plant design and construction since the building boom of the late twenties? The answers are found in the new establishments erected in the recovery period. One of the first and perhaps the most outstanding of these is the diesel-electric locomotive works (p. 31) just completed at La Grange, Ill. Until a newer plant appears, it may be considered as the latest model in its class.

This latest unit of General Motors is noteworthy in that provision for extensive welding operations was made in the design and layout of the buildings. Machined, slotted cast iron bed plates have been put down to serve as the foundations for precision welding. Distribution of electric current throughout the shops has been designed to accommodate welding requirements. Power for all operations will be supplied by completed diesel engines or assembled locomotives undergoing test. The offices and engineering and drafting rooms are air conditioned and the latter are equipped with venetian blinds. This and other new plants will tend to establish a modern vogue. Eventually this will win a designation, as in the case of period furniture. Perhaps it will be known as the 1936 recovery model.

E. L. Shaner

American Sheet & Tin Plate Co. Is Merged With Carnegie-Illinois Steel Corp.

ON MONDAY of this week—April 13—the organization of the American Sheet & Tin Plate Co. began functioning “as an integral part and under the management” of the Carnegie-Illinois Steel Corp.

This was a further step in the reorganization of the United States Steel Corp., for all practical purposes inaugurated by Myron C. Taylor, chairman of the board, shortly after he succeeded the late Judge E. H. Gary in 1927.

Important details of personnel will be announced shortly, possibly beginning this week. C. W. Bennett, president of Sheet & Tin Plate, has already passed the voluntary retirement age and is approaching the “must” retirement limit of 70 years.

Presumably, many Sheet & Tin Plate executives and operating officials will be absorbed by the Carnegie-Illinois staff. Presumably, too, there will be amalgamation of branch sales officials and offices.

Consolidate Capacity

While no definite announcement has been made, it has been assumed that the name Carnegie-Illinois Steel Corp. will also blanket the operations of the Sheet & Tin Plate unit. Benjamin F. Fairless, who resigned last September from a vice presidency of Republic Steel Corp. to head up the Carnegie-Illinois unification on Oct. 1, 1935, will, of course, be the dominating figure in this broader setup.

Eliminating the Dover, O., and the Scottdale, Pa., works, the capacity of Sheet & Tin Plate is 340,000 tons of ingots annually at Vandergrift, Pa., and a total finishing capacity of 1,697,000 tons of various grades of sheets, tin plate, and terne plate. There is also a large roll and machine shop at Canton, O.

Sheet & Tin Plate plants are at Gary and Elwood, Ind.; Farrel, Vandergrift, New Castle, McKeesport and Monessen, Pa., Cambridge and Martins Ferry, O., and Morgantown, W. Va. The Dover works has been virtually written off and the Scottdale works was scrapped recently.

Sheet & Tin Plate was formed originally as a merger of the American

Sheet Steel Co., of which George G. McMurty was head, and the American Tin Plate Co., of which Daniel G. Reid was president, and has been operating as a separate subsidiary of the Steel corporation since the latter was organized in 1901.

Even without the addition of its Sheet & Tin Plate unit, the Carnegie-Illinois corporation was the largest single steel unit in the world. As now augmented, Carnegie-Illinois has



Benjamin F. Fairless

At 44, he has the last word in the greatest steel empire in the world. To the Carnegie-Illinois Steel Corp., of which he became president Oct. 1, 1935, is now added the American Sheet & Tin Plate Co. Combined, these units of the United States Steel Corp. have an annual capacity of 20,800,900 gross tons of steel ingots and 14,912,630 tons of finished steel products

over 83,000 employes and annual capacities of 17,113,900 tons of pig iron, 20,800,900 tons of steel ingots and 14,912,630 tons of finished rolled products.

According to well-informed observers, probably the first major policy to be decided upon from an operating standpoint of the merger will be the authorization of the \$20,000,000 to \$25,000,000 continuous sheet mill at the present Clairton, Pa., works of Carnegie-Illinois. This expansion has been approved by Steel corpora-

tion directors, but funds have not yet been released.

It involves construction of a finishing mill at Clairton, scrapping of most of the present Clairton productive capacity (with the exception of the blast furnaces and coke ovens), and construction of a new slab mill at the Edgar Thomson works at Braddock, Pa., some 7 to 8 miles distant. It is planned to produce slabs at the latter point and finish them at the proposed Clairton sheet mill.

The most important speculation this week, of course, is the matter of personnel, concerning which no definite announcement has been made.

There also is speculation as to the future of other Steel corporation subsidiaries. The Tennessee Coal, Iron & Railroad Co., operating out of Birmingham, Ala., virtually constitutes a southern unit, inasmuch as several years ago it took over the Fairfield, Ala., works of the American Steel & Wire Co.

Other principal subsidiaries still maintaining their corporate entity are the American Steel & Wire Co., National Tube Co., American Bridge Co., Universal Atlas Cement Co., Cyclone Fence Co., Standard Fence Co., Oil Well Supply Co., Columbia Steel Co., Minnesota Steel Co., Lorain Steel Co., Canadian Bridge Co., Scully Steel Products Co., United States Steel Products Co., H. C. Frick Coke Co., Federal Shipbuilding & Dry Dock Co., and various steamship and railroad lines.

Hub of Corporation

Since the capacity of all Steel corporation units, as compiled late last year, was 21,108,900 tons of pig iron, 27,341,900 tons of steel ingots and castings, and 19,261,900 tons of finished steel products for sale, it is evident that the Carnegie-Illinois unit is by all odds the center of the corporation's production activities.

This amalgamation of Sheet & Tin Plate with Carnegie-Illinois is a heartening development for Pittsburgh, and is further assurance that important operating decisions will be made at Pittsburgh rather than New York.

The official statement of the unification follows:

The board of directors of the United States Steel Corp. at its meeting April 7 took the following action:

In continuation of the policy referred to in the annual report, of more closely co-ordinating the activi-

ties of the subsidiary companies, the Corporation has approved the unification of the properties and operations of the American Sheet & Tin Plate Co., with the Carnegie-Illinois Steel Corp.

The plan contemplates that the properties and entire activities of American Sheet & Tin Plate Co. be merged as an integral part and under the management of the Carnegie-Illinois Steel Corp., of which Mr. Benjamin F. Fairless is president.

Taylor Defends U. S. Steel Salaries

THE day prior to this announcement of the proposed absorption of the American Sheet & Tin Plate Co. by the Carnegie-Illinois Steel Corp., stockholders of the United States Steel Corp. trekked to Hoboken, N. J., for their annual meeting.

This year the newspapers lacked the annual feature of the shareholder who requested the meeting be opened with prayer, but played up

the bum who corralled several trays of sandwiches, pie, and coffee as waiters rushed in to succor stockholders at noon, as usual.

Pointing to improvement in ingot operations of the corporation, Myron C. Taylor, chairman, said he was hopeful that it would continue, gradually expanding until a normal basis of operations is reached.

"If one considers the accumulative need of the country for steel for replacement purposes due to ordinary wear and tear, as well as to obsolescence in all capital goods industries, the conclusion is inescapable that even now or very soon these needs must be satisfied, else all commerce and all industry in the nation will suffer a very great injury," he said.

Heavy Products Still Slow

Recent operations of the Corporation have been in excess of 60 per cent, but for the year to date, he indicated, they are still far from satisfactory, due directly to the restricted movement of heavy products.

In perhaps the most comprehensive

discussion of Corporation affairs and policies since he first became chairman—certainly one of the most comprehensive—Mr. Taylor presented figures on wages and employment in the Corporation, outlined policies of the past several years with regard to physical expansion and the disbursement of dividends, and emphasized the sharp progress in the coordination of activities of the subsidiary companies.

Mr. Taylor said, in response to a stockholder's inquiry, that the Corporation as yet had no plan for paying arrears in preferred dividends.

"We felt at our last discussion of the subject that we should see a little further into the future before committing ourselves to any plan," he added.

The Corporation chairman also made a vigorous defense of the salaries being paid the higher executives of his organization. A preferred stockholder (Homer Wakefield) declared that the salaries were too high and urged that preferred stockholders should unite in protest and ask

Capacity of Units Involved in Steel Corp. Merger

Capacities: Carnegie-Illinois Steel Corp., 16,773,900 tons pig iron, 20,460,900 tons ingots, 11,646,600 tons finished hot-rolled products, 1,569,030 tons other finished products; American Sheet & Tin Plate Co., 340,000 tons ingots, 1,697,050 tons hot-rolled finished products

CARNEGIE-ILLINOIS STEEL CORP.

Gary, Ind.

Twelve blast furnaces, capacity 3,016,800 tons pig iron; 49 open hearths, capacity, 5,243,000 tons ingots; 18 rolling mills, capacity 3,336,500 tons finished steel.

Farrell, Pa.

Two blast furnaces, capacity 448,400 tons pig iron; 15 open hearths, capacity, 800,000 tons ingots; 4 rolling mills, capacity 132,000 tons finished steel.

Rankin, Pa.

Seven blast furnaces, capacity 1,586,500 tons pig iron.

Clairton, Pa.

Three blast furnaces, capacity 544,000 tons pig iron; 16 open hearths, capacity 720,000 tons ingot; six rolling mills, capacity 525,000 tons finished steel.

Duquesne, Pa.

Six blast furnaces, capacity 1,371,000 tons pig iron; 32 open hearths, one electric furnace, capacity 1,510,000 tons ingots; 20 rolling mills, capacity 1,021,000 tons finished steel.

Braddock, Pa.

Edgar Thomson Works, 11 blast furnaces, capacity 2,200,000 tons pig iron; 16 open hearths, four bessemer converters, capacity 1,445,000 tons ingots; capacity 876,000 tons finished steel.

Munhall, Pa.

Homestead Works, 65 open hearths,

capacity 2,701,500 tons ingots; 15 rolling mills, capacity 2,146,600 tons finished steel.

Etna, Pa.

Isabella Furnace, three blast furnaces, capacity 180,300 tons pig iron.

Pittsburgh.

Lucy Furnace, two blast furnaces, capacity 118,900 tons pig iron.

McDonald, O.

Eleven rolling mills, capacity 949,100 tons finished steel.

Mingo Junction, O.

Three blast furnaces, capacity 715,700 tons pig iron; four rolling mills, 481,000 tons finished steel.

Youngstown, O.

Ohio Works, six blast furnaces, capacity 1,500,000 tons pig iron; 15 open hearths, capacity 1,700,000 tons ingots; four rolling mills, capacity 1,351,000 tons semifinished steel; Upper Union Works, six rolling mills, capacity 283,000 tons finished steel.

South Chicago.

Ten blast furnaces, capacity 3,016,800 tons, pig iron; 40 open hearths, capacity 4,716,400 tons ingots; 18 rolling mills, capacity 2,445,000 tons finished steel.

Joliet, Ill.

Four blast furnaces, capacity 483,000 tons pig iron; three bessemer converters, capacity 475,000 tons ingots; seven rolling mills, capacity 285,500 tons finished steel.

Cleveland

Two blast furnaces, capacity 472,700 tons pig iron.

AMERICAN SHEET, TIN PLATE CO.

Gary, Ind.

Capacity 551,100 tons black plate, 250,200 tons tin plate, 535,900 tons other sheets.

Farrell, Pa.

Capacity 115,400 tons black plate, 101,300 tons tin plate.

Elwood, Ind.

Capacity, 77,800 tons black plate, 75,500 tons tin plate.

Martins Ferry, O.

Capacity 92,000 tons black plate, 88,900 tons tin plate.

Monessen, Pa.

Capacity 100,000 tons black plate, 97,400 tons tin plate.

New Castle, Pa.

Two plants, capacity 235,200 tons black plate, 211,700 tons tin plate, 19,400 tons other sheets.

Morgantown, W. Va.

Capacity 37,000 tons black plate.

Cambridge, O.

Capacity 95,900 tons black plate, 100,000 tons galvanized sheets.

Vandergriff, Pa.

Capacity 178,000 tons black plate.

McKeesport, Pa.

Capacity 104,000 tons black plate; 25,000 tons cold-rolled.

Canton, O.

Roll and machine works, capacity 18,600 tons rolls, 3600 tons other castings.

Congress for protection through petition. Mr. Taylor said that liberal salaries were necessary, as men of high ability and training were in great demand.

"I think too many of us take too narrow a view of the whole salary question." Then with great emphasis he added: "I do not like anyone to attack this compensation question without knowing what they are doing. And I resent it."

This brought applause.

Discussing aggregate disbursements during the past eight years, Mr. Taylor pointed out that in that time additional properties were acquired at an expenditure of \$91,570,334. He outlined the budget system installed at the beginning of that period, and spoke of the requests made of the various subsidiaries to supply annual estimates of their requirements.

Only 3 Per Cent on Book Value

The management was forced, however, to move conservatively in complying with these estimates, particularly during the depression years. The total amount appropriated during the 8-year period represented only 34.2 per cent of the amounts proposed by subsidiary companies.

The actual amount recommended for all companies for additions, extensions, and betterments was \$372,941,325, which was equal, he pointed out, to an average of \$46,617,665 per year, or less than 3 per cent of the gross book value of the companies. The expenditure of \$372,941,325 was less than the amount of \$411,666,787 reserved for depletion and depreciation. Mr. Taylor brought out that during the 1928-

1935 period upward of 20 plants were definitely abandoned due to obsolescence and high costs.

The Corporation chairman declared that surveys which have been constantly in course of preparation have also indicated desirable locations, markets, and availability of necessary raw materials for the relocation of a number of the Corporation's activities. Plans are in effect, he said, and others in process of completion for the readjustment of considerable finishing capacity along definite lines.

Japanese Buying Nonferrous Mills

A 20-INCH mill for the direct production of brass and copper sheets from molten metal is being loaded in New York for shipment to Osaka, Japan, for the Furalawa Electric Engineering Co. Ltd.

The mill, it is said, is similar in type to that recently installed by the Crown Cork & Seal Co., Baltimore, for production of aluminum and steel sheets by the direct process method. The new mill has a capacity of one ton of bronze sheets in four minutes, and weighs 110 tons, minus the gears and motors, which will be furnished in Japan.

An order has also just been placed for a 24-inch mill of this type by the Simitoma Co., said to be the largest producer of aluminum in Japan, for the production of aluminum sheets. This mill will be for ship-

ment to Osaka also. One of the largest steel companies in Japan, it is interesting to note, is negotiating for a mill of this type for sheet steel production.

Under the process employed, the molten metal is poured in at the top of the mill and flows between two horizontal rolls. One of these rolls is equipped with flanges, which serve to keep the molten metal in its proper channel. The metal comes through the rolls in sheets or strip, as desired, and is passed on to a coiler or to a second mill of the regular vertical type. Sheets can be produced in thicknesses ranging from 0.05 to 0.25 inch, as required.

Josephine Stacks To Be Dismantled

PROSPECTIVE buyers of the two Josephine stacks of the Republic Steel Corp. at Josephine, Pa., inspected the property Thursday and Friday. Acquiring the stacks through merger with the Corrigan, McKinney Steel Co., Republic is offering for dismantling purposes the two stacks, eight stoves, 22 hot metal cars weighing about 22 tons each, about 1000 tons of rails, a heavy cinder trestle, slag cars, and miscellaneous lots of pig iron and scrap.

Republic is taking bids on three bases—sale outright, sale involving dismantling of the plant and preparation of the scrap for return to the company, or on a partial bid basis.

The Josephine stacks were last operated in 1926. No. 1 is 80 feet, 3 inches, with a 15½-foot hearth and 20-foot bosh. It was last rebuilt in 1907 and last relined in 1918. No. 2 stack is virtually identical in size, was rebuilt last in 1912 and last relined in 1921. Four of the eight stoves are 90 x 21 feet, and the remaining four, 85 x 21 feet. Four steam blowing engines, a pig casting machine, and other equipment are included in the sale.

Bids close April 20.

New Capacity

JONES & LAUGHLIN STEEL CORP. has awarded a contract to Mesta Machine Co. to build the new one 10-stand hot mill and two 3-stand tandem cold mill trains adjoining the South Side works, Pittsburgh. This mill is being financed through the recently issued \$30,000,000 first mortgage issue of Jones & Laughlin. The plant will occupy a 23-acre plot at 2140-2540 Second avenue, Pitts-

The Dam That Held



This is the famous Quemahoning dam at Johnstown, Pa., which held during the recent flood, under the most severe conditions in its history. The dam is 950 feet long on the crest, 20 feet thick at the top, and 700 feet in greatest thickness at the base. A new concrete spillway, 250 feet wide and 13 feet deep, was built by Bethlehem Steel Co. in 1933. The safety valve effect of this spillway was a helpful feature in the protection of the dam during the recent crisis

burgh, which had been used as an iron ore storage yard.

General Electric Co. has been awarded electric motors and generators in connection with the expansion, and contracts for cranes, foundations and other incidental equipment will be placed shortly.

ESTABLISH COLD-DRAWN BAR MILL IN NEWARK, N. J.

Empire Finished Steel Co. has been organized for establishment of a cold-drawn bar mill in Newark, N. J., it is reliably reported. The proposed plant will be initially equipped with three draw benches, to specialize in the production of cold finished flats. Production is expected to get under way not later than June 15. An existing building will be used to house the equipment, it is understood.

J. J. Komara, who has designed special wire blocks and facilities for grinding and polishing shafting, is expected to be a leading executive and treasurer of the company, and Henry Bowman vice president in charge of operations. Both have been associated until recently with the Keystone Drawn Steel Co., Spring City, Pa. Further particulars are expected to be revealed shortly.

BOOKS SOAKING PITS

Salem Engineering Co., Salem, O., has been awarded a contract for the construction of all the soaking pits for Inland Steel Co.'s new 46-inch blooming mill, which is now under construction at Indiana Harbor, Ind. It is expected delivery will be made by June.

Institute

STATISTICAL studies of the American Iron and Steel Institute, New York, disclose the following:

Motion picture companies in 1935 used about 3500 tons of steel, including only sheets, strip, wire, shapes, and other products bought for fabrication into various forms, and not including steel in locomotives, furniture and other properties used merely for atmosphere. One picture consumed 10 tons of sheet and strip in helmets, swords and shields. Another picture required chain for galley slaves.

Price of sheet steel is lower, compared with pre-depression levels, than prices of many leading farm products. Hot-rolled annealed sheets which averaged 3.15c at Pittsburgh for 1923-1929 cost 2.40c in 1935, a decrease of 23.8 per cent. Meanwhile, heavy hogs at Chicago were reduced, comparing the same periods, from \$9.88 per 100 pounds to \$8.90, or 10 per cent; No. 2 hard wheat at Kansas City from \$1.34 a bushel to \$1.04, or 22.4 per cent; and beef steers at Chicago from \$10.99 per 100 pounds to \$10.40, or 5.7 per cent.

Structural Steel Frame, Zinc Exterior Panels Used in New Home Design

A NEW method of residence construction, involving the use of steel and zinc, has been adopted by Estate Homes Inc., Chicago, which has been organized to engage in the manufacture and sale of prefabricated materials for home building. Patents covering this method are held by Walter W. Ahlschlager, architect who is a consultant with the company.

The company also is engaging in realty developments by buying vacant property and erecting homes under the Ahlschlager method. Forty-nine lots have been acquired near Chicago on the Indiana lake-front, and work is starting on the first of homes to be built there. In South Evanston, Ill., a block of 21 lots has been purchased.

Operations will extend throughout Illinois, Indiana and Wisconsin. Except for the Chicago metropolitan area, where the company will supervise all building operations for homes built for resale or for private owners, franchises will be granted. Homes will cost from \$4000 upward. Mass assembly and prefabrication of materials is being done under the direction of the company at the plant of Knapp Bros. Mfg. Co., Joliet, Ill.

The Ahlschlager method is said to provide for all of the fundamental requisites of proper home design. These include such factors as utility, appearance, economical all-year air-conditioning, low initial cost, minimum maintenance cost, skeleton steel construction, and flexibility of design.

Instead of using load-bearing steel

panels for the exterior walls, the Ahlschlager method employs continuous length plates of pure zinc, without horizontal joints and with concealed vertical joints which are immune to the elements. These plates are attached by a patented method to the framing. The entire framing members, including outside walls, partitions, floors and roofs, are structural steel similar to skyscraper construction. All framing members are shop fabricated from standard structural shapes.

Zinc, being corrosion proof, will not deteriorate. In weathering it acquires a silvery blue-gray effect which does not require a protective coating, though the plates may be painted in some particular color.

While all steel frame members and exterior zinc plates are completely prefabricated, they are not controlled by any definite system of modules. Floors and roofs in every instance are of fireproof construction. Interior wall finish is optional with the owner. Adequate insulation is provided to accommodate complete and inexpensive air-conditioning, and the method of steel framing permits the installation of air-conditioning ducts at a minimum cost.

Floor plans for a home with five rooms and one bath are available in a variety of designs. These provide for an increase in the size of the unit, by progressive stages if desired, to an ultimate of eight rooms and three baths. This may be done without occupancy interference and with no increase in the size of foundation.



Structural steel framing and zinc exterior panels are features of this nine-room home being erected at Culver, Ind., for Dr. O. E. Bransky, Standard Oil Co. official

Ingot Rate Best Since June 1930

STEEL ingot production in the United States in the first quarter of 1936 was at the rate of 54.70 per cent of the industry's capacity and was 10 per cent higher than for first quarter of 1935, according to figures of the American Iron and Steel institute. Output was greater than for any first-quarter period since 1930.

Daily average production for first quarter of 1936 was 120,048 gross tons; for first quarter, 1935, it was 110,616 gross tons. Total first-quarter production was 9,363,731 gross tons, compared with 8,517,437 gross tons for the first three months of 1935. Per cent of capacity engaged for this period in 1935 was 49.97. During first quarter of 1930 production was 12,067,677 gross tons, 78.5 per cent of capacity.

March production of steel ingots totaled 3,346,489 gross tons, 58.65 per cent of capacity, at a daily rate of 128,711 gross tons. This compares with 2,868,141 gross tons, at 49.83 per cent of capacity, in March, 1935. The daily rate for March of this year was the highest since June, 1930, when it reached 136,741 gross tons. In March, 1935, the daily rate was 110,313 gross tons.

Production

REFLECTING broadening requirements, steelmaking continued its upward trend last week, rising 3 points to 66½ per cent, and setting a new high since the second week of June, 1930, when the rate was 68

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Apr. 11	Change	Same week 1935 1934	
Pittsburgh	57	+ 5	34	39
Chicago	68	+ ½	50½	50
Eastern Pa.....	42	+ 1½	29½	38½
Youngstown...	76	+ 2	55	57
Wheeling	76	None	76	69
Cleveland	86	+ 5	64	69
Buffalo	62	None	54	50
Birmingham...	69	None	55½	52
New England ..	78	+ 6	52	78
Detroit	100	None	82	82
Cincinnati	76	+21	†	†
Average.....	66½	+ 3	45	51

†Not reported.

per cent. This rate is expected to be topped this week. In the major steelmaking centers, Pittsburgh was up 5 points to 57 per cent, Youngstown up 2 to 78, Chicago up ½ to 58, and eastern Pennsylvania up 1½ to 42. Other districts to report gains were Cleveland, New England and Cincinnati, while the remaining were unchanged. Further details follow:

Youngstown—Gained 2 points to 76 per cent, and operations are expected to reach a new six-year peak of 80 per cent at this week's opening.

Cincinnati—Up 21 points to 76 per cent, with 18 of 24 open hearths again in production. No early change from this rate is indicated.

Denver—Colorado Fuel & Iron Co. operated at 88 per cent last week at its Minnequa plant, with 14 out of 16 open hearths active.

Pittsburgh—Up sharply to 57 per cent last week, an advance of 5 points. The leading interest is op-

erating at 57-58 per cent, and the leading independent closed last week at 56 per cent. Sometime this week, operations are expected to touch or pass 60 per cent, which will be the highest rate in six years.

Twenty-nine out of 60 blast furnaces are producing iron. Carnegie-Illinois blew in a fourth Edgar Thomson stack on April 7, and National Tube a third at McKeesport, Pa., blast furnace, April 9. Carnegie-Illinois now has 12 of 32 on; National Tube, 3 of 4; Jones & Laughlin, 7 of 11; Bethlehem, 4 of 7 at Johnstown, Pa., and Pittsburgh Crucible Steel, Pittsburgh Steel, and American Steel & Wire, 1 of 2 each.

Wheeling—Unchanged last week at 76 per cent. Twenty-eight open-hearth furnaces out of 37 are active.

Detroit—Unchanged at 100 per cent, as all 17 open-hearth furnaces were listed on production schedule through last week.

Chicago—Edged up ½ point to 68 per cent, a new peak since June, 1934, and the outlook is favorable for a continuation of this rate for the balance of April. Twenty-one of the district's 41 blast furnaces remain active, with one additional stack scheduled to be started soon.

New England—Up 6 points to 78 per cent, with expectations of a drop of five points to 73 per cent this week.

Central eastern seaboard—Moved up 1½ points to 42 per cent. While new business has not been coming out as briskly recently, thus threatening curtailment of operations at one or two plants, higher operations at certain other points, which in recent weeks have been affected by flood conditions, will serve to offset any temporary lull, and a further increase is expected in the near future due to flood replacement tonnage which has yet to get under way.

Birmingham—Fifteen open-hearth furnaces continue on active schedule, the steelmaking rate at 69 per cent. Demand for steel continues brisk.

Buffalo—Unchanged at 62 per cent last week, with indications of a rise to 65 per cent for this week. Some mills are expected to add additional open hearths to their active lists at the end of this week.

Cleveland-Lorain—Up 5 points to 86 per cent. Republic Steel Corp. lighted two more open hearths to operate all of its 14 units. Otis Steel Co. added one in midweek, operating all of its 8. At Lorain, National Tube Co. continued with a full complement of 12. Republic has on all of its four blast furnaces; Otis, its two; National Tube, three of its five.

STEEL CORP. SHIPMENTS UP

Finished steel shipments of the United States Steel Corp. in March

(Please turn to Page 22)

Steel Ingot Production

	Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 97.91 per cent						Calculated daily pro- duction, all (gross tons)	Number of com- panies work- ing days
	Open Hearth		Bessemer		Total			
	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity		
1936								
Jan.	2,853,050	53.80	196,389	31.54	3,049,439	51.46	112,942	27
Feb.	2,765,358	56.32	202,445	35.11	2,967,803	54.09	118,712	25
Mar.	3,161,449	61.91	185,040	30.86	3,346,489	58.65	128,711	26
3 mo.	8,779,857	57.31	583,874	32.46	9,363,731	54.70	120,048	78
1935								
Jan.	2,631,673	49.73	239,858	34.99	2,871,531	48.04	106,353	27
Feb.	2,553,429	54.28	224,336	36.82	2,777,765	52.28	115,740	24
Mar.	2,637,331	51.75	230,810	34.97	2,868,141	49.83	110,313	26
Apr.	2,408,588	47.27	231,916	35.14	2,640,504	45.87	101,558	26
May	2,381,061	44.99	254,796	37.17	2,635,857	44.10	97,624	27
June	2,020,406	41.23	210,487	33.17	2,230,893	40.31	89,236	25
July	2,045,768	40.15	224,456	34.01	2,270,224	39.44	87,316	26
Aug.	2,685,965	50.76	233,361	34.05	2,919,326	48.84	108,123	27
Sept.	2,596,098	52.98	233,737	36.83	2,829,835	51.13	113,193	25
Oct.	2,875,727	54.34	270,719	39.50	3,146,446	52.64	116,535	27
Nov.	2,901,084	56.93	252,163	38.20	3,153,247	54.78	121,279	26
Dec.	2,833,382	58.23	228,425	35.99	3,081,807	55.68	123,272	25
Total	30,590,512	50.19	2,835,064	35.91	33,425,576	48.55	107,478	311

Capacity percentages are based upon open-hearth capacity of 60,954,717 tons and bessemer of 7,895,000 tons on Dec. 31, 1934.

How Steel Corp. Personnel Stood Up to Flood Crisis

BY COL. W. R. DUNLAP

Colonel Dunlap, public relations counsel for the Carnegie-Illinois Steel Corp., Pittsburgh, who commanded the units of the Pennsylvania national guard called for duty in the recent flood at Pittsburgh, herewith graphically details the obstacles encountered by the steel industry and its employes in the flood area, and their contribution to rescue work and restoration of order:

CONTINUOUS heavy rains for almost 48 hours throughout the watersheds of the Allegheny and Monongahela rivers and their tributaries caused both rivers to begin to rise on Monday, March 16. The weather bureau issued flood warnings to the entire district but indicated that the height of the flood would probably not exceed 32 to 33 feet.

On Tuesday, March 17, word came that Johnstown was threatened with a disaster much worse than the great flood of 1889. The rise of the flood was exceedingly rapid and there was 18 feet of water in the business district and many bridges had been wiped out.

Predictions Far Short

The reports of death and destruction from Johnstown spread fear throughout the Pittsburgh district. The weather bureau then predicted about 34 feet at "the Point." By midnight, however, the flood had reached a stage far beyond the level predicted and at noon on Wednesday had attained a height of 46 feet, or 8 feet above the highest stage previously recorded.

On Wednesday morning, the entire Pittsburgh district was in the grip of the greatest flood in its history. The city was without electric power and there were no lights and little heat. Business was at a standstill. All ordinary forms of transportation had ceased and the great buildings and stores in the business district were closed. A complete failure of the water supply was also threatened. The police were unable to cope with the situation and the state police were called and the national guard was mobilized.

The great plants of the subsidiary companies of the Steel corporation, located in the valleys of the Monon-

gahela, Allegheny, Ohio, Conemaugh and Kiskiminetas rivers, were seriously affected by the flood. The plants had been put in shipshape to withstand the highest stages previously known, but as the water crept up and up far above any previous mark, many of them were completely submerged and others were badly crippled.

Some plants located on higher ground, such as Donora works of the



Col. W. R. Dunlap

American Steel & Wire Co., National works of the National Tube Co., Clairton works and Duquesne works of Carnegie-Illinois Steel Corp. were not directly affected. While flood waters did not reach the yard level of Homestead works, they did attain a height that required shutting down, for a short time, all producing and rolling units.

The plants most seriously affected by flood waters were the Vandergrift plant of the American Sheet & Tin Plate Co., Rankin plant of the American Steel & Wire Co., Edgar Thomson works, Carrie Furnaces, Schoen Works, Isabella Furnaces, Mingo works and the Lorain plant of Carnegie-Illinois Steel Corp., Ambridge plant of the American Bridge Co. and Pittsburgh warehouse of Scully Steel Products Co.

While all these great plants were completely submerged, they managed

to resume at least partial operations within a surprisingly short time after the flood receded.

The prompt rehabilitation of the plants and the rapid resumption of operations have been among the most outstanding features of this great disaster. With one or two exceptions, all plants are today operating as usual and even during the period of the flood were able to accept and fill their orders. This condition is entirely due to the loyalty and devotion to duty of every employe from the highest to the lowest. The stories of the men who worked long hours under the most trying circumstances, often in water up to their waists, to save valuable equipment and prevent the ravages of the flood are so numerous that it would be unfair and ungenerous to single out any individual or groups of individuals for special mention.

One of our executives has said,

"This writer cannot bring himself to close this report without a tribute to the Lorain division organization. The resourcefulness and fortitude with which they have met this emergency — supervisors and men alike — are beyond all praise. The subscriber acknowledges himself proud and vain of his association with the men who have done these things and carried on, regardless of their own comfort and well being."

Assist in Welfare Work

Our employes were not only active in protecting our plants, remaining at their posts of duty until ordered to leave for their own protection, but were also instrumental in saving the lives of many who were marooned in their homes, often with great danger to themselves. They also added to the comfort and welfare of the less fortunate by generous contributions to local relief agencies and the Red Cross.

At Vandergrift, where the loss was unusually heavy, 111 houses were washed away by the rushing waters of the Kiskiminetas and 200 additional houses were moved from their foundations and badly damaged. More than 1500 people were homeless and in dire need of relief.

The employe representatives of Vandergrift works of the American Sheet & Tin Plate Co. contributed \$125, the entire amount in their treasury, for relief, and their fellow employes at Farrell, Monessen, New Castle and Shenango sent many truck-loads of food and clothing.

There was a great shortage of cots and bedding in the district. A large quantity of such material was stored in a building at Edgar Thomson works, surrounded by 8 feet of water at the height of the flood. As soon as the flood receded sufficiently

to permit entrance into the building, many salaried employes and office workers volunteered their services, working all night to sort and ship the material. Much of it was sent to Vandergrift, where the need was unusually great. The Edgar Thomson works supplied to the Red Cross 68 truck-loads.

These are only two examples of the spirit of courage and helpfulness which prevailed among our employes during the entire emergency. Like instances could be multiplied a thousand times over.

The same spirit which was manifested in our plants, prevailed among our employes in the general offices in Pittsburgh. While the Frick building, due to lack of power, heat and light was closed for several days, the Corporation companies located in the building established temporary quarters at the University club, the William Penn hotel and elsewhere and carried on their work under the greatest possible handicaps.

The Carnegie building was dark and cold and without elevator service and in spite of the lack of usual transportation facilities to and from their work, hundreds of employes reported for work each morning and eagerly volunteered their services. The telephone operators worked long hours at their switchboards getting through to our plants and other points wherever possible. It was a real privilege to observe their skill and ingenuity.

Route Orders by Candlelight

The order and shipping bureaus continued to keep the mills scheduled, working without light and heat. Some little relief was finally given by the temporary installation of gas stoves. Thousands of candles, lamps and lanterns were purchased and distributed where most needed.

The operating officials, working night and day, established headquarters on the second floor of the Carnegie building and kept in touch with the plants and their operations. When telephone communications failed, an auxiliary operating headquarters was established at Homestead works to take advantage of the interplant communication system. This system made possible the closest co-operation among the plants of the company in the Monongahela valley, one plant helping another, often at great sacrifice to its own interests.

While the subsidiary companies of the Steel corporation have suffered most severe losses in plant and equipment, they have, nevertheless, contributed the generous sum of \$25,000 to the American Red Cross for flood relief in this district and also made many other contributions to local relief committees.

The emergency has passed, great

losses in plant and equipment have been sustained, but the morale and courage of our employes have never faltered. They were ready and anxious not only to do their regular work but anything that would aid their organization to carry on.

The terror of the rushing waters, the fear of a water and food famine, the danger of disastrous fires and the

hardships all were compelled to undergo, will soon be forgotten, but the loyalty and devotion of our employes to their company and to their neighbors, their spirit of co-operation and will to carry on, will always be remembered as one of the brightest spots in the history of the greatest of all floods encountered in the Pittsburgh district.

Men of Industry

WILLIAM C. REILLY, vice president, Youngstown Sheet & Tube Co., Youngstown, O., and first auditor of the company when it was organized in 1900 by the late James A. Campbell, and the late Col. George D. Wick, has resigned, effective April 1.

When Mr. Reilly first became associated with Youngstown Sheet & Tube, the company was known as the Youngstown Iron Sheet & Tube Co. He was the first general superintendent of the company, and retained that title until 1934, when he was named vice president in charge of operations.

Prior to affiliation with Sheet & Tube, Mr. Reilly spent several years in the yard office of the Brown-Bonnell Iron Co., now a part of the Republic Steel Corp. He then went to the former Mahoning Valley Iron Co., where he first came in contact with James A. Campbell, who was superintendent. In 1899, when Mr. Campbell became Youngstown district manager for the old Republic Iron & Steel Co., Mr. Reilly went with him as assistant.

Mr. Reilly has taken an active

part in the development of Sheet & Tube's various steelmaking activities.

♦ ♦ ♦

George M. Laughlin Jr., chairman of the board of Jones & Laughlin Steel Corp., Pittsburgh, has resigned, effective immediately, and at a board of directors meeting of the company held April 7, Harry E. Lewis was elected board chairman. Mr. Lewis was also elected a director and a member of the executive committee (see STEEL, April 6, page 17).

W. C. Moreland, vice president of Jones & Laughlin and a veteran executive of the company, has resigned as vice president and a member of the executive committee. Both Mr. Moreland and Mr. Laughlin retain their offices as directors of the company.

♦ ♦ ♦

William F. Hart has been appointed special representative for Pittsburgh Crucible Steel Co., Pittsburgh. From 1909 to 1920 he was, successively, cost clerk, assistant to the president, general manager and vice president of the Central Tube Co., and from the latter date until 1927 he was president of the Verona Tool Works, at that time a wholly-owned subsidiary of Central Tube. From 1927 to 1932 he was manager of sales of tubular products for Bethlehem Steel Co., and from the latter date to the present had been employed by Treedale Laboratories Inc., Pittsburgh, as vice president in charge of sales.

♦ ♦ ♦

E. J. Hedlund, who with E. A. Steinfurth has established the Hedlund Steinfurth Co. Foundry, Erie, Pa., for the past 20 years had been identified with the Erie Malleable Iron Co. His first position with that firm was as melting foreman. Previous to that, he had been employed as a draftsman with Metric Metal Co., Erie, Pa.

Mr. Steinfurth's first employment was with the National Tool Co., Pittsburgh, as metallurgical engineer. Following this he was employed successively by the Goodyear Tire & Rubber



William C. Reilly

Co., Akron, O.; General Electric Co., Erie; and Ferro Foundry & Machine Co., Cleveland. He entered the employ of Cascade Foundry Co. in 1915 as salesman, later advancing to sales manager and finally general manager, a position he resigned recently to embark in business with Mr. Hedlund.

M. A. Sommer has been elected a director of Keystone Steel & Wire Co., Peoria, Ill., to fill a vacancy.

W. Howard Edwards has resigned as manager of the truck division of the Studebaker Export Corp. to devote all his time to the Edwards Iron Works, South Bend, Ind., of which he is president.

A. D. Heffron Jr., has been appointed district sales manager of the Chicago territory for Babcock & Wilcox Tube Co., Beaver Falls, Pa., with headquarters in the company's Chicago office, 1502 Marquette building.

C. H. Scheman, formerly general manager of the Fort Erie, Ont., plant of the Horton Steel Co., has been transferred to New York, for sales department duty, with the Chicago Bridge & Iron Works, of which the Horton company is a subsidiary.

William C. Bulmer, formerly connected with Blaw-Knox Co., Pittsburgh, has been placed in charge of sales and promotion of the open-hearth and blast furnace specialty departments of the Reliance Steel Products Co., Rankin, Pa.

F. R. Magill has been appointed representative in the Pittsburgh territory for the Trabon Engineering Corp., Cleveland, manufacturer of lubricating equipment, with headquarters at 327 First avenue, Pittsburgh. Mr. Magill has spent the past 12 years in engineering sales work in this district.

Walter E. Hawkinson has been elected treasurer of the Allis-Chalmers Mfg. Co., Milwaukee, succeeding the late Raymond Dill. Mr. Hawkinson entered the offices of the company in 1907 at the age of 15. Later he served 15 years in the treasurer's department and then was transferred to the tractor division as assistant manager, which position he now relinquishes.

S. M. Tallman has been appointed representative in western and central New York state for the Tubular Service Corp., maker of seamless and welded steam tubing, seamless pipe and boiler tubes, 120 Forty-fourth street, Brooklyn, N. Y., with warehouses in the New York met-

ropolitan district, Philadelphia, Boston and Pittsburgh. Mr. Tallman was formerly sales representative in the same district for the Chicago Pneumatic Tool Co., Chicago. He will make his headquarters in Buffalo.

F. B. Wolfe and A. G. Wallerspedt have been elected directors of the Standard Steel Spring Co., Coraopolis, Pa., to fill vacancies.

Arthur B. Lawrence, of F. S. Smithers & Co., New York, has been elected a director of the Reynolds Spring Co., Jackson, Mich.

A. W. Leland has been appointed manager of the Rockford, Ill. works of J. I. Case Co., Racine, Wis., to succeed the late Bradford Brinton.

Roy E. Adams has been named president of the J. D. Adams Mfg. Co., Indianapolis, manufacturer of a wide line of road building and maintenance machinery.

Other officers are: William Ray Adams, first vice president; Howard R. Meeker, second vice president and secretary; Floyd D. Wallace, third

vice president; William W. White, treasurer; Frederick E. Matson, assistant secretary, and Walter E. Tirmenstein, assistant treasurer. John E. Kenall has been elected to the board of directors, in addition to the officers named.

A. F. Dobbrod, formerly in the Chicago office of Carboloy Co. Inc., manufacturer of carboloy cemented carbide cutting tools and dies, has been transferred to Milwaukee, with headquarters at 2802 Atkinson avenue, where he will represent the company throughout Wisconsin.

Haig Solakian has been appointed research metallurgist for the A. F. Holden Co., New Haven, Conn. He formerly had been chief metallurgist for Geometric Tool Co., at New Haven. He also had been identified with Bethlehem Steel Co., Remington Typewriter Co., and the United States Mining & Refining Co., with the latter as research metallurgist.

Ford Lamb, Detroit district manager, Consolidated Machine Tool Co., has been named national president of the American Society of Tool Engi-

Steel Its Own Advertisement



As part of the greeting to visitors at the American Ceramic society convention held recently in Columbus, O., the Empire Sheet & Tin Plate Co., Mansfield, O., told the story of its Wabik metal for vitreous enameling purposes in the unique display pictured above. The foreground was in dark blue with chromium letters as shown. Wabik Metal was in relief in front of a row of lights illuminating transparent pictures. The background was in light blue and in the background the world, representing Empire's trade mark, was revolving continuously within a chromium belt as shown. The transparent pictures from left to right show the making of sheet metal and illustrate Empire's craftsmanship in producing enameling sheets. The views show charging of the open hearth furnace, tapping, chemical analysis of the steel, bar mill rolling, sheet rolling and inspection of the finished product. The next six pictures in the series of 12 show views in the fabricating of sheet steel into finished products. The first of this series shows welding, press room work, continuous enameling furnace, porcelain enamel drop test, inspection and the final picture showing a refrigerator assembly line

neers, Detroit. Other officers elected include: Frank Shuler, master mechanic, Chrysler Corp., Highland Park plant, first vice president; Luke Beach, Packard Motor Car Co., second vice president; Ray Brunner, Dodge Bros. Corp., secretary, and Frank Crone, Lincoln division, Ford Motor Co., treasurer.

C. H. Tate has been appointed Cleveland district representative for the Northern Equipment Co., Erie, Pa., manufacturer of Copes feed water regulators, differential valves, pump governors and allied equipment. His headquarters are at 507 Hunkin-Conkey building, 1740 East Twelfth street.

F. W. Bunting and Harold A. Schleider have been appointed inspection engineers for the Northern Equipment Co., Erie, Pa. Mr. Bunting, a graduate of Drexel institute, was formerly associated with the Radio Corp. of America, and Mr. Schleider, a graduate of Renssalaer Polytechnic institute, had been associated with the power department of National Paper Products Co.

Production

(Concluded from Page 18)

were 783,552 tons, an increase of 107,237 tons over the February total. This is the largest month's shipments since June, 1934. The March

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1936	1935	1934	1933
Jan.	721,414	534,055	331,777	285,138
Feb.	676,315	583,137	385,500	275,929
March	783,552	668,056	588,209	256,793
3 mo	2,181,281	1,785,248	1,305,486	817,860
April	591,728	643,009	335,321	
May	598,915	745,063	455,302	
June	578,108	985,337	603,937	
July	547,794	369,938	701,322	
Aug.	624,497	378,023	668,155	
Sept.	614,933	370,306	575,161	
Oct.	686,741	343,962	572,897	
Nov.	681,820	366,119	430,358	
Dec.	661,515	418,630	600,639	
Yearly adj.		19,907	44,283	
Total	7,371,299	5,905,966	5,805,235	

total compares with 668,056 tons in March, 1935. For three months this year shipments were 2,181,281 tons, compared with 1,785,248 tons in the corresponding period of 1935.

Vanadium Corp. of America, New York, for 1935 reports loss of \$425,791; 1934, loss of \$861,017.

Metal Trades Outline Program

NATIONAL Metal Trades association's thirty-eighth annual convention will be held at the Waldorf-Astoria, New York, April 22-23.

One-half day of the sessions will be devoted to an important report which the newly organized committee on employer-employee co-operation has been preparing. Henry W. Johnson, vice president and works manager, De Laval Steam Turbine Co., Trenton, N. J., is chairman of this committee. Other members are Howard Dunbar, manager, grinding machine division, Norton Co., Worcester, Mass.; J. S.



Charles H. Strawbridge

Nominated for president, National Metal Trades association

Knowlson, chairman of the board, Stewart-Warner Corp., Chicago; and Louis Ruthenburg, president, Servel Inc., Evansville, Ind. The committee will discuss: The Problem, Management's Responsibility, Need for Co-ordinated Effort, and Direct and Indirect Benefits from the Program.

A number of timely addresses will be delivered, among them: The State of the Union, by Merle Thorpe, editor, *Nation's Business*; Current Legislation and Litigation Affecting Employers, by John Gall, associate counsel, National Association of Manufacturers; Need for Skilled Help and How to Meet It, by George A. Seyler, works manager, Lunkenheimer Co., Cincinnati; The Federal Old Age Security Program and Some of Its Consequences, by M. Albert Linton, president, Provident Mutual Life Insurance Co., Philadelphia; Oh, You Rascal You, by John H. Van Deventer, editor, *The Iron Age*.

The following have been nominated

as officers of the association for next year: President, Charles H. Strawbridge, Goodman Mfg. Co., Chicago; first vice president, N. W. Pickering, Farrel-Birmingham Co., Inc., Ansonia, Conn.; second vice president, A. H. Timmerman, Wagner Electric Corp., St. Louis; treasurer, Harold C. Smith, Illinois Tool Works, Chicago.

The six who have been nominated to the administrative council are: R. W. Gillispie, Jeffrey Mfg. Co., Columbus; George A. Seyler, Lunkenheimer Co., Cincinnati; Louis Ruthenburg; Alexander Sellers, Wm. Sellers & Co. Inc., Philadelphia; Harold S. Falk, Falk Corp., Milwaukee; and D. F. O'Brien, A. P. Smith Mfg. Co., East Orange, N. J. Officers and councilors will be elected at the convention.

Ice Pack Blocks Buffalo Harbor, Delaying Navigation

Ice conditions at Buffalo make the opening of navigation uncertain. Shifting winds sent the huge pack swinging toward the Buffalo harbor on April 9 but there still was no sign of an impending breakup and drift of the ice down the Niagara river. A few steamers are ready to buck the ice when conditions are more favorable, but that time appears distant. Scrap will move into Buffalo from Detroit, and finished steel and pig iron out, as well as iron ore in.

On the state barge canal the outlook is even worse, so far as movement of scrap and pig iron is concerned. Veteran fleet captains say high water will prevent operation before April 25, and that the opening of navigation may be deferred even beyond that date.

Filene Hits Price Fixing

Edward A. Filene, leading Boston merchant, testified last week before the senate interstate commerce committee on the Wheeler-Utterback anti-basing point bill.

Disclaiming any specific knowledge of the marketing problems of the steel industry. Mr. Filene attacked price fixing in general, and maintained that any artificially high level for steel would discourage buying and react principally upon the steel industry.

No further testimony on the anti-basing point bill will be taken for about ten days. There are rumors that Senator Wheeler is attempting to get Henry Ford to testify. Charges were made Friday before the senate educational committee that the steel industry employs many spies to watch on labor.

Interlake Iron Corp., Cleveland, shows net loss of \$435,841 in 1935, against loss of \$683,764 in 1934.

Mirrors of

Motor-dom

DETROIT

NEWs from the automobile industry the past week was all bullish. Assemblies were bowling along at the best rate since 1929, there was every assurance of May being equally as good a month, and the industry was confidently thinking in terms of a 4,750,000 car year.

In fact, the only thing lacking to make Detroit believe it had returned to the fabulous mid-twenties was that Chrysler and General Motors were not selling on the big board at over 200 apiece.

Detroit, with so much in the way of tangible automobile business at hand, does not exactly pine for the return of those extremely gusty and speculative days, but it is again eyeing motor stock prices and many a wager is being made on market prices before 1937.

See Big Rise in Stocks

One typical burst of optimism was backed by a round sum at one to five recently that General Motors common would pass the market on Chrysler before the year is out, even allowing for a possible Chrysler split.

This is not to depreciate Chrysler, but is an example of what Detroit thinks of the market's probabilities. The automobile accessory stocks, so market observers think, are also in for an upward play.

Assembly lines were still dropping off cars last week at the unabated tempo of the week before when weekly assemblies first crossed the 100,000-mark this year. The position from a production angle still finds Chevrolet and Ford virtually bracketed at 30,000 jobs apiece, followed by Plymouth at 13,000.

Then comes Dodge in round figures at 9000; Olds, 6000; Pontiac, 5000; Buick, 4000. The showing is imposing; all of the prognostications that the depression in February would be transient have come to pass, and then some.

Speaking of automobile assembly schedules, there is an interesting story going around in Detroit these

days. As it is well known, many motor companies, when the sailing is especially good, come out toward the close of a month with the statement that they will make so many cars in the following month.

These anticipated schedules, as anyone closely allied with the industry knows, may or may not mean anything. Often they are subject to overnight changes, in either direction. At any rate, if the month's prospects are good these stories make good publicity.

Many companies still use this publicity tool. Others, of which Ford is conspicuous, refuse to issue an anticipated assembly schedule at any time.

The story in Detroit is that one of the large motor companies recently received the hint from an official body in Washington that if it wanted to keep on telling the world what anticipated monthly assemblies were to be, that it must do so for every month of the year.

Smell Security Tie-up

The reason: Suspicions had got around that the stories were getting out only for good months, then were conspicuously absent when rates were falling off. So conspicuously absent were they that no statement on assemblies of any nature would be issued.

The hint from Washington was to the effect that certain stock manipulations were coinciding too closely with the bullish reports. For the good of the public, advance notices on manufacturing now have to be for all months, or none.

Packard and Hudson are good examples of the slice the independents will add to April activity. With Studebaker and Nash, both outside of Detroit, this group of four adds up imposingly.

Hudson at 14,000, Studebaker at 8500, Packard at 8000, and Nash

at 6000 cars set for manufacture in April thus aggregate 36,500 models. True, none is a General Motors, but when you count in Graham, Auburn, Reo, and Willys (which will be back in production shortly) the sum of the "Independents" may reach to 50,000 jobs.

Packard is working down a 7500-unit backlog of orders and is making just short of 2000 cars weekly. Capacity on the "120" is now figured at 342 jobs daily, and the past week operations averaged that figure. Add in the super eight and twelve, and Packard puts out 360 to 370 jobs daily.

Packard has begun to build a new foundry addition, also some large bins for coal and coke storage purposes. The foundry addition takes 350 tons of structural shapes, the bins 160 tons.

Marking Time on New Packard

Plans on Packard's small six still are coasting along. There is no immediate announcement to be made, but preparations are proceeding, and the program has by no means been discarded or temporarily shelved. Incidentally, well-informed opinion in Detroit is coming to think that since Packard has found a popular line in the "120", this line itself is not likely to undergo any radical change for 1937.

At Hudson the five-day week is again vogue and for two weeks now 3500 jobs each have been made. Hudson says the last two weeks for which it has records on retail sales, with sales of 4373 cars, smashed all records since 1930. Hudson's former 127-inch wheelbase sedan, now mounted on a 120-inch base, is receiving a good play, likewise the convertible.

Convertible models, at best only a minor percentage of total car assemblies, are a fast stepping item these days. Taking into account all car manufacturers, the total of con-

Mirrors of Motordom

vertibles rarely touches 5 to 6 per cent of the total made, but in some individual cases now the total is up to 10 per cent.

It is an axiom in the automobile industry that a year of good southern travel is also a good one for convertible models, this improvement usually continuing unabated through the spring. As evidence of the pickup, practically all of the motor makers here have revived the push on their convertibles first included in the 1936 lines brought out last November.

In northern climates these models did not sell over the winter for obvious reasons, but the advertising accent is now on them for the spring trade. People are anxious to get out and from under their steel tops, turret tops, or general overall covering, and the appeal is in the convertible.

In other recent years it might not have been wise to push this model, due to its high price, often at the top of the line. But when the motor executives see sales by Cadillac, Lincoln, and Packard booming, they know the public has more money to spend.

Bulwark Total Sales

By and large, convertibles are identical in many details with their brother models on a line and are made all under one roof. But some, such as Hudson, let their body jobs to outside suppliers for the convertible only.

The industry figures this way: That if convertibles could be boosted up to 10 or even 12 per cent of assemblies in April and May, their mite would go far toward the 500,000-car total Detroit is talking of for at least April, and possibly also May.

Of course, the coupe and two-door sedan jobs are still the big volume items; little in the offing can alter that. Yet, there is some well-versed prognostication in Detroit that the wholehearted swing of the 20's from open to closed cars, may reverse itself, at least in part. Especially may this come to pass when one considers the interior improvements for automobiles, regardless of model type. Car heaters are no longer a luxury, neither are appliances for defrosting windshields.

This column several weeks ago referred to the lessons that a hard northern winter had taught the motor manufacturers in making auto-

mobiles more rugged. It was suggested then that oil crankcase pans be made of thicker steel, that rims and frames be made heavier and that certain other underframe parts be strengthened — all to meet the problem of battling drifts and high road crowns.

One job that the industry probably will do is make exhaust tubing of heavier steel. Extreme cold combined with moisture from high-compression motors made more of these parts rust deeply this past winter than in some time.

Usually this part in most cars is made of hot-rolled strip steel, 0.120-inch thickness, but it probably will be increased in gage. Torque tubes, generally of 0.014-inch strip steel, may also be stepped up in ruggedness.

Go into almost any automobile plant and the production bulletin board readily discloses the reasons why Detroit is so bullish on automobile stocks.

For example, Buick has scheduled 18,602 cars for April, including export and Canadian shipments, which will be the highest since August, 1930, when Buick announced its new models for the following year. Retail deliveries in March were 15,067, more than double those of February, and 130 per cent over March a year ago.

Olds, which went on a six-day

basis last week, is not announcing specifically its April schedule but it will be the highest ever attempted by this unit of General Motors. Retail sales in March were greater than for any month in the history of Olds. Since the introduction of the 1936 models, a total of 107,733 have been built up to the end of March.

Hudson-Terraplane has the same story to tell. Retail sales are surpassing all high marks since 1930. Hudson's first quarter was the best in six years, production totaling 20,730 units for both lines.

Highspotting Motor News

Toledo has decided to finance the industrial peace board that came into being when strikes were hot and heavy there, and city council has set aside \$5625 in its budget . . . Chrysler is equipping all of its Air-flow and DeSoto cars with all-adjustable front seats . . . Buick is set to broadcast the Joe Louis-Schmeling prize fight this summer, on a wide hookup similar to the way it sponsored the Baer-Louis fight last September . . . Buick now has turned out its 100,000th car of the 1936 lines . . . A Michigan parts maker has received a big stepup in Chrysler releases, from 2000 to 14,000 units daily, this being for a part used two to a car . . . Plymouth still indicates its preference for the forged crankshaft and, contrary to a former story, now may not swing over to a cast design . . . The proposed merger of Houdaille Hershey and Motor Products failed to be consummated last week and has been called off . . . Graham has finally placed stamping orders outside for its business coupe job . . . So far this year Chevrolet dealers over the country have sold 1.8 used cars to each new car sale. . . Ford last week brought out a new style body, a club cabriolet with seats for six. The convertible top is deep enough to house a three passenger seat fitted into the forward rear deck. . . Studebaker at South Bend is another to report record-breaking business, its first quarter sales of 21,229 exceeding every quarter since 1929, and topping last year by 50 per cent. . . White Motor Co., Cleveland, is operating at a profit for the first time in five years, its first quarter deliveries of trucks and buses aggregating 2483, compared with 1261 in 1935. March deliveries were the best for any month since 1927.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1934	1935	1936
Jan.	155,666	292,785	367,252
Feb.	230,256	335,667	290,964
Mar.	338,434	429,793	*425,000
3 mo.	724,356	1,058,245	1,083,216
Apr.	352,975	477,691	.....
May	330,455	364,662	.....
June	306,477	361,248	.....
July	264,933	336,985	.....
Aug.	234,811	239,994	.....
Sept.	170,007	89,804	.....
Oct.	131,991	275,024	.....
Nov.	83,482	398,039	.....
Dec.	153,624	407,804	.....
Year	2,753,111	4,009,496	.....

*Estimated.

Estimated by Cram's Reports

Week ended:	
March 21	95,223
March 28	98,415
April 4	108,426
April 11	112,818

Died:

WILLIAM ALEXANDER FORBES, 59, vice president, United States Steel Corp., New York, in that city, April 7. Mr. Forbes had been a vice president of the Corporation since Jan. 1. He was born at Stockton-on-Tees, England, and received his education in English schools. He entered the employ of Park Bros., Pittsburgh, in the chemical laboratory in 1895, and later in that year joined the Carnegie Steel Co. at Homestead, Pa., in its chemical laboratory, remaining there until 1900. He then became associated with National Tube Co. at McKeesport, Pa., as assistant chemist, chief chemist and assistant superintendent of the blast furnaces, and at Mc-



William A. Forbes

neer for Carnegie, Phipps & Co. Ltd., of the same city. In 1885 he moved to Chicago as representative of these companies where he participated in the development of steel skeleton construction for office buildings, as well as in the building of various bridges over the Mississippi, Missouri and Ohio rivers. In 1893 he went into business for himself, and incorporated the Strobel Steel Construction Co. 12 years later. He retired in 1926.

Paul Ewald, 53, secretary-treasurer, Superior Wire Spring Corp., Cleveland, in that city, April 3.

Edward Pierce Hulse, 67, a retired mechanical engineer and secretary of the Industrial Lubrication council, 51 East Forty-second street, New York, in New York, April 4.

Frank S. Hunter, 83, vice president, F. M. Howell & Co., Elmira, N. Y., manufacturer of oil field equipment, in that city, April 1. He had been engaged in this line of manufacturing for many years.

Willard Jay Woodcock, 73, mechanical engineer and inventor of a number of improvements in automatic refrigeration machinery, in Brooklyn, N. Y., April 2. He was a member of the American Society of Mechanical Engineers.

Onward Bates, 86, former president of the American Society of Civil Engineers, in Augusta, Ga., April 4. For 13 years he was engineer in charge of bridges and buildings of the Chicago, Milwaukee, St. Paul & Pacific railroad, later becoming president of the Bates & Rogers Construction Co., Chicago.

Charles W. Register, 75, retired official of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in Chicago, April 5. He was one of the pioneer engineers in railway electrification in the Chicago district, where he was associated with the Chicago office of Westinghouse. He retired in 1932.

Stephen Q. Hayes, 62, a retired engineer of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in Pittsburgh, April 4. In addition to 40 years of service with the Westinghouse company, Mr. Hayes had been consulting engineer for the United States government on the Muscle Shoals project, Japanese Imperial railways, Italian government railways, and the Quito Light & Power Co., Ecuador.

William C. Peyton, 67, president, Standard Stoker Co., New York, in that city, April 4. Mr. Peyton was also president of the Peyton-du Pont Securities Co., New York. For many years he served as chemical engineer

with the California Powder Works, of which his father is president. Following his invention of smokeless powder he formed the Peyton Chemical Co. in 1900, and in 1910 he merged his company with another to form the General Chemical Co. of California, of which he was president. A few years later he became president of the Standard Stoker Co., manufacturer of locomotive stokers.

Daniel M. Clemson, 83, one of the original "Carnegie partners" and later a vice president of United States Steel Corp., at Pittsburgh, April 7. He was born near Bellefonte, Pa., and at an early age worked in the machine room of the Scotia ore mine of Carnegie Bros. & Co. For a few years he was in charge of the mine machinery, and



Daniel M. Clemson

in 1885 became superintendent of the Scotia mine. Shortly afterward he was transferred to Pittsburgh as manager of the Youghiogheny and Larimer coke works of the Carnegie company, and subsequently rose to be general manager of the company's gas interests, later president of Carnegie Natural Gas Co., and president of the Pittsburgh Steamship Co. During the height of his career Mr. Clemson was one of the confidential advisers to Andrew Carnegie, and was responsible for the purchase of many of the properties which went to form the Carnegie Steel Co. In recent years Mr. Clemson had been retired, but had been active in Pittsburgh religious and social organizations.

John E. Gallagher, 58, a director and assistant treasurer, Apollo Steel Co., Apollo, Pa., in Apollo, April 8. He was one of the organizers of the Apollo company.

William H. Vogel, 68, former president of the metal specialties firm

of William Vogel & Bro. Co., Brooklyn, N. Y., in that city, March 26. He had been associated with the firm founded by his father for over 50 years.

Norman W. Warren, 59, vice president and general manager of the Dominion Bridge Co. Ltd., Montreal, Que., in that city, April 5. He was also vice president of Canadian Tillsoil Farm Motors, and a director of the Eastern Canada Steel Co., and Dominion Welding Engineer Co.

After graduating from Yale university in 1899, he began as a draftsman with the American Bridge Co. and remained there until 1910, when he went to Montreal for the Structural Steel Co. He then became assistant chief draftsman for the National Bridge Co. Ltd. and subsequently was made chief draftsman. When the company was absorbed by Dominion Bridge Co. Ltd. he was made manager of the National company. After serving in various executive posts, he finally was made vice president and general manager in 1929.

Meetings

BETHLEHEM STEEL CO. on April 16 at its Cambria plant, Johnstown, Pa., will formally open its new mill for the manufacture of Bethanized wire. Metallurgists, rural economists, and editors have been invited to view the new mill, which is part of Bethlehem's \$30,000,000 program of improved facilities for making types of steel for consumers' goods. The Bethanizing process provides a new type of zinc coated galvanized wire, having a mirror-like chromium type finish (see STEEL, Dec. 24, 1934, p. 22).

Labor

NATIONAL labor relations board came to grips for the first time with the steel industry Friday when it ordered the Jones & Laughlin Steel Corp. to reinstate, without loss of pay, ten workers which the company claims it discharged for inefficiency,

but which the board finds were dismissed for union activities. Since the company contended that the board is unconstitutional and that its (J. & L.) employes were engaged strictly in intrastate business, court action seems probable.

"The mining of materials, their transportation to and collection at a point, their transformation there into pig iron, into steel shapes, in all stages of finish, their reshipment for further fabrication, for use in railways, automobiles, buildings: All this is one giant, indivisible economic process. It is commerce among the states," stated the board in its decision.

ORDERS CHRISTMAS BONUS

Allis-Chalmers Mfg. Co., Milwaukee, has adopted vacations with pay for its 10,000 employes and will pay a Christmas bonus of about \$500,000 to 8000 shop workers, which will constitute 3 per cent of their wages between March 1 and Dec. 1.

Weigh Financing for New Steel Mill in Bengal

Three outstanding producers of iron and steel in India are said to have under consideration the joint financing of a new steel mill in Bengal for the production of steel products which are not manufactured locally, according to Trade Commissioner George C. Howard, Calcutta, in a report to the department of commerce, Washington.

The firms involved in the proposed enterprise are the Tata Iron & Steel Co., the Indian Iron & Steel Co., and the Bengal Iron Co. The possibility exists that the last two-named organizations may not follow through with the venture, in which event it appears seasonably certain that the Tata company will finance the enterprise, the report states.

It is understood that the site selected will be in the center of the coal and iron ore districts of Bengal where adequate railway facilities, water, and raw materials are available.

That there is adequate scope for the proposed new steel plant is indicated by the fact that in 1935 imports of steel into India totaled 81,242 tons valued at 8,719,731 rupees (\$3,227,000), plus 313,763 tons under the customs heading "iron or steel" valued at 57,941,824 rupees (\$21,440,000), according to the report.

HANNA BROADENS CHARTER

Shareholders of the M. A. Hanna Co., Cleveland, approved a proposed charter amendment to broaden the statement of kinds of business in which the company may engage.

1935 Rail Output Less Than 1934 Bulge

PRODUCTION of steel rails in 1935 was 29.57 per cent lower than in 1934. Total output in 1935 was 711,537 gross tons, compared with 1,010,224 gross tons in 1934. A reason for this shrinkage is found in the greatly stimulated buying of rails in the former year by government aid.

The total for 1935 looks much better when contrasted with 402,566 gross tons in 1932 and 416,296 tons in 1933. The figures are by the American Iron and Steel Institute.

Slightly less than half the total production was in weights from 100 to 120 pounds per yard, this class totaling 340,800 gross tons. In

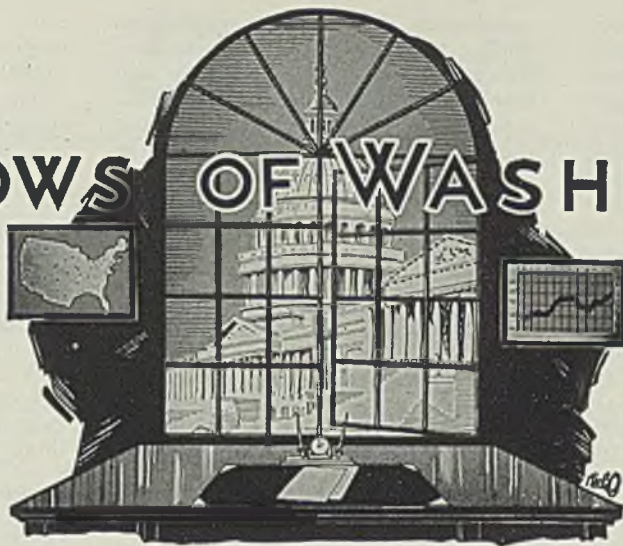
heavier sections there was a gain in weights of 136 pounds per yard and heavier, with 58,858 gross tons, compared with 31,805 tons in 1934. There was also a gain in production of weights between 85 and 100 pounds per yard, from 73,639 gross tons in 1934 to 85,627 tons in 1935. In all other classifications there was a decline.

Active rail mills numbered 18, five in Pennsylvania, three in Alabama, two each in Ohio, Indiana and Illinois and one each in New York, Maryland, West Virginia and Colorado. Pennsylvania mills rolled 186,285 gross tons of rails, about 26 per cent of the total.

Production of Rails by Processes

Years	Gross Tons				INCLUDED IN TOTAL		
	OPEN-HEARTH Rolled from ingots	Rolled from new seconds, etc.	Bessemer and Electric	Rolled from old rails	Total	Girder and high tee	Alloy
1920.....	2,312,750	21,472	143,196	126,698	2,604,116	100,910	12,909
1921.....	2,019,988	7,227	55,564	96,039	2,178,818	89,162	6,276
1922.....	2,032,004	996	22,317	116,459	2,171,776	128,878	3,163
1923.....	2,721,578	17,201	25,995	139,742	2,904,516	130,056	2,142
1924.....	2,295,755	11,778	16,069	109,730	2,433,332	85,533	5,167
1925.....	2,678,536	13,287	9,687	83,747	2,785,257	98,620	4,009
1926.....	3,098,776	9,216	12,533	97,124	3,217,649	116,374	4,216
1927.....	2,712,287	5,578	1,566	87,055	2,806,486	99,621	1,265
1928.....	2,573,608	6,533	3,156	64,196	2,647,493	113,150	6,453
1929.....	2,651,397	10,766	4,209	55,766	2,722,138	109,678	1,965
1930.....	1,829,143	5,790	2,182	36,118	1,873,233	69,814	4,687
1931.....	1,132,433	3,118	828	21,372	1,157,751	44,652	533
1932.....	390,816	2,198	64	9,488	402,566	29,003	565
1933.....	388,420	9,372	300	18,204	416,296	17,561	437
1934.....	970,428	11,645	2,032	26,119	1,010,224	29,988	1,598
1935.....	684,661	7,004	565	19,307	711,537	25,940	520

WINDOWS OF WASHINGTON



WASHINGTON

NOW that the anti-basing point bill hearings are over, after five weeks of intermittent testimony by steel executives, it can be said that Sen. Burton K. Wheeler, Democrat from Montana, co-author of the Wheeler-Utterback bill and undisguised critic of the steel industry, was much impressed with what Messrs. Grace and Irvin had to say and how they said it.

There was considerable wonderment as Mr. Grace, president of Bethlehem, concluded his testimony that Senator Wheeler had not taken him over the jumps. There were some who expected inquisitorial treatment, such as the Black committee has exhibited, as there are not many sharper tongues or penetrating minds in Washington than those of the senior senator from Montana.

Business Baiters Calmed

But Senator Wheeler, almost purring, mildly requested Mr. Grace to submit some cost sheets to the committee, and when Mr. Grace demurred, saying he would have to ask his board of directors about it, the senator did not insist. There are some who are disturbed by this apparent docility and shake their heads, fearing that when the storm breaks it will be violent, but sufficient unto the day—.

Likewise, when Mr. Irvin, president of United States Steel, was asked for some typical costs he put the committee in an affable frame of mind by saying he did not want to be alone in the goldfish bowl—and even Senator Couzens of Michigan, arch foe of the steel rail price, acquiesced with Senator Wheeler's acceptance of this position.

All in all, the hearing was not a bad proceeding for the steel industry, although it need be borne in mind that it was a part of a general program of the brain trusters to ad-duce certain facts relative to iron

and steel. Of a certainty the bill will not pass at this session, and the hearing was largely a fishing trip.

Except that Senator Wheeler had to be insistent that Messrs. Grace and Irvin appear, and some senators were a bit rasping in their quizzing early in the course of the hearings, there were few frayed nerves. Probably Walter S. Tower, executive secretary of the American Iron and Steel institute, had the worst moments because of an effort to pin on him completely responsibility for running the institute, fixing prices, and generally dominating the industry.

One thing is certain. The senate committee on interstate commerce knows much more today concerning the steel industry than it did five weeks ago. Having the advantage of ranking position and a high vantage point, with plants in various parts of the country, Messrs. Irvin and Grace did a good educational job.

While some letters opposing the basing point system were received from consumers, the support of the bill emanating from consumers was relatively small compared with the objections interposed by producers. Possibly because producers are the hub of the wheel and are concentrated, whereas consumers are scattered and usually smaller individually, the hearing at the start took on the color of a producers' procedure, and retained it.

It is regarded here as a safe bet that for the present at least there will be no change in the basing point situation other than any voluntary program on the part of producers to make more producing points basing points.

WORMED BY EVERYONE, BLUE EAGLE IS A SICK BIRD

The erstwhile Blue Eagle is about the sickest looking bird imaginable these days. The organization has dwindled down to some 40 or 50 persons, now known as the division

of industrial economics, and these are housed together with all of the old NRA files, in eight or ten rooms of the department of commerce, instead of taking up dozens of rooms in the commerce building and elsewhere.

There is to be a showdown in a few days on the future of what is left when Dr. Leon C. Marshall, who has been named chief of the new division, makes suggestions for future operations to the three secretaries now having charge of the work and composing what is known as the committee on industrial analysis. These secretaries are commerce, labor, and agriculture.

Wants More Time To "Study"

One of the things that Dr. Marshall wants to do, he has stated, is to complete five or six of the so-called industry studies. One of these studies includes the steel industry. This study, Dr. Marshall says, is practically completed, but he does not want to go ahead with it until after leaders of the industry have had ample chance to go over it. If it is found by the industry that the study is not so good, it may never be finished; but if there is nothing very wrong or harmful in it, it will be finished or mimeographed for general distribution. This, however, will not be known for some time. There are four or five other industry reports in the same category at this time.

Secretary Roper indicated at a recent press conference that the committee of which he is chairman wants to have a special committee of four to work out a final report for the President. This committee, Mr. Roper has indicated, will be composed of one industrialist, one economist, one lawyer and one representative of labor. These four men will not receive any salary and their names have been suggested to the President, but no action has yet been taken on them.

One of the other things that Dr. Marshall thinks is most important,

and which he will suggest to the committee of secretaries is the consolidation of all the NRA files. He thinks that this should be done for future reference so that the NRA files will not go the way of the files of the old war industries board, which are now in such a mess that it is impossible to make head or tail of them.

An estimate has been made by a commercial firm for the consolidation of these files for \$150,000. Of course, this bid will not be accepted because at this time the division has only \$100,000 with which to do all of the work that it may undertake to finish by Dec. 31 next. The sole purpose of the committee of industrial analysis is to make a study of the accomplishments of NRA.

INDUSTRY WAKES TO THREAT IN HEALEY LABOR BILL

More opposition has been expressed to the Healey government contract bill than even the Walsh bill for which the former is a substitute. This substitute bill vests Secretary Perkins' labor department with jurisdiction over hours and wages in all government contracts and that is a provision against which all kinds of opposition has been shown.

It will be recalled that the house committee on judiciary stopped—at least temporarily—the Walsh bill, providing for NRA hours and wages in all government contracts. The committee substituted the Healey bill, which as already indicated has run into very stiff opposition. Incidentally, there seems to be rather a general opinion at this stage of the game that this will never become law at the present session.

Strangely enough, the A. F. of L. is not pushing this bill too hard. One story is that union labor figures that Mr. Roosevelt is going to be re-elected and is holding its punches on legislation in the hope and expectation that when he is re-elected he will help it get all the legislation it wants.

While on the legislative situation, there are many ideas at this particular time as to what is to become of the various proposals now pending in both houses of congress to amend the antitrust laws.

One is now pending on the senate calendar. Several others still are pending before the senate committee on judiciary, and the house judiciary committee—as reported last week—has made a favorable report on one such bill, the latter containing also basing point provisions.

The bills in the two houses are radically different, and there is a much better chance now than there has been at any time during the present session that no action will be taken during this congress.

Up to this time, those pushing the bills, including independent druggists

and grocers, have had a very definite feeling that they would become law. However, even the Washington representatives of these groups, who lose faith last of all, are admitting that they have not even a 50-50 chance of getting any action.

TO RE-ELECT F.D.R., REASON FOR BERRY'S "CO-OPERATION"

Any influence which Maj. George L. Berry and his committee for industrial co-operation might have had has apparently been dissipated through the announcement by Major Berry of the organization of a so-called nonpartisan labor league, set up to oppose the American Liberty league and with the avowed purpose of re-electing President Roosevelt.

Not only will the major alienate what little industrial element there is on his committee but probably also the labor element, because he is joining in his work with John L. Lewis, head of the miners, and Sidney Hillman, head of the garment workers—both active for industrial organization of labor. It is reported that William Green, head of the A. F. of L. and guardian of craft unionism, is not in sympathy with this new idea, and inasmuch as he and his organization have been actively backing Major Berry and his committee trouble is seen in the future.

There have been all kinds of guesses as to why the President re-appointed the major co-ordinator for industrial co-operation, and while Major Berry stated that the new league was formed without the knowledge of the President, such a move would be unthinkable without his permission. This has certainly put the Berry committee on the spot.

While it is true that Major Berry made his announcement about the proposed new league from his private room at the Willard hotel, it is equally true that his own publicity agent—on the government payroll—was with him at the time and helped in disseminating the news.

COMING ELECTION MAKES CONGRESS CHARY ON TAXES

In spite of the fact that President Roosevelt took enough valuable time from his southern fishing trip to write a letter to house leaders asking that processing taxes be included in the forthcoming revenue bill, there is every indication now that his request will not be heeded.

Members of the ways and means committee charged with writing a new tax bill seem unalterably opposed to include the processing taxes in the bill. There is some feeling on the other side of the capitol—the senate side—that these taxes should be in, but no one yet knows whether this feeling is strong enough to insert them in the bill if it passes the house without them.

Indications are that it will be an-

other ten days before any bill can be completed, agreed to by the committee, and introduced in the house.

There has been plenty of back stage gossip as to the way in which the President's letter on the processing taxes was received. Of course, it will not help the re-election of members of congress if these taxes go into the bill, and they feel—it is reported—that the President was putting them right on the spot when he sent his letter urging them. Members of the committee are said to feel that they can raise enough revenue without the processing taxes, for which they have not yet substituted anything.

Denies Penalty on Reserves

Herman Oliphant, general counsel of the treasury department, appearing before the ways and means committee toward the close of its hearings last week, refused to concede that corporations would be refused the right to accumulate reserves for a rainy day as a result of the dividend-forcing corporations tax, or that the administration would presume to dictate corporate reserve policies.

Mr. Oliphant argued that large corporate surpluses are not necessarily a prosperity guarantee. Repeatedly he told the committee that "the greatest depression in the history of the country followed accumulation of the greatest corporate surpluses in history."

It was his contention that the proposed tax would place "the least hardship on the people as a whole, business and nonbusiness, knowing there are only four sources of revenue—business profits, wages and earnings, taxes on rents, and taxes on interest."

Mr. Oliphant stated that he personally thought that there are only two other alternatives—drastic increases in the corporation income tax, which he said would accentuate inequalities, or steep excess profits taxes, which he said, "had a good deal to be said for them."

SCREEN STANDARD EXTENDED

Division of simplified practice of the national bureau of standards has announced that simplified practice recommendation R147-33, wire diameters for mineral aggregate production screens, has been reaffirmed without change by the standing committee of the industry.

This recommendation, which covers wire diameters classified as light, standard light, standard heavy, and heavy, for specific clear openings ranging from $\frac{1}{8}$ to 3 inches, was effective Feb. 1, 1933.

Copies of the recommendation may be obtained from the superintendent of documents, government printing office, Washington, at 5 cents each.

Can Politics Equal Industry's Record on Management?

ONE of the purposes of the annual stockholders' meeting of an industrial corporation is to afford an opportunity for the chief executive officer to present an account of his stewardship. The reports of chairmen of boards and presidents in the recent meetings of stockholders of hundreds of companies have been studied with more than usual interest because public opinion has assumed a more critical attitude toward management. Economic and political pressure in recent years has aroused suspicion in the minds of laymen, employes and stockholders. The stewards of business have been put on the spot.

In view of this state of unrest, executives have gone to unusual lengths to make their annual reports more understandable. Many of them have indulged in frankness to an extent unheard of a decade ago. Numerous reports indicate clearly that the authors are striving earnestly to hold or rewin confidence. In almost every case, the executive stresses sound, conservative policy as being essential to good management and attempts to show the benefits of that policy accruing to the public, the company's employes and its stockholders.

Shows Benefits of Sound Business Policies To Public, Company Employes and Stockholders

The report presented by Myron C. Taylor to the thirty-fifth annual meeting of the stockholders of the United States Steel Corp. illustrates these points in an admirable manner. The chairman reviewed first the operations and volume of business of the corporation's subsidiaries; cited its wage record and explained its attempt to distribute work equitably; reported the amount of money devoted to additions, extensions and betterments and related this sum to the amount reserved for depletion and depreciation; named the amount of net profits and the still greater amount paid out in dividends; called attention to the extent to which bonds, mortgages and other obligations had been liquidated; stated the cash position of the corporation; and finally touched upon the "renaissance in the corporation's life" in "refreshing" its personnel and co-ordinating its properties.

Mr. Taylor reduced all of this to a simple pol-

icy, which is worth the study, not only of every industrial executive, but of public representatives in the executive and legislative branches of the federal government. The statement reads as follows:

"The simple formula is that we could . . . safely expend for improvements annually the amount of our charges for depletion and depreciation. And the pursuance of that policy has kept us within the limits of safety, all contingencies considered. At the same time we did not lose sight of the rights of the stockholder to participate in earnings, through dividend distributions on one hand, nor our obligation to the stockholder to protect his property and keep it in good condition on the other hand. Our utmost endeavor has been given to the protection of resources, to the exercise of diligence and loyalty to the public on one hand, and to the stockholders and employes on the other."

Industrial Reports Stress Security. How Would Reports of Political Management Compare?

The underlying theme in this and hundreds of other annual reports of industrial companies is security—security through preservation of resources, through stability in the flow of profits or surplus into wages and dividends, and through improved service to customers.

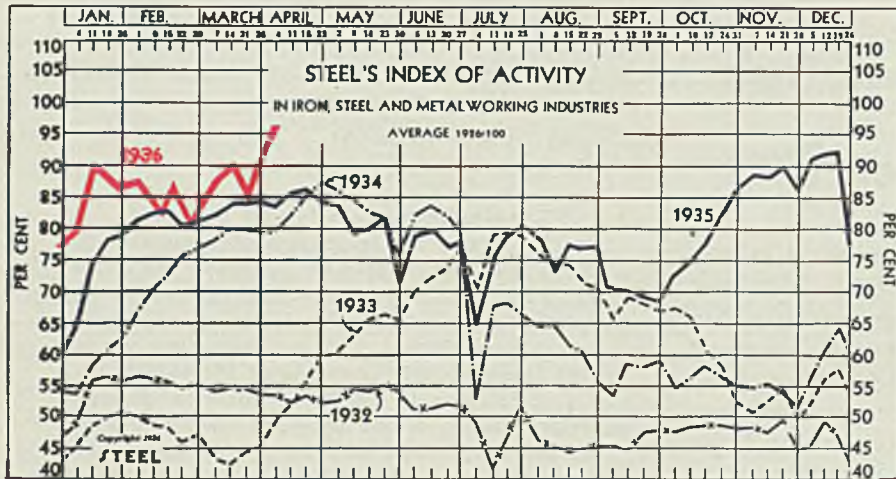
This is the doctrine of thrift, as opposed to the ballyhoo for waste and recklessness which emanates from so many quarters in our federal, state and local governments.

Perhaps it is impossible, but we would like to see a report from the mayor of a city, the governor of a state, or a President of the United States, accounting for his stewardship in the form, in the detail and in the frankness that are required of an industrial executive when he reports to his stockholders. It would be interesting to lay such a report alongside a typical industrial company report and to compare them. This would enable critics to check the good and bad features of industrial management point by point with the corresponding qualities of political management.

If this could be done, the American public would learn that industry's concern for the rights of the public, employes and stockholders is as earnest as that of the sincerest politician and that its action in behalf of these interests is much more effective.

What is more, the comparison would cause the man in the street to shift his critical attacks from industrial management to political mismanagement.

THE BUSINESS TREND



STEEL'S index of activity in the iron, steel and metalworking industries gained 5.4 points to 96.6 in the week ending April 4:

Week ending	1936	1935	1934	1933
Feb. 1	86.5	81.8	66.9	49.9
Feb. 8	83.8	82.7	70.7	48.7
Feb. 15	85.9	82.8	72.4	48.3
Feb. 22	81.8	80.5	75.5	46.0
Feb. 29	83.4	81.1	76.8	47.4
Mar. 7	87.7	82.0	78.6	43.4
Mar. 14	89.7	84.0	79.9	42.7
Mar. 21	86.0	84.0	79.7	44.6
Mar. 28	91.2†	84.3	79.3	45.2
Apr. 4	96.6*	83.4	79.6	49.1

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.

Industrial Activity Almost Matches 1926 Average

IMPROVEMENT all along the line has lifted STEEL'S index of activity in the metalworking industries to 96.6 for the week ending April 4. This represents a gain of 5.4 from the previous week, sets a new high for 1936, and is the highest point touched by the index since the first week of June, 1930. The nearest approach to the current figure during the recovery period of 1933-1935, inclusive, was 91.9, as of the third week of December, 1935.

Par for the index is 100, which represents the average of the four component factors for 1926. In view of the fact that the current figure establishes a new recovery peak, it will be interesting to check the four components with par. Based upon 1926 averages, par for the steelworks operating rate would be 93.9 per cent of capacity, or

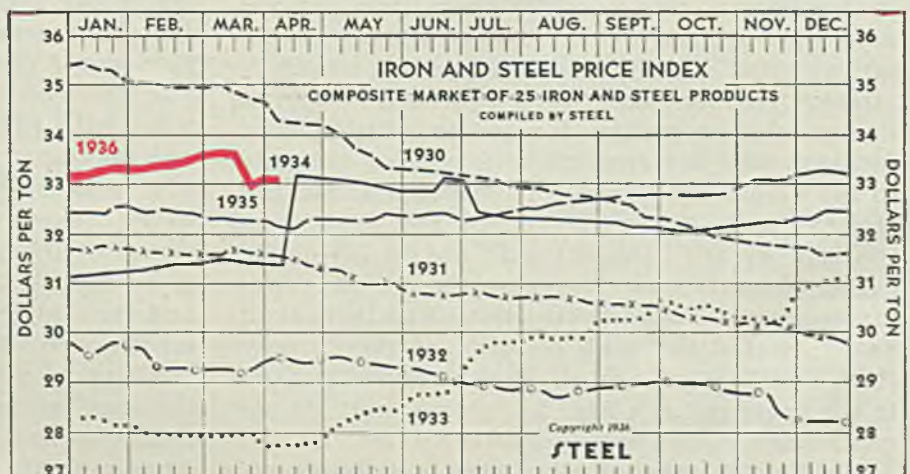
40 points in STEEL'S index. The actual rate for the week ending April 4 was 63.5 per cent, which means 27 points in the index.

Par for revenue freight car loadings is 1,026,000 cars weekly, or 20 points in the index. The current figure is about 600,000 cars, or 11.8 points in the index. Thus the steel rate and car loadings both are below the 1926 average.

On the other hand, weekly automobile assemblies, which averaged 82,708 in 1926 or 20 points in the index, in the week ending April 4 totaled 108,426 units, representing 26.2 points. Power output averaged 1,213,000,000 kilowatt-hours weekly in 1926, or 20 points, whereas the current output is 1,916,486,000 kilowatt-hours, which means 31.6 points in the index. In other words, automobile production and electric power output currently are running well ahead of the 1926 par.

The total of the four components, 96.6 lacks only 3.4 points of equalling the 1926 average. This in itself indicates the strong position of industrial activity today.

	1936	1935	1934
April 4	\$33.13	\$32.30	\$31.33
March 28	33.13	32.33	31.34
March 21	33.05	32.38	31.42
March 7	33.60	32.39	31.43
Feb. 29	33.59	32.42	31.36
Feb. 22	33.54	32.50	31.34
Feb. 15	33.45	32.54	31.33
Feb. 8	33.44	32.56	31.30
Feb. 1	33.40	32.56	31.21
Jan. 25	33.38	32.60	31.20
Jan. 18	33.34	32.62	31.17
Jan. 11	33.33	32.57	31.13
Jan. 4	33.31	32.51	31.10



March Iron Production and Furnace Rate Gain

	Daily Average, Tons		Blast Furnace Rate, Per Cent	
	1936	1935	1936	1935
Jan.	65,461	47,692	48.2	34.2
Feb.	63,411	57,675	46.6	41.4
Mar.	66,004	57,120	48.5	41.0
Apr. ....	.....	55,719	.....	40.0
May ....	.....	55,986	.....	40.2
June ....	.....	51,949	.....	37.2
July ....	.....	49,043	.....	35.2
Aug. ....	.....	56,767	.....	40.7
Sept. ....	.....	59,009	.....	42.5
Oct. ....	.....	63,818	.....	45.8
Nov. ....	.....	68,876	.....	49.5
Dec. ....	.....	68,242	.....	49.0

Steel Operations Continue Sharp Upward Trend

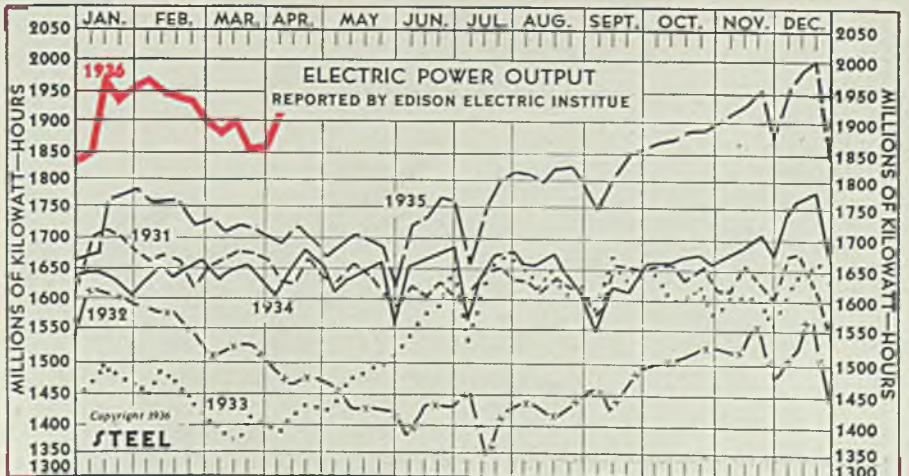
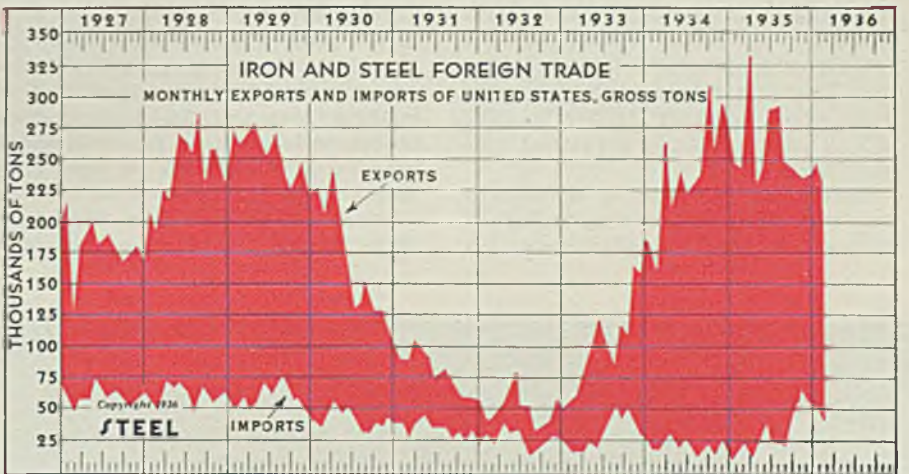
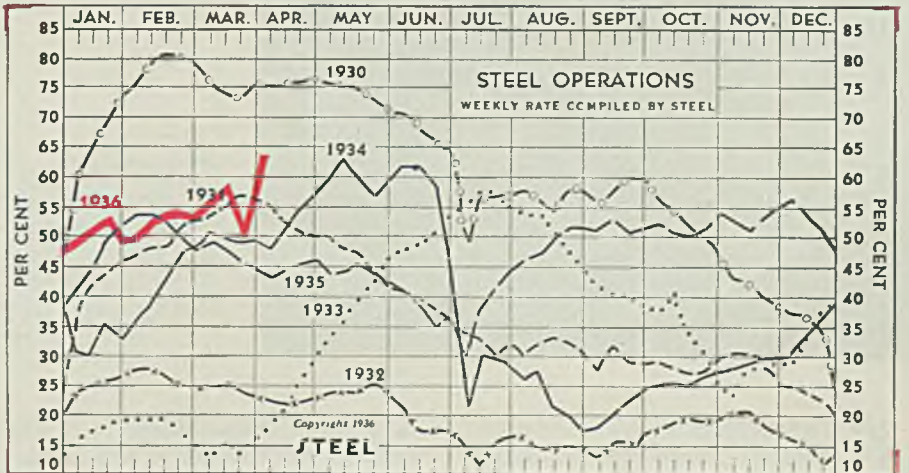
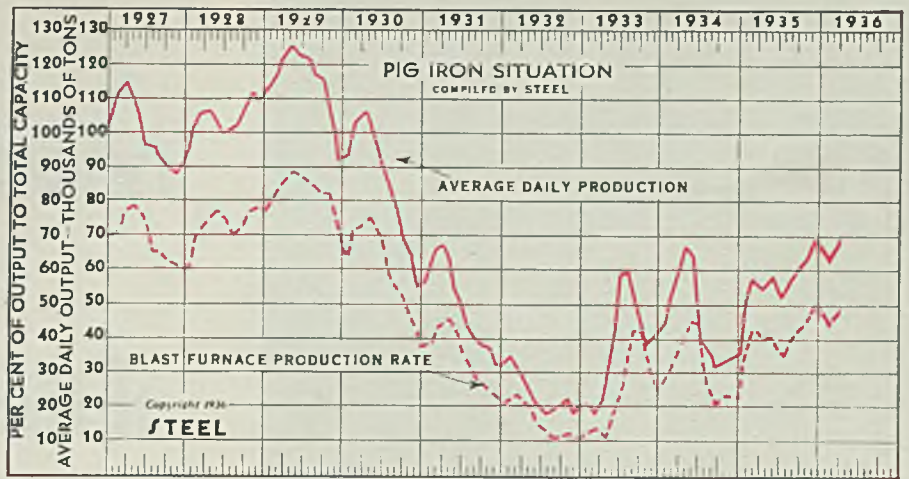
	1936	1935	1934
April 4	63.5	44	48
March 28	58.5	45	49
March 21	50	46	49
March 14	57.5	48	50
March 7	55.5	50	51
Feb. 29	54.5	48	48
Feb. 22	54.5	50	47
Feb. 15	54.5	53	43
Feb. 8	53	54.5	39
Feb. 1	50	54.5	36
Jan. 25	50	53	33
Jan. 18	52.5	51	35
Jan. 11	51.5	45.5	30
Jan. 4	49.5	42.5	31

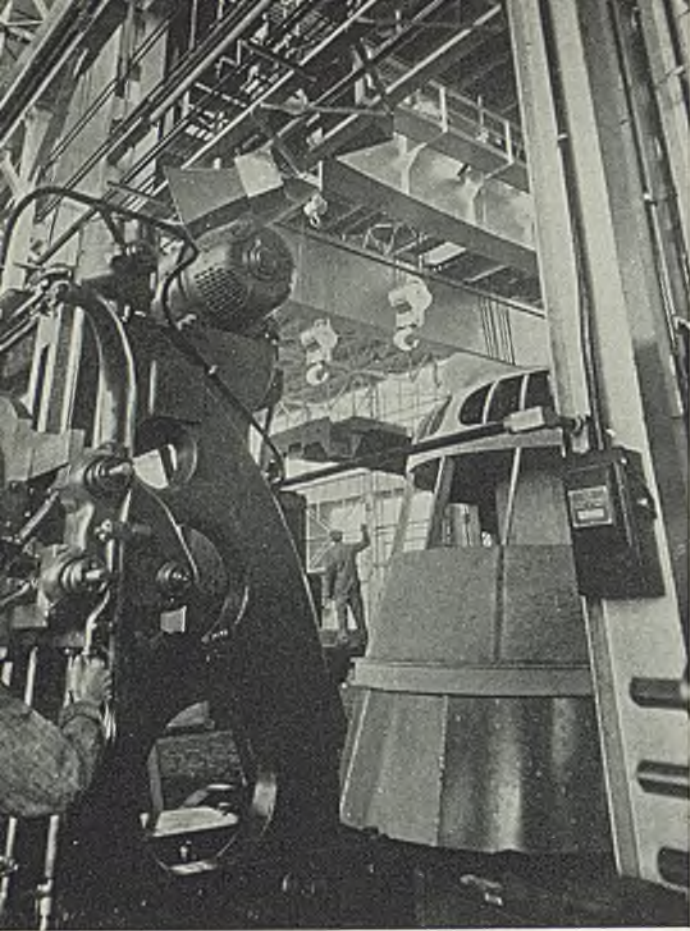
Steel Exports and Imports Decline in February

	1936		1935	
	Imports	Exports	Imports	Exports
Jan.	50,489	241,564	22,784	262,740
Feb.	43,358	213,802	28,905	228,537
March	21,409	323,035
April	28,866	205,336
May	47,719	286,598
June	33,208	289,687
July	31,894	296,802
Aug.	31,312	247,312
Sept.	53,153	244,419
Oct.	59,569	238,358
Nov.	56,637	205,242
Dec.	53,678	239,268

Electric Power Production Shows Sharp Recovery

	Millions Kw.-Hrs.		1934	1933
	1936	1935		
April 4	1916	1700	1616	1399
March 28	1867	1712	1665	1402
March 21	1862	1724	1658	1409
March 14	1900	1728	1650	1375
March 7	1893	1724	1647	1390
Feb. 29	1903	1734	1658	1422
Feb. 22	1941	1728	1646	1425
Feb. 15	1950	1760	1641	1469
Feb. 8	1952	1763	1652	1482
Feb. 1	1962	1762	1636	1454
Jan. 25	1955	1781	1611	1469
Jan. 18	1949	1778	1625	1484
Jan. 11	1970	1772	1646	1495
Jan. 4	1854	1668	1564	1461





Modern Industrial Diesel - Electric

CAMERA study in the new plant showing machine tool operator at the left, wood model of a diesel-electric locomotive at the right, with the 200-ton crane hoisting a large locomotive frame in the background

COMPLETION of the world's first complete diesel-electric locomotive works for the Electro-Motive Corp., division of the General Motors Corp., at La Grange, Ill., in a period of nine months after acquisition of the 70-acre cornfield and pasture which occupied its site, has set a new pace for heavy industrial construction.

The plant was built by the Austin Co., Cleveland, to facilitate the application of progressive production

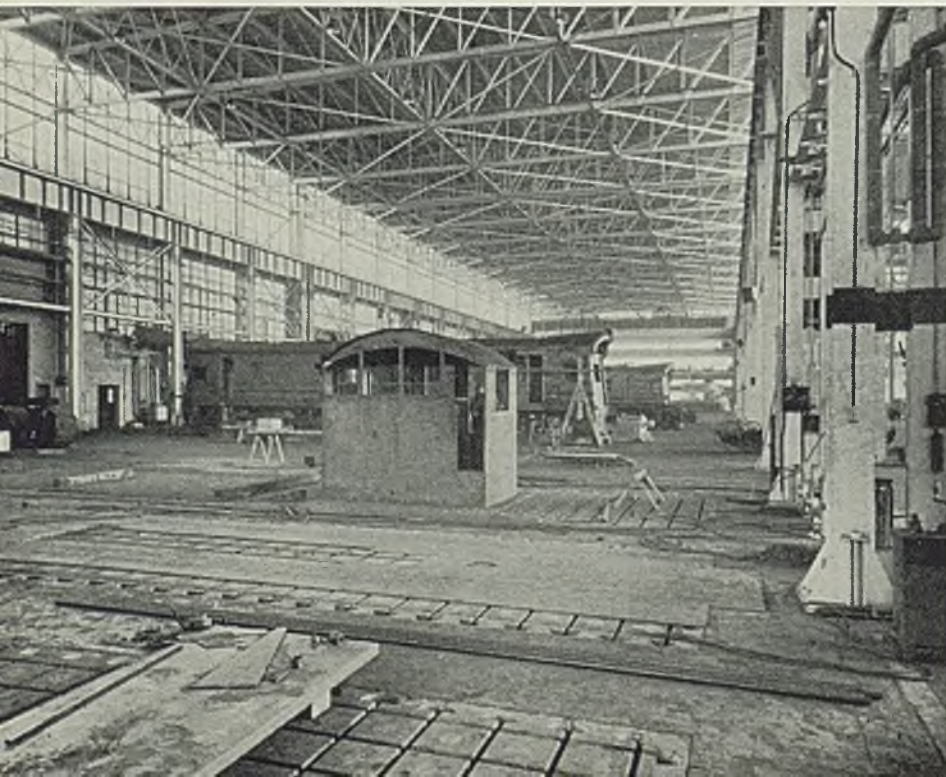
methods in the manufacture of locomotives weighing up to 200 tons.

Electrically welded structural steel throughout nine buildings included in the project affords an unusual application of welding for heavy structural work. Fifty thousand feet of welding rods and $7\frac{1}{2}$ tons of electrodes were required for erection of more than 2000 tons of structural members in the construction.

Much of the welding was done right at the Austin structural shop

in Cleveland, from which 104-foot roof trusses and 65-foot columns weighing 7 and 8 tons, respectively, were shipped in prefabricated state to facilitate erection on the site. An indication of the extent of shop welding is seen in the fact that only 17 per cent of the welding rods and electrodes used on the job were shipped to the site.

The largest building—550 x 170 feet—houses the erection shop and machine shops. It is surrounded by 57,000 square feet of horizontal sash, which encloses the structure even at the corners. The main erection aisle has a clear span of 104 feet, with 49-foot clearance under the roof trusses. It extends for more than 500 feet and consists of 24 locomotive construction bays, most of which are served by track laid transversely in the aisle. The individual bays have been designed for specific steps in locomotive construction and are closely related in function to adjacent facilities for heat treating, shot-

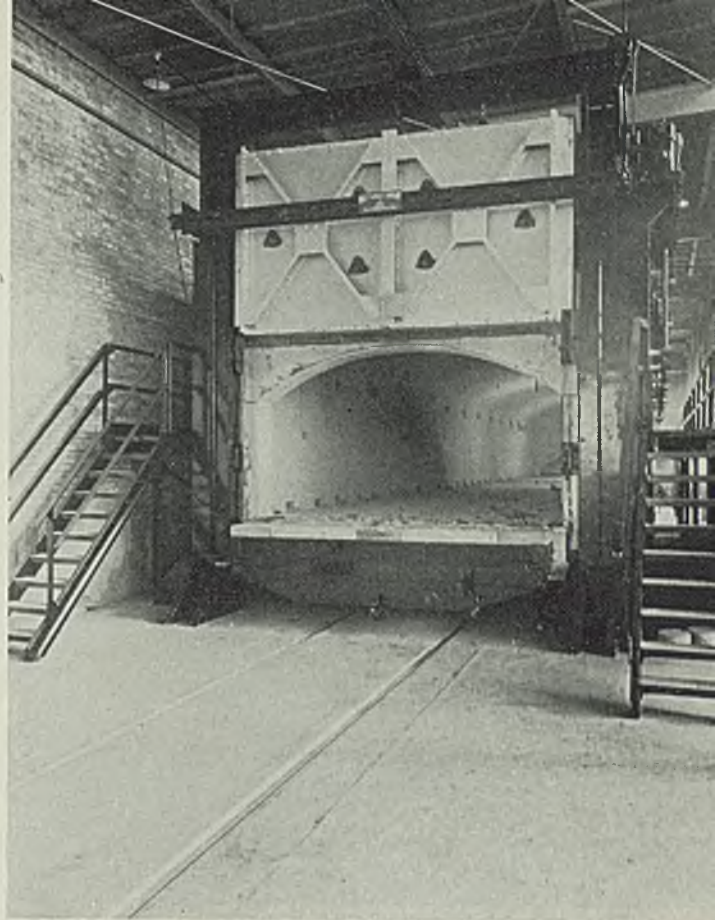


MACHINED and slotted cast iron bedplates serve as foundations for precision welding operations. Plate to be used in locomotive construction and a portion of a locomotive cab are seen on bedplates in the foreground

Structures House

Locomotive Plant

A FLAT car, surfaced with firebrick, transports frames or other engine parts directly from the main aisle to this 22 by 70-foot, gas-fired annealing furnace, designed for heats up to 2000 degrees Fahr.



blasting, painting and the like, which are housed in individual structures opening directly onto the main erection aisle on the east. Track serving these bays connects with 2½ miles of the company's service and test track which is served by a 200-ton track scale and approaches the plant from the east.

Alongside the erection shop and opening into it on the west is the machine shop. This has a clear span of 64 feet and extends the full length of the main aisle. While transverse monitors provide for permanent lighting and ventilation in this part of the plant, the largest section of horizontal sash ever erected closes in its 550-foot west wall with one broad sweep of glass which will be removed when contemplated expansion is carried forward. The machining of all the major locomotive parts occurs in this aisle, while smaller precision parts, instrument panels and the like are finished on a balcony at the south end of the main aisle situated above the shop superin-

tendent's quarters and the shop office.

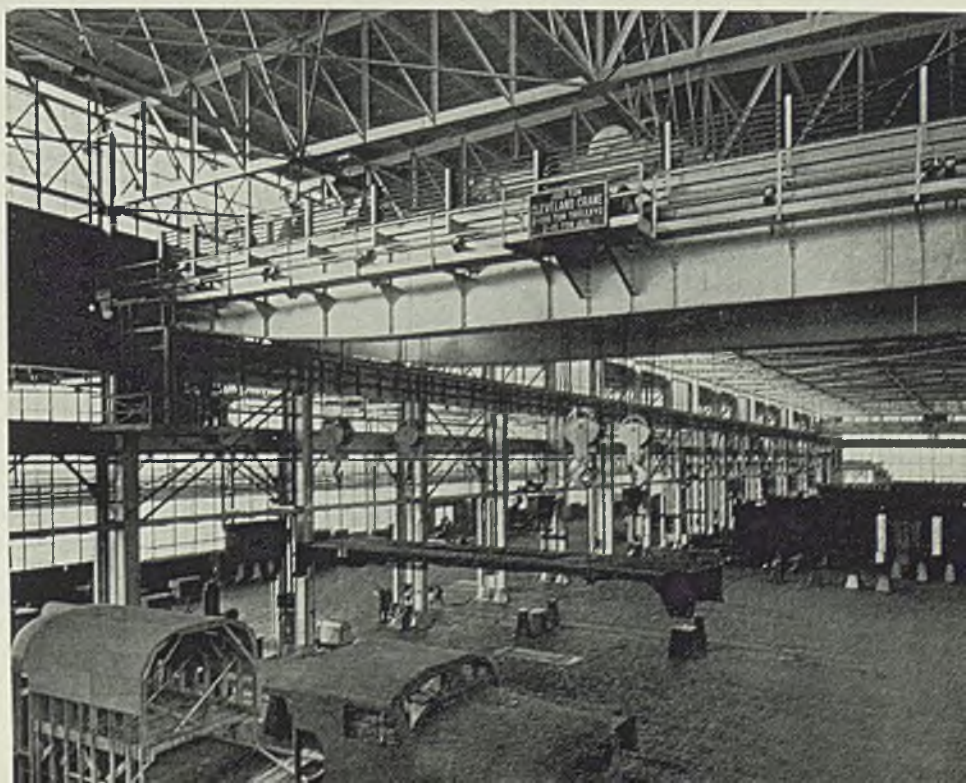
Dies, machine parts and other shop equipment supplies are concentrated in a department which is located at the head of the machine shop aisle.

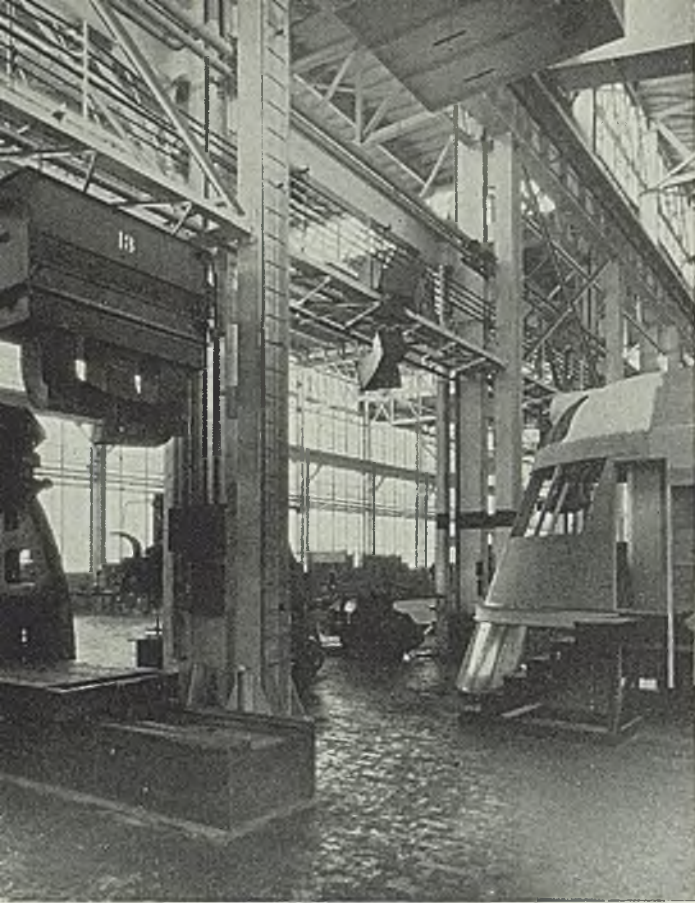
Mechanical handling in these two major areas has been designed for a maximum of flexibility and avoidance of delay. In the main erecting aisle a 200-ton all-welded electric traveling crane, itself weighing 205 tons, has been installed on track support-

ed on the structural columns which separate the main aisle from the machine shop on the west and from the heat treating, shotblasting, paint shop and other structures on the east. The concrete column footings rest on a floor of solid limestone 300 feet thick, which underlies the entire site, about 19 feet below the surface.

This crane, equipped with four 50-ton hooks, has a one-piece all-welded trolley frame and one-piece all-welded end trucks, with all-welded box

MAIN erection aisle is served throughout its 500-foot length by this all-welded crane which has two 100-ton trolleys with two 15-ton auxiliaries. Wood models of locomotives are shown in the foreground





UNIT heaters, loud speakers for a call system throughout the erection shops and lighting transformers which facilitate current distribution are seen in this view

girders and bearings of the MCB type. All gears and pinions are enclosed in welded oil-tight cases which remain oil-tight without the use of packing. All conductors are of angle iron, and roller bearings have been used throughout.

The two auxiliary electric traveling cranes of 30 and 40 tons capacity which supplement handling facilities in the main aisle and the balcony precision machine shop, as well as the 200-ton crane, are equipped with hydraulic bridge brakes and face-plate type controllers. Power to the

550-volt motors is provided by diesel-electric engines on test at the plant. This aisle is also served by a 15-ton gantry crane which passes transversely through the plant at the north end on rails in a double bay 48 feet wide. This track extends 200 feet along an unloading area outside the plant to facilitate bringing heavy materials into the shop. Two 20-ton traveling cranes answer handling problems in the machine shop.

The 200-ton crane represents a noteworthy achievement for the reason that it is the largest unit of

this kind ever welded. Its girders alone, fabricated from plates of 7/16-inch to 1½ inches in thickness, weigh 80,000 pounds each and required three flat cars to take care of their length in shipment. The trolleys were shipped in cars with specially constructed wells in order to negotiate railroad clearances.

A temporary track was laid into the building under two extra heavy welded roof trusses, installed to facilitate erection and future servicing of the crane. Steel blocks were lashed to these trusses to support lifts, the heaviest of which was 52 tons.

The end trucks which carry the crane along the main aisle were set into place on the rails. Then, in order to raise the girders into place about 40 feet above the track level, a special clamp was fitted to each and afforded the grip necessary to enable two locomotive cranes, one on each side, to hoist this load. The same procedure permitted the placing of the two trolleys on the crane girders. When the maximum load of 52 tons was being raised, the two extra heavy welded roof trusses from which it was suspended deflected only ¾-inch at the center.

The facilities for welding throughout the entire plant are adequate to every need in production which utilizes welding extensively. Among these facilities are special cast iron bed plates in several of the bays, machined and slotted to serve as a foundation for precision welding operations.

Current Distribution

Size of the structure and the necessity for the diversified current distribution to all parts of the plant for purposes of illumination, welding and a wide range of machine operations resulted in the installation of individual transformers on alternate columns along the entire length of the main aisle on the west. In this way the necessity for installing three or four substations through the building, each with its own oil-cooled transformers, was avoided and small transformers were provided at 48-foot intervals with three-phase 440-volt feeders carrying current to the lighting transformers which convert this power into a



VENETIAN blinds, indirect lighting and automatic air conditioning provide ideal working conditions in the drafting room. Lighting fixtures are arranged to eliminate shadows on drafting boards

single-phase 220-volt, with 110-volt secondary.

Measured illumination has been provided throughout the plant by direct lighting. Aluminum reflectors with special noncorrosive finish assure undiminished brightness without excessive maintenance. These reflectors carry 1000-watt lamps on the roof trusses 49 feet above the working floor in the main aisle. They are arranged so that the traveling cranes cannot interfere with the light from more than one outlet at one time.

Co-ordination of all the production operations was sought in the layout with the result that the unloading dock, blacksmith shop, annealing furnace, shotblast building, paint shop and warehouse for storage of locomotive parts adjoin the main erection aisle as integral branches on the production line. The annealing furnace, 22 x 70 feet in size, has been constructed to receive the entire frame of the largest locomotives at one heat up to 2000 degrees Fahr. A flat car, surfaced with firebrick, serves as the bottom of this furnace and transports frames or other parts directly from the main aisle over a track leading from the erection shop to the oven itself.

Makes Own Power

At the north end of the main building is a testing room where two diesel engines will be on test at all times. Power generated by these engines is adequate to meet the needs of the plant. Because of the necessity for changing the engines on test at frequent intervals, this section has been fitted with a removable roof and can be served by the two cranes in the machine shop aisle. Adjacent to this engine test room is a locomotive testing pit and the power generated here can likewise be converted into constructive use in the plant.

With this source of industrial power and its own complete water supply system, modern sewage disposal plant, fire protection apparatus, and efficient heating plant, the works could operate entirely independent of all public service facilities. A 1600-foot well, drilled through the limestone bed, furnishes water at a rate of 310 gallons per minute to the 200,000 gallon reservoir, with capacity sufficient to supply the needs of a community of about 2500 inhabitants.

The sewage disposal plant was developed by Austin engineers in co-operation with sanitary health authorities of the state of Illinois. Sewage from the plant runs by gravity into an octagonal basin inside the base of the power house stack, which thus serves a dual purpose, and is pumped from this basin into the sewage disposal plant nearby. Steps leading into the base of the stack

make it possible to clean the basin at all times.

Planning for Future

The layout has been designed to accommodate shops four times the present size without augmenting the service facilities. It will permit extension of the plant to double its initial length without necessitating the installation of additional cranes, and duplication of such extended facilities on foundations partially in alongside the west wall of the present building. In this way, the 200-ton crane, the 40-ton crane and the 30-ton crane in the main erection aisle and the two 20-ton cranes in the machine shop, will be available for service over an area double that of the present structure.

After the present plant has been doubled in length and it becomes necessary further to expand the facilities alongside, the existing wall of horizontal sash enclosing the machine shop on the west will be removed. Column footings and columns on this west wall have been constructed in anticipation of this development, so that nothing further need be erected to support the roof on this side of the extended machine shop, and only stub columns to carry the crane girders.

A three-story and basement office building of modern design serves as business office and headquarters for the engineering staff, which has been provided with a drafting room occupying the entire upper floor. A complete air-conditioning system has been installed in the office building, with automatic controls to cool the air in summer and circulate and humidify warm air in winter. A cafeteria, located in the basement, is available for use by office employes and executives, with service from a kitchen in this building which is the source of meals transported to workers in the plant by means of motorized facilities. A ramp connects the kitchen and the plant, while a covered 15-foot passageway makes it possible to go from the office building upper levels into the plant without going outside.

Location of the office building is such that it will be equally accessible to all sections of the plant after extension of the initial facilities to four times the present size, as this has been contemplated from the outset.

Modern lines, most strikingly introduced in the office building and main erection shop, also characterize the power plant and secondary shops. Concrete, steel and brick construction has been employed in all the buildings, with two-tone brick to accentuate horizontal lines in the architectural detail throughout the group.

The 74-acre site at McCook, 14

miles southwest of Chicago, was the sixth examined by engineers before a selection was made. The unusually heavy loads, the necessity for adequate area and removal from quiet residential areas, plus the urgency of locating where adequate labor and residence accommodations were available, finally dictated selection of the farm site in March, 1935.

Now, back 800 feet from the main highway, into a hollow which acts as a protecting barrier against resounding noises inescapable in heavy locomotive work, office workers, skilled mechanics, laborers and executives drive over the company's own 30-foot right of way from homes in LaGrange, Lyons, Berwyn and Oak Park.

Their offices and workshops bear as little likeness to the farm which they replaced as the products of their workmanship bear to forerunners on the rails.

Manual for the Company Doctor Solves Problems

Industrial Medicine, by W. Irving Clark and Philip Drinker; cloth, 262 pages; published by the National Medical Book Co. Inc., New York; supplied by STEEL, Cleveland, for \$3, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

While this book is written particularly as a handbook or reference book for the general practitioner entering industrial medicine, it provides valuable information to the management of industrial concerns operating or inaugurating medical departments. The authors have endeavored to clarify the general practitioner's knowledge of what industrial medicine is, to assist him in understanding conditions under which his patients work, to discuss his contacts with industrial medical departments when one exists in a neighboring industry, and to inform him of standard practice in the industrial field of medicine.

Industrial medicine is defined simply as complete medical service to the industrial unit involved.

It is pointed out that medical problems in the industrial plant may be divided into two groups, maintenance of the health of workers and diagnosis and treatment of miner sicknesses and injury. Prevention of industrial disease is largely an engineering problem, as its basis is the separation of the toxic or irritating substances from contact with the worker. The industrial medicine department, however, must co-operate with the engineering department by discovering the health hazard, determining its distribution and pointing out its origin. Then the engineer is able to eliminate the source of danger.

Search for NEW PRODUCTS—

How Shall It Be

Directed Intelligently?

ACHIEVING increased volume of business is seldom merely a problem in selling. First you must have the right product to sell. That may seem too obvious to mention, but the fact is that in these days of rapid changes many concerns fail to recognize new trends soon enough and so waste much time and exert super-human selling effort bucking a trend which has set in against the once popular product on which the business was built. It is always well to face the facts and search for products which are "coming in," especially if yours is "going out."

But the search for new products is always time-consuming and usually extremely discouraging. Most concerns turn the problem over to some executive who already has about as much as he can do in connection with his regular job. If any real search is made it is usually carried on without adequate plan, and without a clear-cut knowledge of just what type of product is needed. Usually the search consists of a passive but receptive waiting for the right product to be submitted. As a result most of the time is wasted in sifting the hundreds of products which are brought in by hopeful inventors or promoters. Most of them turn out to be entirely unsuitable. It is far more effective to carry on an active search under the supervision of men who have in addition a thorough knowledge of the business and of the capabilities of their organization, wide contacts both in and out of the industry involved.

Personnel Habits Studied

Finally, time and money will both be saved if the characteristics of the desired new products are so thoroughly studied and crystallized as to narrow the field. Strange as it may seem, this is too seldom done, with the result that exhaustive study is given to products which should have

BY L. M. DEMAREST
L. M. Demarest & Associates
New York

been rejected at first glance. Such products may have much merit in themselves, yet not fit the specifications of the particular manufacturer.

It is most important to select a new product which fits in with the training, experience and thinking of the existing organization. Typical of the things to be considered first are: Is the organization accustomed to large-scale mass production, to recurring short runs, or to strictly job production; does it think along the line of extreme accuracy, close tolerances and fine finish? Does it pay more attention to appearance or to utility?

In taking on the search for new products the most difficult thing often is to determine along just what lines the organizations think. Usually they will tell us what kind of productive equipment they have and through what channels they sell, and feel that is all we need to know. The fact is every business is different and the greatest difference is not in the equipment but in the experience and habits of thinking of the organization. Two metalworking plants might well have identical shop equipment and yet a product which would be admirably suited to one would be wholly unsuitable for the other.

Before starting the search for a new product the management should make, or have made, an analysis not only of the equipment and selling methods but also of the organization's experience and method of thinking. Even the management may be unable to set down on paper a clear statement as to the lines the organization's thinking takes—in spite of the fact that it may be doing able thinking. Often it is necessary to submit the officers and directors

KNOWLEDGE of what is happening in related or even unrelated industries may save much wasted money and effort in new product development.

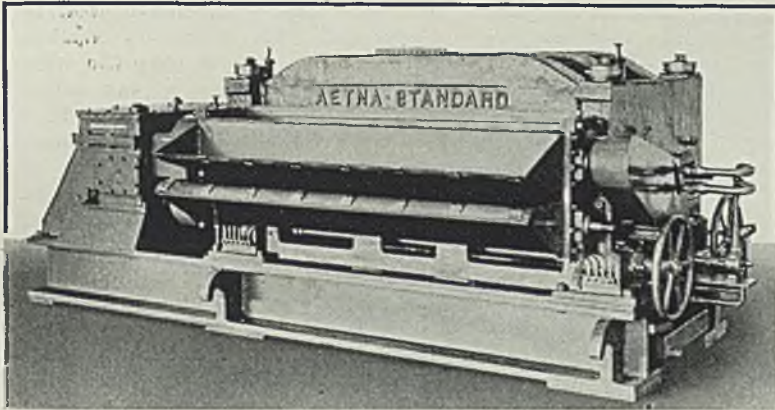
of a company to what amounts to a cross-examination before obtaining that all-important information. Thinking along certain lines has become such a part of most men that it is hard for them to define how it differs from the thinking of others. Once this is defined, the search for new products becomes much simpler. Consider an example, to show how such analyses narrow the field.

One of our clients has a plant in which is made a single product consisting of tin plate and wire in a relatively few sizes and styles. This product has been made in substantially this form by four generations of the same family. Until within the past 15 years or so the product had a good year-round sale. It was considered a necessity by millions of people. Then developments in another industry began to cut down the market. Summer sales especially suffered, so something else was sought to fill in during that period.

Past Experience Considered

At first glance it would appear that any product made of tin plate and wire would be worthy of consideration, but the fact is the success of the above plant has almost no relation whatever to its ability to manufacture the product. It is due primarily to the fact that efforts and thinking have been confined to a certain field of usefulness for this product and the company is pre-eminent in that field—an authority on the use of this product. More thought is devoted to the uses to which the product is put than to the product itself. This company could be just as successful with a product made of paper or castings, or any other material, provided it fitted into a field of usefulness where the firm's knowledge and experience would apply.

Wide contacts with many branches of industry are desirable, for no company or individual has a monopoly on ideas, and ideas which are created in



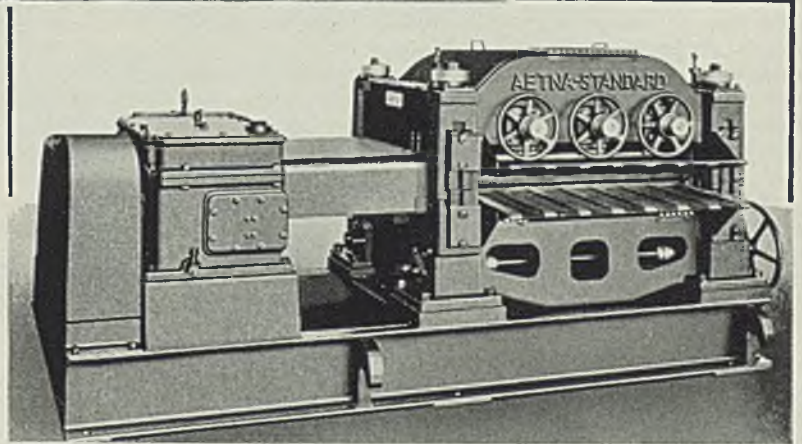
Used as a Rectifier for automobile body sheets

BACKED-UP LEVELERS

Installed in twelve different steel and automobile plants



For Production leveling of all material 1/4" to 36 gauge.



For precision leveling of high grade flat material.

**HAVE RESULTED
IN REPEAT
ORDERS . . .**

We have introduced a new conception of COMMERCIAL FLATNESS and a more practical method of REDUCING MECHANICAL STRAINS in sheet metal by means of our Backed-Up Levelers. Thirty of these machines, some in service more than two years, are giving results not obtainable on machines of other types, and are performing the following duties in high production service: In TIN MILLS for producing plate of greater flatness and conditioning plate for forming—SHEET and STRIP MILLS for flattening temper mill stock, producing full finished sheets of better quality, reducing mechanical strains, leveling enameling stock, galvanized sheets, terne plate and reclaiming aged material—AUTOMOBILE PLANTS for improving the drawing quality of body and fender sheets, reclaiming old stock and salvaging scrap.

Write us for data on Backed-Up or our improved Two High Levelers.

THE AETNA-STANDARD ENGINEERING COMPANY
 CONSULTANTS • DESIGNERS • BUILDERS
 STEEL AND NONFERROUS INDUSTRIES
 YOUNGSTOWN « OHIO » U. S. A.

one industry may be most helpful to some other industry in an entirely unrelated line.

For example, one company recently spent thousands of dollars for the rights to a process and in developing it. Had we known what they were doing we could have told them of a different and much better process for accomplishing the same result. Their new and expensively developed process was obsolete before it was put

into use, and they ended up by using the other process under a license arrangement.

Many similar instances could be cited of how lack of knowledge of what is happening in other related or even unrelated industries affects the search for new products. Knowledge of them may save much wasted money and effort. Ignorance, through lack of sufficient contacts, is nearly always expensive.

for the largest of manufacturing equipment. This planer is capable, for instance, of machining the ways of six gear finishers at one setup, with the bases mounted three in a row and two abreast on the planer table. In the normal production of equipment, machine bases are routed to this planer direct from the filling and priming room.

From the planer, bases and other parts of the equipment being produced are transferred to one or more of a group of horizontal boring, drilling, and milling machines graduated in size according to the type of work to be performed. The largest of these (see accompanying illustration) is a single-spindle model, while the others are of the double-spindle type.

To the rear of the larger equipment, which is arranged along a wide central aisle, are a variety of smaller machines including drill presses, lathes, shapers and the like. On these, smaller machine tool parts are produced. Some parts are turned out in the adjoining "main" plant of the company and transferred directly from there to the assembly "line".

Assembly of machine tools is carried on progressively from almost one end of the new wing to the other. The job of transferring bulky equipment in process from place to place to the assembly "line".
(Please turn to Page 96)

Tool Company Expands Facilities for Building Special Machinery

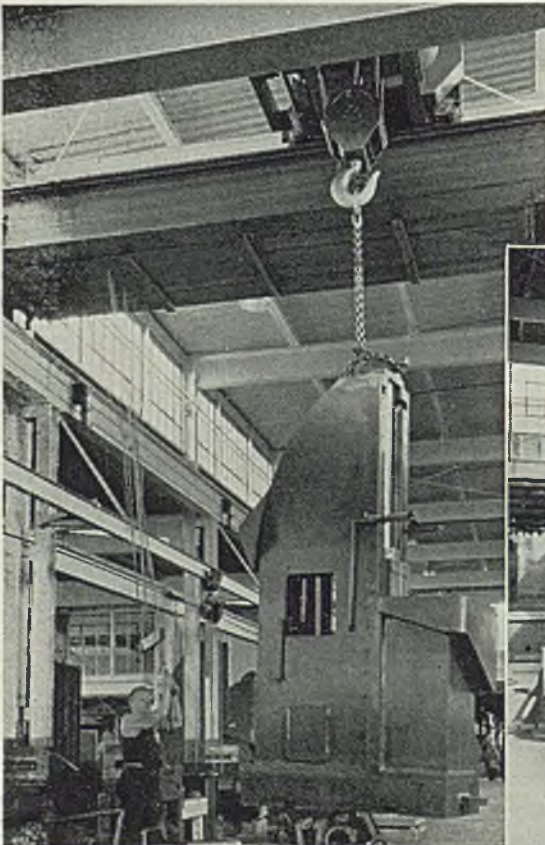
FOR the second time in five years, Michigan Tool Co., Detroit, has expanded its manufacturing facilities in line with increasing business and a broadening of the company's products. The present expansion, in the form of a 20,000-square foot wing, adjacent to the main plant, has been completely equipped and tooled for the production and assembly of special machinery.

During the past few years, Michigan Tool has become active in the design and building of gear production and checking equipment and has built up an extensive produc-

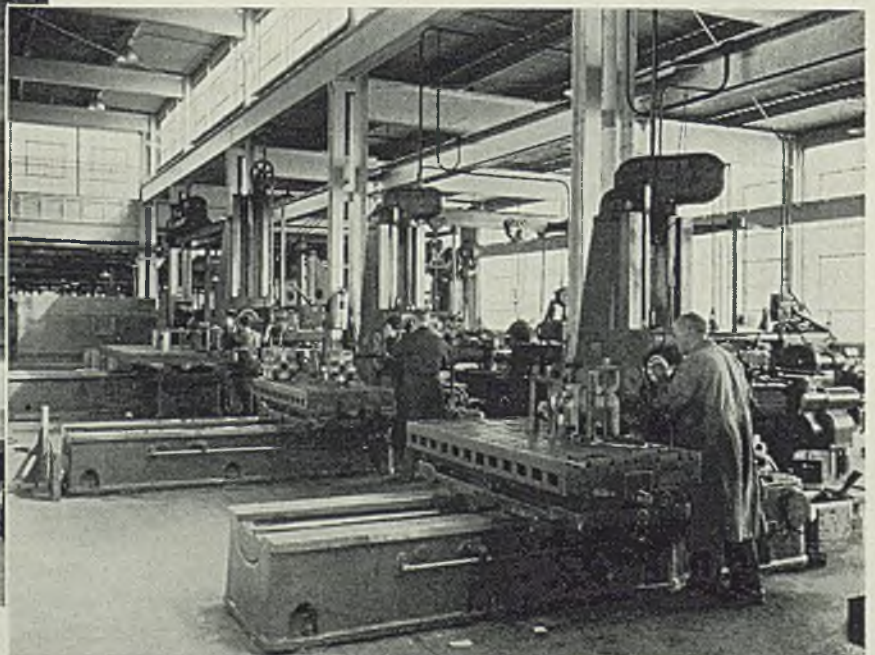
tion engineering and design staff. The net result has been a further extension of manufacturing and design activities to include special machinery of all types — designed and built to solve other production problems of its customers.

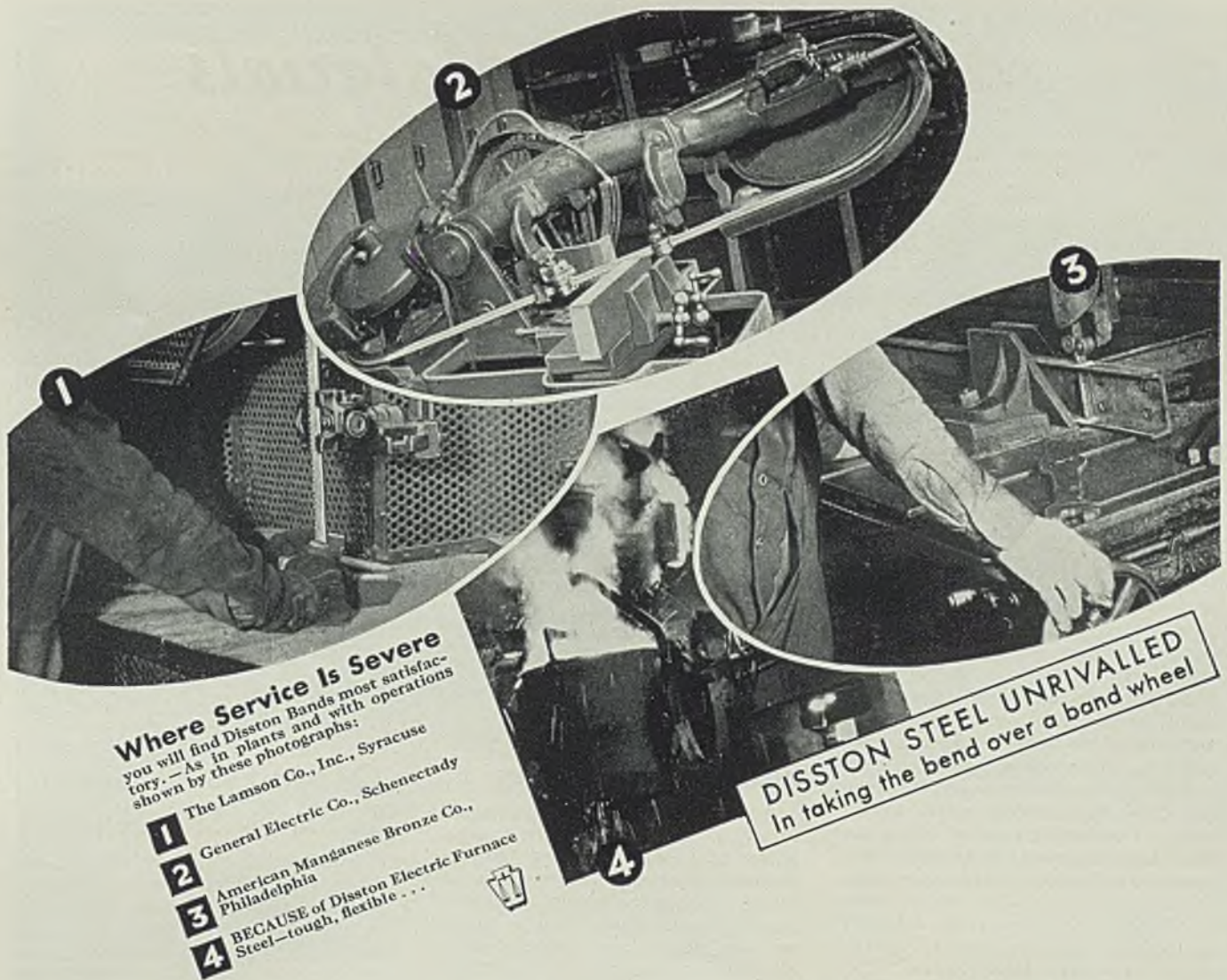
Production equipment in the new wing is of the latest type, enabling rapid and accurate production of equipment, complete from the snagging of the rough castings to the spray booth painting and sludging of the finished product.

Included in the new equipment is a large planer for machining bases



BELOW is shown a group of three boring mills engaged in boring, drilling and milling heads and other parts for special machine tools in production. At the left, the crane which serves the new wing is lifting a 25-ton broaching machine housing in process of assembly





Where Service Is Severe
 you will find Disston Bands most satisfactory. — As in plants and with operations shown by these photographs:

- 1** The Lamson Co., Inc., Syracuse
- 2** General Electric Co., Schenectady
- 3** American Manganese Bronze Co., Philadelphia
- 4** BECAUSE of Disston Electric Furnace Steel—tough, flexible . . .

DISSTON STEEL UNRIVALLED
 In taking the bend over a band wheel

Uniformity in steel and heat treatment
Hardness in every tooth identical
Flexibility . . . speed . . . production

Disston Metal-Cutting Band Saws stay sharp, cut fast, work better on machines: do more work. Made of Disston steel, there is a Disston Band to meet every need for shape and size of teeth, set, speed, feed. Disston service goes with Disston Saws. Tell us what you are cutting. We will work with

you for better results in production volume, time, quality, economy!

Henry Disston & Sons, Inc., 405 Tacony, Philadelphia, U. S. A. *Branches:* Boston, Chicago, Detroit, Memphis, New Orleans, Seattle, Portland, Ore., San Francisco, Vancouver, B.C. *Canadian Factory:* Toronto.

DISSTON FLEXIBLE BACK
Metal-Cutting Band Saws

"Band Saws" and other Metal-Cutting Manuals, FREE. Simply write name and business address on margin below. Clip and mail to DISSTON, 405 Tacony, Philadelphia.

Methods and Materials



Use Herringbone Conveyors To Speed Car Unloading

Gravity herringbone conveyors, replacing trucks and elevators, have greatly simplified the unloading of raw materials from railroad cars to the basement warehouse of the Westinghouse Lamp Co., Trenton, N. J. The more efficient unloading was necessitated by double production as a result of absorbing another plant with corresponding increased input of raw material.

Herringbone conveyors slow up the sharp descent sufficient to protect materials against damage or breakage and to allow handlers ample time to load the skids. Three conveyors, such as the one shown in the accompanying illustration, equally spaced along the side of the building, make it possible to unload as many cars simultaneously. By the former trucking method, two cars at the most could be unloaded simultaneously, a condition partly the result of restricted platform area. Cars are still unloaded by hand trucks, especially for those materials too fragile to shoot down conveyors, so that altogether, five cars may be unloaded at one time.

The Trenton plant, a single, narrow

building, receives the bulk of its raw materials and lamp parts from a lone track siding. In the past, the use of hand trucks and elevators was slow and tedious, frequently holding up supplies at times of peak production. Congested truck traffic often tied up elevators that should have been delivering supplies to the production line on the top floor. Frequently, too, it was necessary to truck materials to the opposite end of the building from the elevator on which they were lowered to the basement warehouse.

\$ \$ \$

Electric Steam Generation Produces Large Saving

A manufacturer of electric motors formerly used an oil-fired steam boiler to supply steam at 120-pound pressure to four molding presses used in manufacturing commutators for single-phase motors. The commutators are insulated and bonded with a phenolic resin. This department frequently operates three shifts per day. During slack production, it is sometimes necessary to operate only one press during a shift. Electric steam generators were adopted as a result of a heating survey which in-

dicated their practicability and desirability for this application.

Operating data gathered over a period of a little more than a year indicate that the saving originally estimated has been achieved and that an additional advantage not originally considered, has been obtained—closer control of steam pressure resulting from the individual steam generators. This results in a more uniform mold temperature, which, in turn, is reflected in improvement in the mechanical qualities of the molded product.

\$ \$ \$

Oil Bath Expands Bearings To Provide Shrink Fit

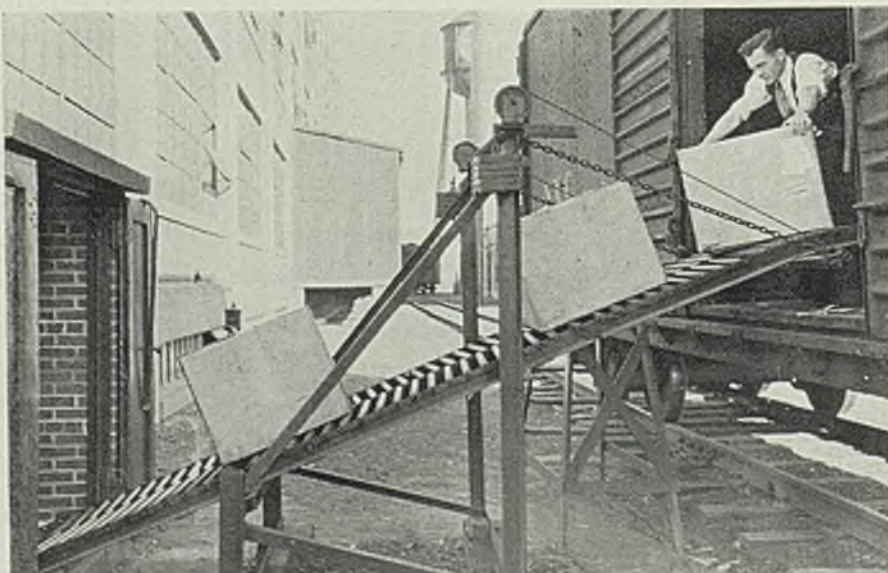
In assembling of machinery, a tight fit between parts frequently is essential. An example is the fit of the roller bearings on the rear wheel shaft of a well-known tractor. To obtain a perfect fit without strain, the inner cone of the roller bearing is placed in a small oil heating pot in which the oil is maintained at a temperature between 160 and 180 degrees Fahr. by an electric immersion heater with thermostatic control.

When the hot oil has properly expanded the roller bearing, the bearing is slipped over the rear wheel shaft and a tight fit is obtained when it cools. Use of the oil heating pot has speeded up this assembly operation and has made possible uniform results in fitting.

\$ \$ \$

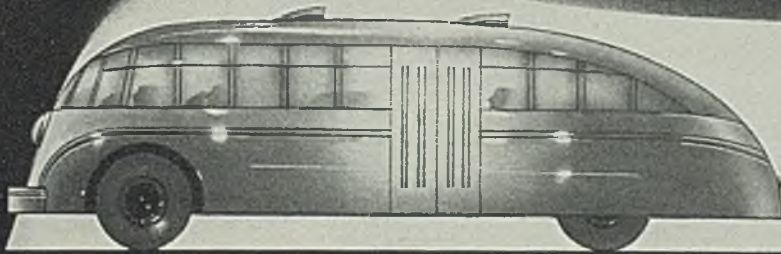
Nitrided Cylinder Sleeves Made from Special Iron

A special grade of iron for cylinder sleeves to be nitrided on the bore surface, has the following analysis: Total carbon, 2.93 per cent; graphitic carbon, 2.31 per cent; combined carbon, 0.62 per cent; phosphorus, 0.058 per cent; sulphur, 0.029 per cent; manganese, 0.76 per cent; silicon, 2.69 per cent; chromium, 1.28 per cent; vanadium, 0.16 per cent; molybdenum, 0.24 per cent; and aluminum, 1.01 per cent.



Gravity herringbone conveyors, which slow up the sharp descent, are used at this eastern plant to unload raw materials and supplies from car to basement warehouse

FREE! Send for our handy celluloid vest pocket size "Hardness Conversion Table." Quickly gives approximate relation between Brinell, Rockwell and Shore hardness values and corresponding strengths of Nickel Alloy Steels. Address Dept. M1



John

Steeds of steel whose sinews are strengthened with **NICKEL**

Although Nickel Steels were the first alloys to be used in commercial quantities for mechanical applications, they have kept abreast of modern engineering developments and are extensively used in all forms of modern transportation.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

Brinell hardness ranges from 800 to 1000 for a depth of 0.004 to 0.006 inches.

\$ \$ \$

Silicon Carbide Claimed To Improve Cast Iron

Improvement of cast iron, particularly that made from high scrap mixtures, results from the use of silicon carbide, it is claimed in a

recent patent. The silicon carbide preferably is added with the iron in the cupola, although benefit is obtained through ladle additions. The amount to be used ranges from 6 to 15 pounds per ton of metal, and in the higher ranges claims are made for a lower sulphur content; reduction in coke required for melting; more uniform structure; increase in spout temperature, and more fluid iron.

Spirals and Other Fabricated Steel Units Permit Delivery of Clean Coal

BY L. O. RICHARDS

Robert Holmes & Bros. Inc., Danville, Ill.

ADVANTAGES of trucking coal for domestic consumption and the appreciation by such consumers for coal that is clean and in good condition, form the basis for a number of fabricated steel products developed by the company

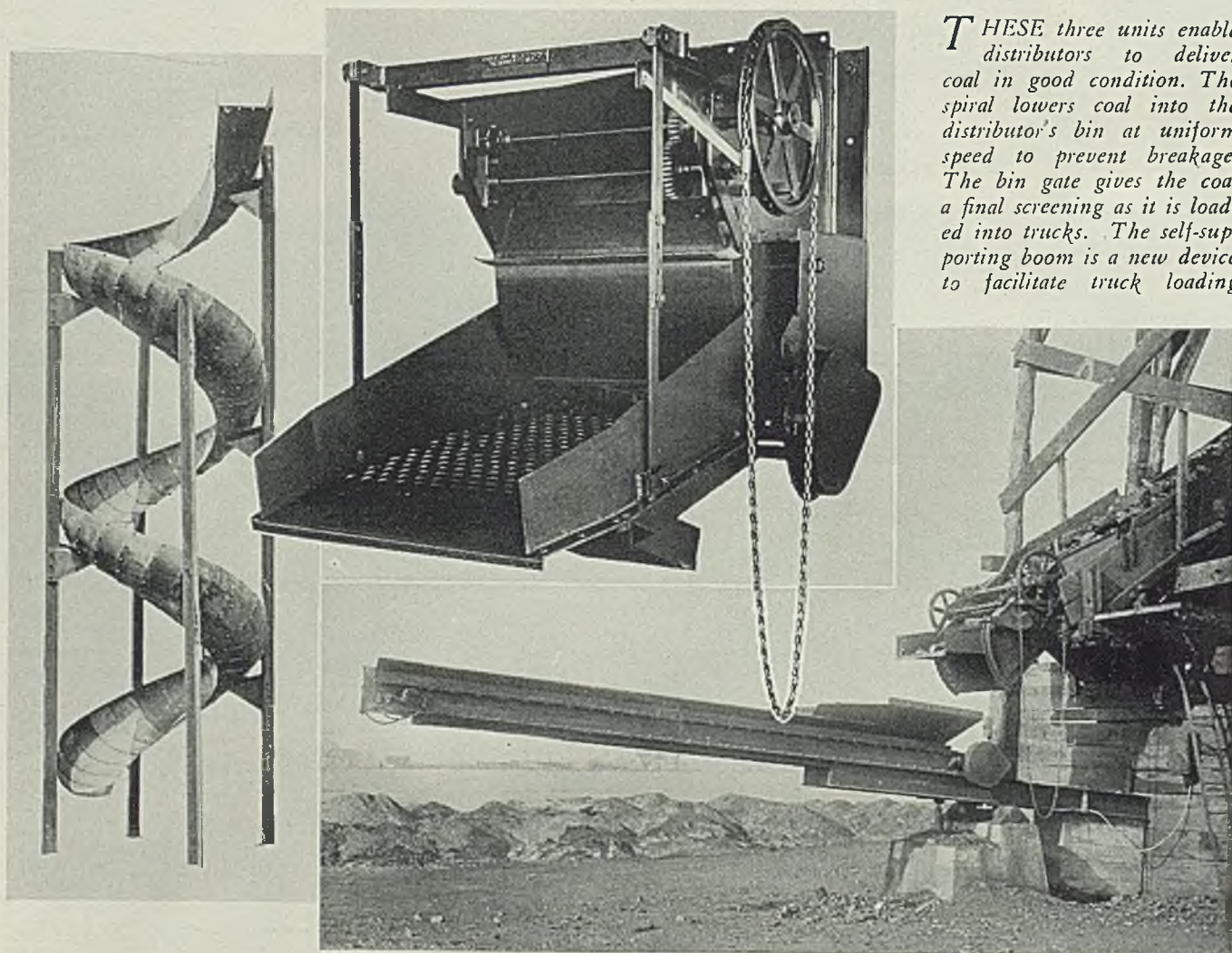
with which the writer is associated.

With the advent of scientific consumption of coal, and the increasing demand for a clean, sized product, much study has been given to methods by which so fragile a commodity may be handled without breakage.

Demand not being uniform, storage bins must be large enough to carry stocks adequate to meet peak demand. Dropping of sized coal from conveyors to the bottoms of these bins causes excess breakage and dust. This problem is solved by using lowering spirals designed to take the material from the conveyor and carry it gently to the bottom of the bin.

Of late our line of spirals has been enlarged and improved. They are available in standard sizes ranging from 3 to 9 feet in diameter, while they can be made as long as desired. We have installed units in which the coal travels 70 feet to the bottom of the bin, while we also install units as short as 3 feet, embodying only a fraction of a turn of the spiral. The spiral is so designed that the lowering speed of the coal automatically is retarded when it begins to exceed a safe limit. Regardless of the distance the coal travels, its velocity remains uniform and it reaches the bottom in a continuous, even stream.

These spirals are of riveted steel construction throughout, using plate in thicknesses of 10-gage, $\frac{3}{8}$ and $\frac{1}{4}$ -inch. Diameter and weight of plate are governed by the size of the lumps

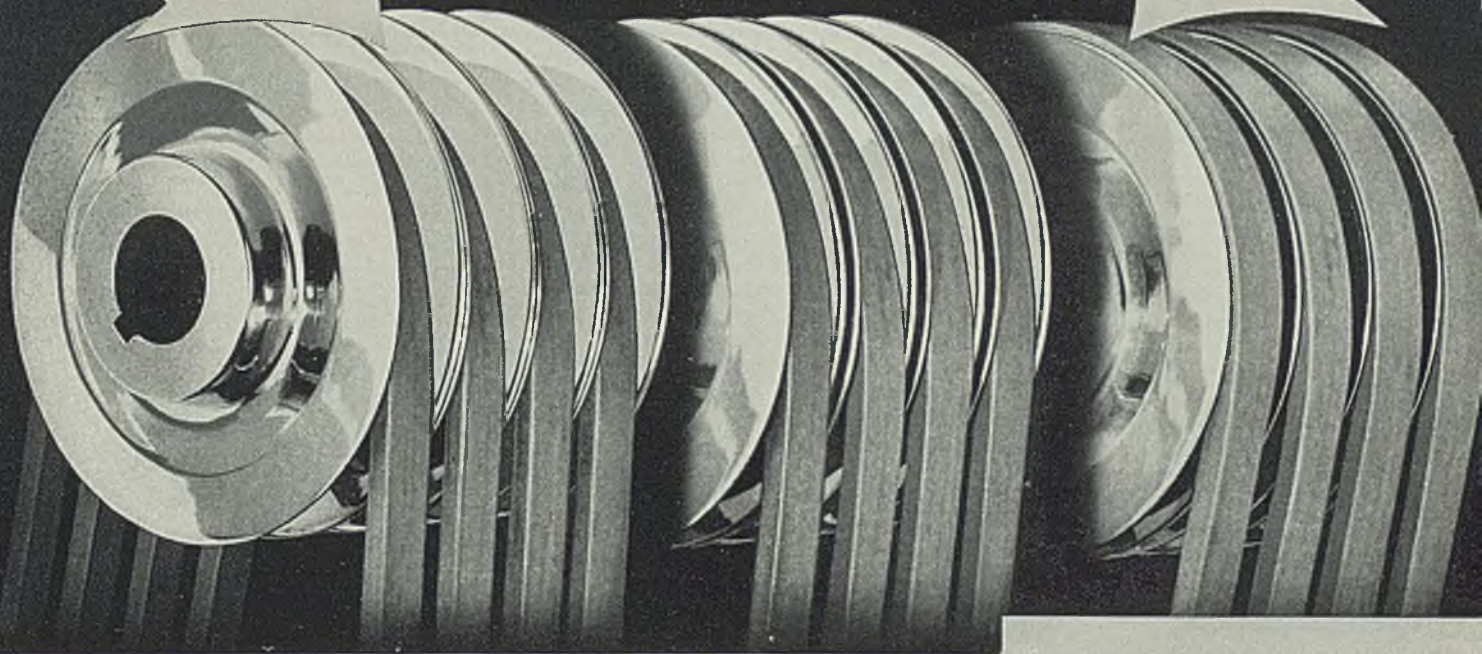


THESE three units enable distributors to deliver coal in good condition. The spiral lowers coal into the distributor's bin at uniform speed to prevent breakage. The bin gate gives the coal a final screening as it is loaded into trucks. The self-supporting boom is a new device to facilitate truck loading

If Increasing Your Profits Bores You...so will this page!



15% TO 25% VARIATION IN SPEED

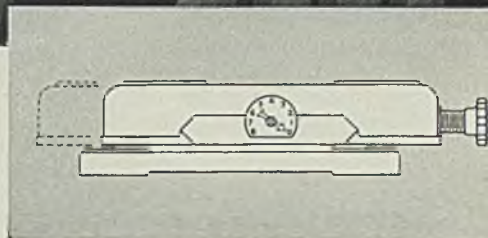


THE new Vari-Pitch Sheave, for Texrope V-Belt Drives, gets the highest efficiency out of your machines and in so doing puts every possible penny of profit into your pocket.

Here is how it is done: by a simple adjustment, which takes but a few moments, the diameter of the Vari-Pitch Sheave can be altered to an extent which will give you a variation in speed of from 15 to 25% per sheave; if both sheaves are of this type the range of variation will be from 30 to 50%.

This permits you to experiment with the minutest fractional increases or decreases of diameter, through the entire range of possible speed variation, to ascertain at just what speed your machinery shows the highest possible efficiency; also you can use the same machines for making different products, some of which may require higher, some lower speed—and do all this without the cost and delay of dismantling the old and buying and installing the new, but merely by a simple adjustment.

Vari-Pitch Texrope Sheaves are made for stationary and motion control.



Straitline Automatic Ball Bearing Motor Base developed for the motion control Vari-Pitch Sheave. You simply turn the hand wheel to alter the diameter of the sheave and simultaneously the base moves forward or backward to maintain proper belt tension.

Write for Vari-Pitch Bulletin No. 1261

Belts by Goodrich

TEXROPE DIVISION
ALLIS-CHALMERS



MILWAUKEE WISCONSIN

to be lowered and the tonnage to be handled. Spirals are supported in the bin by angle columns riveted direct to the spiral plates and consisting of four legs of 4 x 4 x $\frac{5}{8}$ -inch or 5 x $\frac{3}{4}$ -inch angles, depending upon the weight of the spiral.

Normally our spirals are constructed of standard carbon plate but they also are available in copper bearing steel. We have made experiments with abrasion resisting steels and also with various liners for the standard units. The added cost of the original investment, however, does not seem to be warranted excepting in rare cases. Spirals, while designed for coal, also may be used for handling any material which is cubical in shape and which tends to slide in the chute instead of roll.

Coal Screened in Chute

Another fabricated steel product which makes it easier for the coal operator to supply clean fuel to the consumer is our Dust-O-Lator gate. It gives the coal a final screening as it is withdrawn from the bin for delivery to the consumer. It removes any dust or degradations which may have carried over from the primary cleaning plant. Such gates are available in four standard sizes and may be of the overcut or undercut types, for side or bottom discharge, built integral with a shaker screen loading chute.

Operation is automatic so that on opening the gate the screen automatically is placed in motion, the lump of desired size passes to the truck and the fine material is discharged through the screen and returned to the degradation hopper. When the gate is closed, the screen comes to rest. The screen motion is transmitted from a forged steel, automotive type crankshaft operating at 300 revolutions per minute from a 1 or 2-horsepower motor with reduction through gears or V-belt.

Gates and screens are of welded steel construction throughout and are made up of $\frac{1}{4}$ or $\frac{3}{8}$ -inch plate, depending on the material handled.

Recently we developed another fabricated steel product which facilitates the loading of coal into covered trucks. This is a self-supporting boom which is built on the principle of the jackknife bridge, without any supporting cables to interfere with the truck. The boom is mounted on a fixed concrete base at the bin gate opening, using a concrete block as a counterweight. The boom is raised and lowered by means of a hydraulic lift so that the coal may be deposited on the floor of the truck at the beginning of the loading; as the depth of the load increases the boom is elevated toward the roof. The driver then pulls from under the boom, until his truck has been entirely loaded.

These booms are built up of stand-

ard steel shapes and plates welded together throughout, excepting the drag trough which is bolted for replacement. Standard, drop forged, steel, rivetless chain carrying $\frac{3}{8}$ -inch formed steel flights convey the coal into the truck at a rate of 75 tons

per hour. Motor starter and drive are assembled at the tail end ahead of the counterweight. A complete unit, with flights 18 inches wide and with capacity for conveying a distance of 18 feet, weighs approximately 3500 pounds.

Joins in Tear Gas Projectiles Are Made by Electric Furnace Brazing

IN THE manufacture of a new long-range projectile for use with tear or nauseating gas, the Lake Erie Chemical Co., Cleveland, has adopted electric furnace brazing as a practical method of providing five strong, gas-tight joints between seven important members of the assembly. The shell, shown in the accompanying illustration, must withstand severe gas pressures without leaking and, because the design embraces certain small complicated parts having surfaces that are difficult to reach, much depends upon the reliability and efficiency of the joint making process.

Shells Resist High Pressure

Electric furnace brazing, in a controlled atmosphere furnace atmosphere, a process developed several years ago by the General Electric Co., Schenectady, N. Y., makes it possible to fabricate the shell with joints that are absolutely tight and able to withstand pressures of more than 3000 pounds per square inch. In one test, the shell failed at a pressure of 3300 pounds per square inch, but the brazed joints remained sound.

Brazing is accomplished in a 20-kilowatt batch-type electric furnace operated at 2100 degrees Fahr. and used in conjunction with a combustion-type furnace atmosphere controller. The latter reforms a mixture of natural gas and air, supplying a reducing atmosphere which acts as a flux for the brazing metal. Both the furnace and atmosphere con-

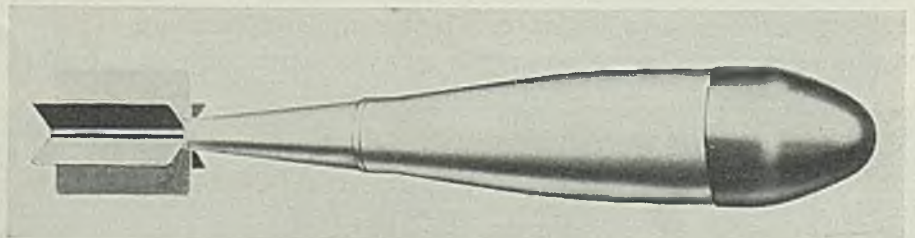
troller were built by the General Electric Co.

The shell parts, assembled with copper wires tightly wound at the joints, are laid on trays and placed in the heating chamber of the furnace for 15 minutes. The copper flows into all parts of the joint by capillary action, and the process is completed by passing the work into the cooling chamber of the furnace, where it remains for an hour during which its temperature is reduced to about 200 degrees Fahr.

The shells thus manufactured are approximately 9 inches long and $1\frac{1}{2}$ inches in diameter. Loaded in a cartridge and fired from a 37-millimeter shoulder gun, they have a range of 500 yards and may be sent through a window at 100 yards. In appearance, they resemble an aerial bomb, being shaped like a torpedo and having a finned tail. When a rapidly moving shell of this type strikes a solid object, a percussion cap is set off, firing an explosive charge which bursts the shell and liberates the compressed gas.

Greater Safety Afforded

Because of its long range and the accuracy with which it can be directed, the new projectile may be used to advantage by police officers. For instance, when attempting to capture criminals barricaded in a building, instead of exposing themselves to gunfire as might be necessary with commonly used hand-thrown grenades, the officers will in many cases be able to fire the new



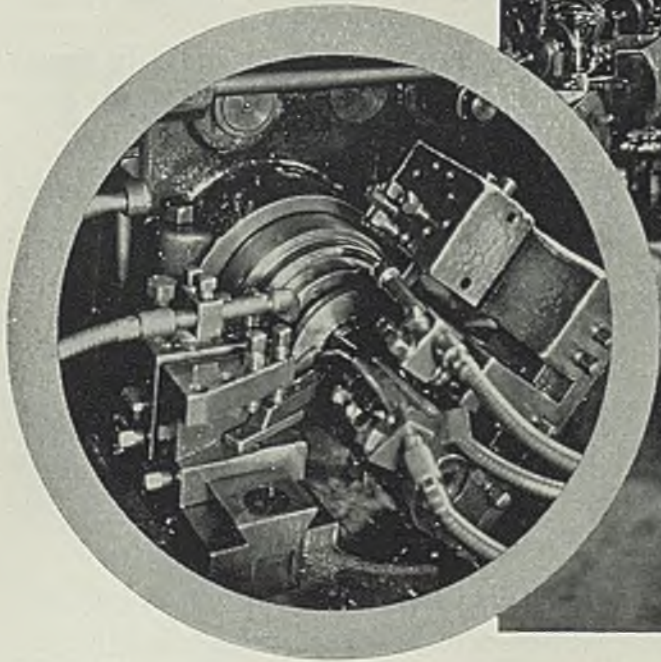
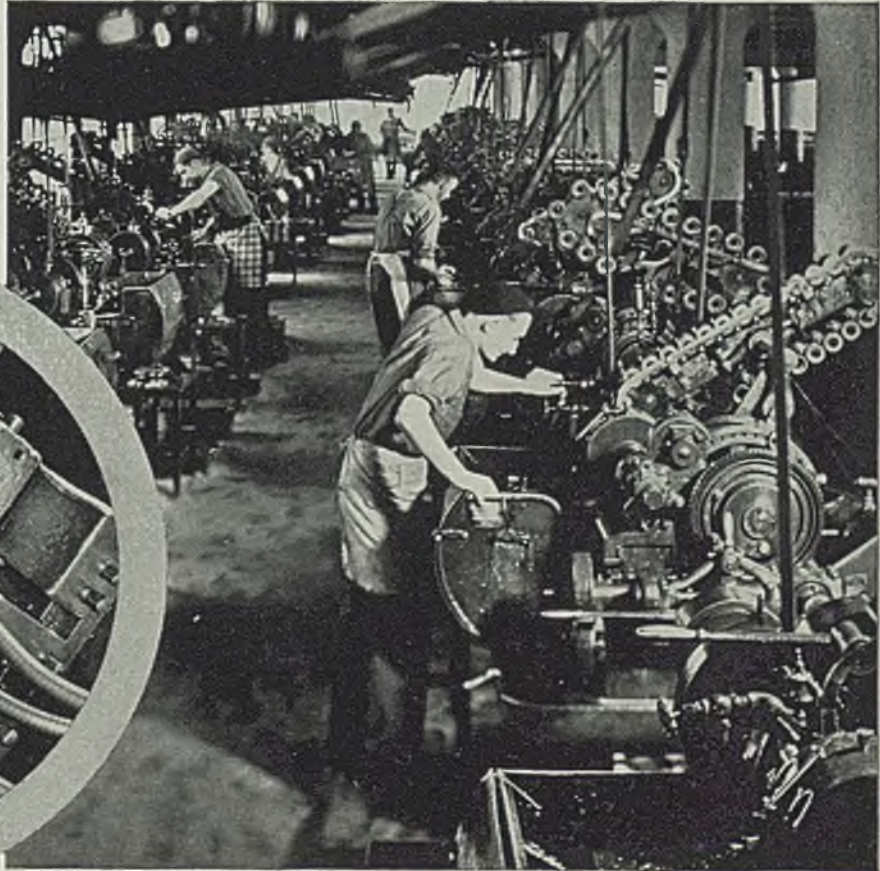
Tear gas shell before being loaded in its cartridge. It is about 9 inches long and $1\frac{1}{2}$ inches diameter. The seven important members are joined together by electric furnace brazing in controlled atmosphere

Working within exact Tolerances

HIGH SPEED MACHINES DEMAND QUALITY LUBRICANTS

(Right) These magazine feed chuckers, in the plant of a great bearings manufacturer, machine annealed forgings. Gulf supplies a quality machine oil which assures continuous operation of this equipment.

(Below) The faces, bore, outside diameter and ball race are machined here. Gulf Seneca Oil C protects this machine against excessive friction and wear.



GULF OILS AND GREASES *Help Maintain Precision Machines at Peak Efficiency*

● Here is the reason why 20 leading U. S. builders of anti-friction bearings use Gulf quality lubricants to protect the costly precision equipment in their plants:

From a complete line of more than 400 oils and greases, exactly the right lubricant can be selected to give maximum protection to each machine in a metal working plant. The Gulf engineer cooperates with the oper-

ating men to the end that the most efficient lubrication practice be adopted. Thus, precision machines are kept operating at peak efficiency, the need for repairs is minimized and waste of lubricants eliminated.

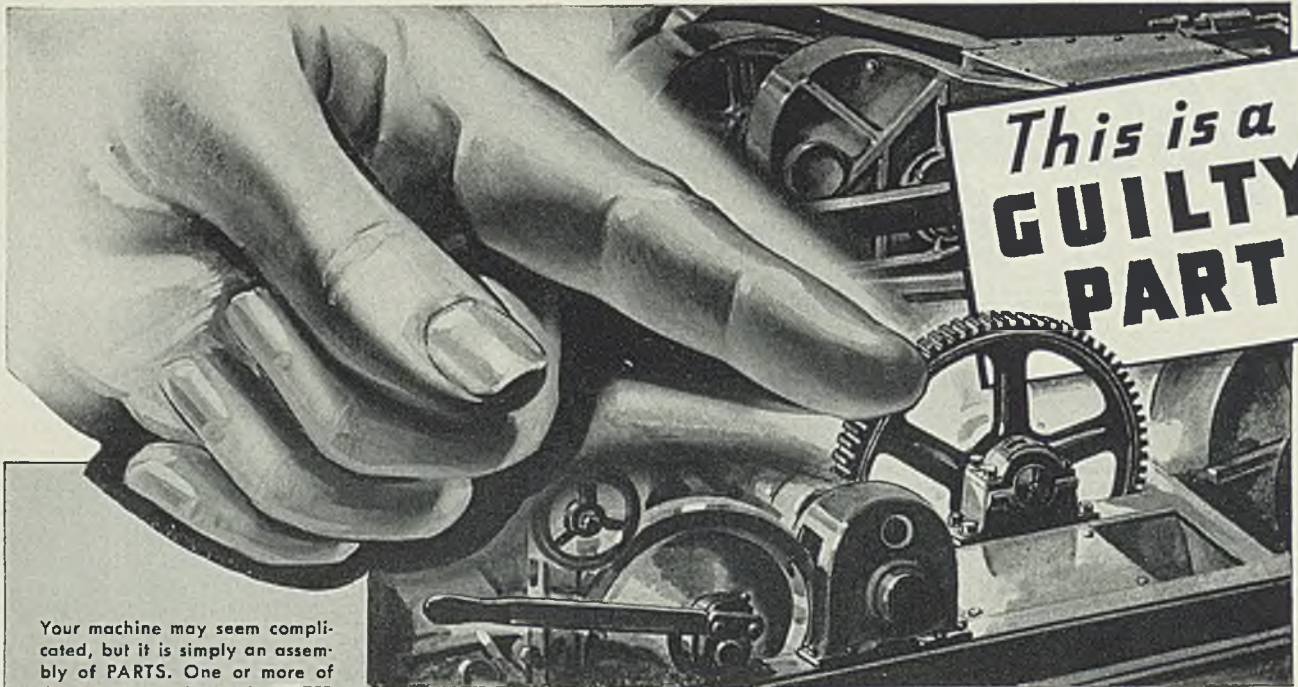
Savings in operating costs invariably accompany this scientific use of lubricants. If you are not using Gulf products, give them a trial.

GULF REFINING COMPANY, Pittsburgh, Pa.

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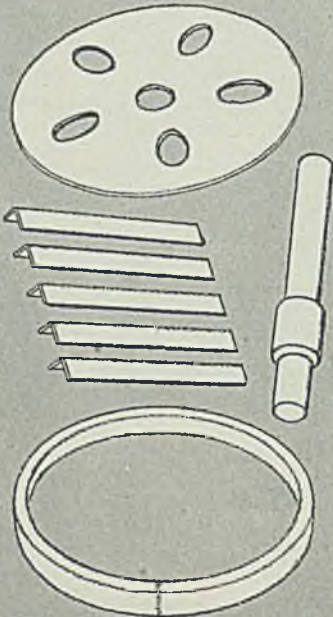
Makers of that Good Gulf Gasoline and Gulflube Motor Oil



This is a
GUILTY PART

Your machine may seem complicated, but it is simply an assembly of PARTS. One or more of these parts can be made BETTER at LOWER COST by "Shield-Arc" Welding.

You can start now. Change one part at a time to "Shield-Arc" welded construction and thus reduce your costs and improve your product. Simply take standard mill shapes and cut them to proper size, like this—



Then assemble and fuse these shapes into a single unit by "Shield-Arc" welding, like this—



The Lincoln man nearby can show you how. He is at your service without obligation.

IT CAN'T "TAKE IT"

★ This cast iron gear could be changed to welded steel construction . . . made impervious to fatigue and impact fracture . . . made lighter . . . and *made for less money*. Until it is changed, it is a GUILTY PART in the manufacturer's product.

The odds are five to one that there is also a GUILTY PART of some kind in your product. Whether or not it is a gear is beside the point. Your machine is an assembly of *parts* and one or more of these parts can be made less susceptible to breakage . . . or lighter . . . or more rigid . . . or quicker . . . or at less cost . . . by "Shield-Arc" welding.

You can find out what this inefficient part is by calling in the Lincoln man nearby. And he will show you how to make it better at lower cost by using standard steel shapes and fusing them together by "Shield-Arc" welding. No obligation. THE LINCOLN ELECTRIC CO., Dept. Y-249, Cleveland, Ohio. Largest Manufacturers of Arc Welding Equipment in the World.

P. S. The above gear has been changed to "Shield-Arc" welded construction. It is now unbreakable—weighs 20% less—costs 10% less.

LINCOLN

"SHIELD-ARC" WELDING

THE LINCOLN ELECTRIC CO.
Dept. Y-249, Cleveland, Ohio

Show me some Guilty Parts in our product. Show me how to make them stronger, lighter, at less cost by "Shield-Arc" Welding.

Firm _____

Name _____ Position _____

Address _____

City _____ State _____

projectile into the building from a position of safety.

Similar projectiles are being made by the electric furnace brazing process, which have a diameter of 3 inches and are intended for use with mortars. Other applications of the brazing process are being developed for making certain types of munitions for war purposes.

Arrange Program for A.S.M. Tri-Chapter Meeting

Cincinnati, Columbus and Dayton chapters of the American Society for Metals will hold their annual tri-chapter meeting at the Alms hotel, Cincinnati, April 21, with the Cincinnati chapter as host. The program will consist of plant visitations in the morning, a luncheon at noon, a technical session in the afternoon and a dinner meeting in the evening. The coal division of the Ohio section of the American Institute of Mining and Metallurgical Engineers will participate in all events except the afternoon technical session at which time it will conduct a meeting of its own.

Plants to be visited in the morning include Andrews Steel Co., Cincinnati Milling Machine Co., Metal Specialties Co., Dalton Adding Machine division of Remington-Rand Inc., Crosley Radio Corp., and Proctor & Gamble Co.

E. F. Davis, chief metallurgist, Warner Gear Co., Muncie, Ind., will address the afternoon technical session on "Modern Gears." This will be followed by the initial showing of a new sound film, "Manufacture of Alloy Steels," through courtesy of the Bethlehem Steel Co. R. S. Archer, Republic Steel Corp., Chicago, and national president, American Society for Metals, will address the dinner meeting on "The Place of Research in Industry."

The afternoon meeting of the American Institute of Mining and Metallurgical Engineers will feature the following papers: "What Not To Expect from a Coal Cleaning Plant," by Byron M. Bird, research engineer, Battelle Memorial Institute, Columbus, O.; and "Coal Cleaning and Screening in Relation to Marketing and Consumers Problems," by J. B. Morrow, preparation manager, Pittsburgh Coal Co., Pittsburgh.

Issues Standards Manual

American Standards association, 29 West Thirty-ninth street, New York, has issued a 12-page pamphlet "A Manual of American Standards," containing an indexed list of engineering and industrial standards and safety codes approved by the association as of March 1, 1936. Prices are listed in the manual.

Welding, etc. . . .



by Robert E. Kinkead

Economic History

TO THOSE who came from the country or from small towns, a mail-order house catalog is more than just a great merchandising organization's advertising; it is a source of entertainment and education. Most large libraries of the country have these catalogs back to about 1913. Engineers who believe that welded steel will replace most, if not all, materials used in homes and farm equipment will find a study of the series from 1913 to 1936 enlightening.

Gone is the old wood icebox; now it is steel, with improved lines. The transformation in kitchen stoves is even more striking. In 1913, gas hot plates and huge cast iron stoves were shown. In 1936, oil stoves and trim gas ranges are shown, with all the smooth, sleek lines of the modern refrigerator. Even farm wagons have gone over to steel. Feed grinding equipment is all steel, and welded.

One cannot fail to find some economic justification for the large increase in strip mill capacity in the pages of these catalogs. The trend toward the use of steel is based on the sound premise of doing a better job for less cost.

* * *

Low-Temperature Welding

FROM recent discussion in the technical press on Dr. Antonio Longoria's new welding process, it appears that the metal to be welded is brought up to some predetermined but relatively low temperature, and while at that temperature high-frequency vibration is applied which results in breaking down the molecular bond so that a weld takes place in much the same manner as if the metal were brought to the molten state, as in arc or gas welding. The principal difference lies in the fact that the weld takes place at a temperature far below what has heretofore been called "welding temperature." The butt welded seam has

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

much the same appearance as a welded seam made by gas welding.

It would, of course, be easy for any man of welding experience to use extravagant terms in estimating the significance of such a revolutionary process. Many of our present welding problems arise from the fact that the temperature at which welds must be made causes objectionable changes in physical properties of the metal being welded.

However, there is little question but that this development promises to be the most important in welding in the last 25 years.

* * *

Unfounded Rumor

RUMORS travel about from time to time that one or another type of arc welding electrode gives off toxic gases which might be injurious to the operator of the welding process. Certain tests are alleged to have been made which prove that the gases are toxic but no proof has been submitted that there is any danger to the operator.

So long as the matter is allowed to rest in this state, there is plenty of dynamite in it. Stripped of its secret and anonymous lure, there is nothing in the least exciting about the subject. Thousands of operators are using all the principal makes of covered welding rod with no record of injury or even indication that any injury might result.

If a man is working in a confined space with no forced ventilation, any type of gas or electric arc welding is dangerous. In free air, either gas or arc welding is perfectly safe with any commercial apparatus or supplies when welding on steel. Certain nonferrous metals should be welded under forced ventilation under all circumstances.

Surface Treatment

Selection, Application and Use of Finishes for Metals

II—The Metallic Coatings (Continued)

THIS is the second and concluding installment of Part II of the Selection, Application and Use of Finishes for Metals series. The first installment, which appeared in the March 30 issue of STEEL, included a discussion of zinc and cadmium coatings and a tabulated outline of the recommended applications of the common metallic coatings. This installment covers the applications of nickel, chromium, copper, tin, brass, aluminum, silver and gold.

Nickel

Electroplated nickel has been used on iron and steel parts for many years for decorative and protective purposes. Nickel is practically always applied by electroplating and numerous baths and various plating procedures are available to produce coatings of different degrees of brightness and hardness. Nickel coatings usually have a slight yellowish tint when compared with chromium coatings. A patented process is now available, however, which deposits a bright cobalt-nickel alloy similar in appearance to chromium plate.

With respect to corrosion, nickel protects in a different fashion than the electronegative metals such as zinc and cadmium. The coating protects by preventing access of the corroding influences to the base metal. Nickel itself corrodes at a slow rate in most environments and is a good coating in this respect. As can easily be deduced from the method of protection, the continuity of coating is important since the presence

of corroding influences at pinholes and crevices in nickel coatings will cause more rapid corrosion of iron than if the nickel were not present. (see Fig. 1).

There is a relation between thickness of coating and number of pinholes per unit area for any set of plating conditions and it is this relation which determines the thickness of nickel coatings for various purposes. In cases where soft nickel coatings are used in a buffed condi-

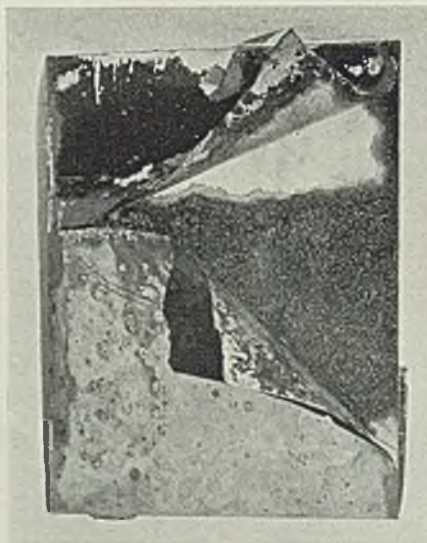


Fig. 1—An imperfection in the nickel plate, illustrated here, permitted corrosion of the base metal to such an extent that the nickel, which was comparatively unattacked, peeled entirely away

tion, the pinhole frequency is appreciably reduced by the buffing operation.

When used over iron or steel at least 0.0005-inch of nickel should be employed for long indoor life and at least 0.001-inch for general outdoor service. For short indoor life such as on novelties, thin coatings are employed, at times less than 0.0001-inch. Even thinner coatings than these are used over nonferrous base metals for indoor service.

A considerable variation in hardness of nickel coatings can be obtained by variation of plating conditions, that is, the bath composition, operating temperature and the current density. The softer coatings are used where buffing is involved while the harder coatings find use where rubbing or abrasion are anticipated in service.

Nickel coatings have been widely used in combination with copper to form composite coatings. Since copper buffs more easily than nickel, heavy copper base coatings are often used to reduce buffing costs of nickel finishes. In such cases, the corrosion resistance is dependent on the aggregate thickness of coating as both metals protect in the same way and their pinhole frequencies are approximately the same.

Hydrogen Causes Embrittlement

When used for finishing spring steel, steel music wire or spring lock washers, it should always be kept in mind that nickel plated coatings as well as most other electrodeposited metals will have an embrittling action due to hydrogen adsorption by the parts during the cleaning and plating operations. An effective way to overcome this condition in most cases is to specify a three-hour heat treatment at 300 degrees Fahr. Treatment does not affect the internal structure of the steel but drives out the adsorbed hydrogen which may otherwise materially

and Finishing

lower the fatigue resistance or embrittle the spring part.

It is possible to deposit a black nickel coating by using a special bath. This coating is an inexpensive way of coloring any metal which can be nickel plated. If the part is buffed before application of the black nickel a satisfactory lustrous black finish can be produced. These black nickel coatings, like oxidized copper and brass coatings, are usually lacquered to improve their resistance to corrosion and to color change incident to handling.

Nickel-Chromium

The demand for a permanent mirror-like metallic finish was realized a few years ago when chromium plating became a commercial process. Chromium possesses the valuable property of not visibly tarnishing. Unfortunately, chromium plating is rather expensive due to high equipment cost, high current consumption and the necessity for continuous positive contacts in racking. It is therefore customary, where the non-tarnishing property of chromium is desired primarily for appearance purposes, to use nickel or copper and nickel as a base coating. The nickel or composite base coatings provide most of the corrosion resistance and often facilitate the surface preparation with respect of buffing, graining, or other processes. As outlined in the table in the March 30 issue of STEEL, p. 54, good practice calls for 0.001-inch of nickel on such items as automobile hardware and fittings and about 0.0005-inch for a high quality coating for indoor use. The chromium coating used over nickel for such purposes is usually only 0.00002-inch or 0.00003-inch thick. While these figures indicate extreme thinness, such chromium coatings appear to be effective for the intended purpose.

In the use of chromium coatings, it should be kept in mind that even the thin chromium coatings are relatively expensive. This is particularly

true on small parts such as screws, washers, etc., which, if nickeled, would be barrel plated. It is not possible to barrel-plate chromium, in that each part must be individually racked. A screw which could be given a bright nickel finish by barrel plating for \$1, per 1000 would quite probably cost \$10 per 1000 to chromium plate. This cost differential changes materially, of course, with large or fragile parts which would have to be racked even for the nickel plating.

For a convenient method of specifying nickel-chromium finishes on steel the reader is referred to A.S.T.M. specification A166-35T.

Chromium

Chromium is used alone directly on iron, steel and other metals for its wearing properties and hardness. In such cases, much heavier coatings are employed than when the coating

is used for appearance alone. On gages, where wear is the measure of life of the gage, chromium coatings have been successfully employed. In such cases, the gages are made slightly undersize, plated with 0.001-inch to 0.005-inch of chromium and then carefully ground to final size. The chromium coating not only wears longer than hardened tool steel but provides lower long-time gage cost since the gage is easily stripped when worn beyond the limit and can then be replated back to the initial dimensions.

One case where a thin chromium coating is used effectively to combat wear is on printing plates for money, bond and stock certificates, where such coatings have increased the life of plates several hundredfold.

Each item must be considered on its own merits, of course, but the use of chromium as a wear resistant hard finish is even now not fully appreciated. Rolls in paper mills, phenol plastic molding dies, electrical relays and guide rings on braiding machines are only a few of the diverse items on which wear resistant chromium coatings are used. Chromium coatings have a low coefficient of friction with most other metals which fact is used to advantage by employing it in the flutes of reamers and drills and on drawing and forming dies. The corrosion resistance of chromium plate as compared with nickel plate is shown in Fig. 2.

Copper

The principal uses of copper coatings are for decorating hardware and fixtures and as an undercoat for nickel and nickel-chromium coatings. When used as the final coating, copper is usually lacquered or varnished
(Please turn to Page 56)

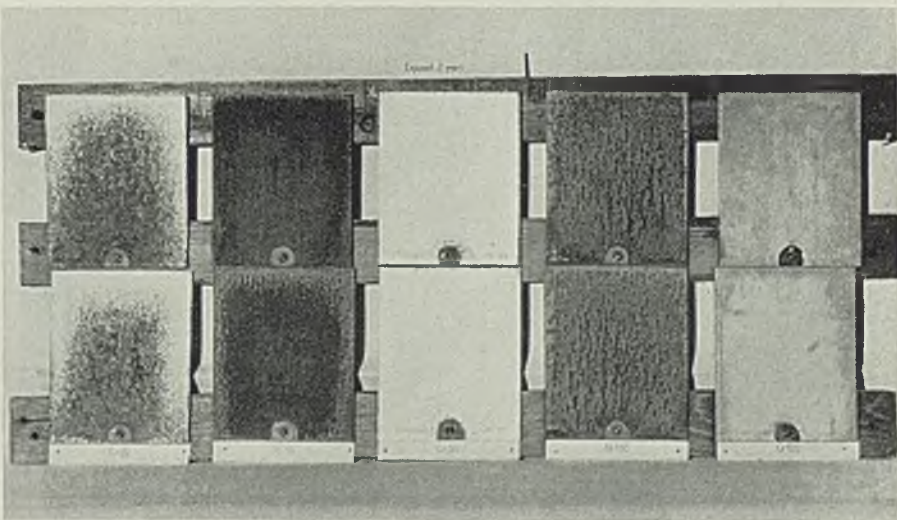


Fig. 2—The comparative corrosion resistance of equal weights of chromium and nickel coats is well illustrated by these panels. Note the darkened condition of the nickel plate and the pinhole corrosion on the light weight chromium panel. The upper and lower panels, in each case, are duplicates. The weights of coating are in proportion to the numbers appearing below each panel

Power Drives



Anticipative Maintenance

MANY plant executives would be astonished if they knew how much their idle time is costing them. Seldom is the amount of such losses ever recorded. Plants using the Gantt system of industrial management keep a careful record of such losses and charge them against the departments responsible, an effective method of obtaining results. Although but one of many causes, only idleness due to drive trouble will be discussed here.

Costs of any enforced idleness of a machine in production include: Operator's time; overhead on the machine; cost of material and time for maintenance, too often consid-

ered as the only cost when usually only a minor item; and the seldom considered items of loss in production and interruptions to production schedules, which may be the highest of all. Such interruptions can be reduced to a small item by selecting proper drive equipment and applying systematic inspection, and correct servicing.

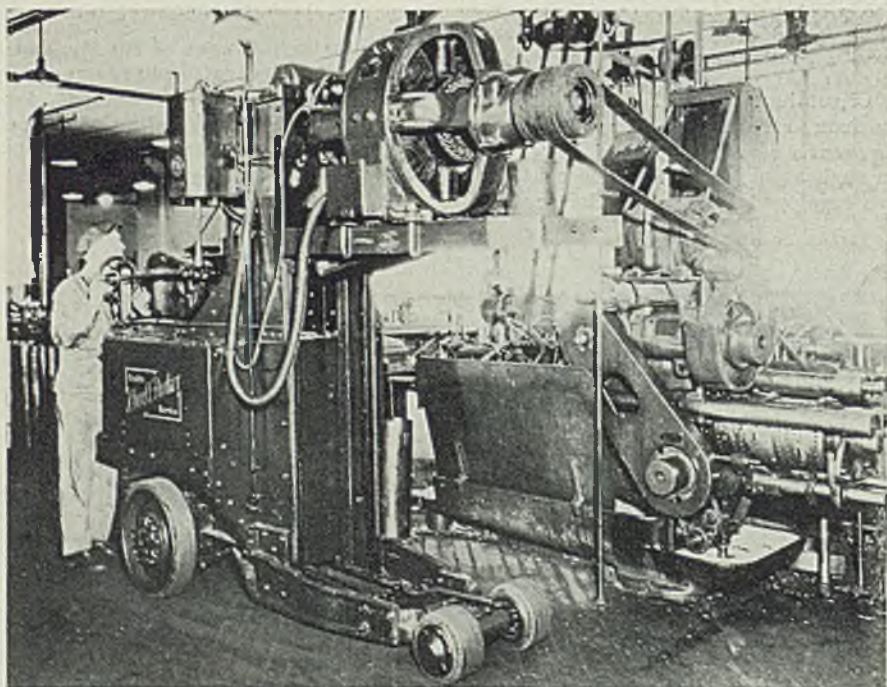
How well this applies is illustrated in the experience of one midwestern plant employing about 250 men. The new plant engineer recommended certain changes in equipment, mainly the installation of antifriction bearings, and an "anticipative maintenance" program, virtually the stitch in time. After approving the changes, the president of the company or-

dered that all interruptions due to drive trouble be reported direct to him as a check on the worth of the expenditures.

The plant engineer asked for six months to put the new system into operation so that the near-failures would be caught and remedied. The results following that period were most satisfactory in that in two years only three interruptions totaling less than 30 minutes were reported. Incidentally, the president also called for reports on other causes of machine stoppage which put other department heads on their toes, too.

Anticipative maintenance is merely preventing as much wear and tear as possible, locating the necessary wear and tear, and making the repair or replacement before it becomes an emergency case.

Checking on Speeds



MACHINE speeds in general follow rules which are usually established on a "safe" basis. To prove that many of these speeds were too conservative an engineer in a certain plant mounted a variable-speed motor on a tier-lift platform electric truck and belted the motor up to various machines on different jobs. Changing the motor pulley gave additional adjustments in speed. No official statement of results is permitted but the smile of satisfaction and unofficial remarks which cannot be reported indicate many of these rules need revision or at least a test check in connection with particular types of work, machining and material. The truck shown here is built by the Elwell-Parker Electric Co., Cleveland

Pertinent Pointers

The lubricating film must cushion the shock between two moving surfaces under pressure, such as gear teeth. Therefore, select a lubricant which will not squeeze out under pressure or flow so slowly as to fail to resurface the bearing areas with a new film before pressure is again applied.

Is your maintenance department on top of its job or buried hopelessly under a mass of emergency "fixing?"

Pet drive theories are acceptable if sound and based on good engineering rather than on the stubborn insistence that "we've always done it that way," or that "someone else does it this way."

The best test of a lubricant is its performance in actual operation.

Use of the wrong type or improperly adjusted switches, relays, circuit breakers, or other types of automatic cutouts results in unnecessary interruptions to production or may not provide the necessary protection desired.



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THIS phrase, easily said, tells a story of progress which is the picture of our present age, an age in which steel has found an ever-widening service.

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In the Bethlehem organization, the wide diversity of mills, the experience in many fields, the large staff of metallurgists, provide a total of facilities and experience which enables us to meet the customer's most exacting demands in every detail.

Bethlehem Steel Company

General Offices: Bethlehem, Pa.



Bars and Special Sections

Carbon Steel Bars, Bessemer and Open Hearth in all grades and analyses; tube rounds for seamless piercing, special and automotive sections of every description. Iron Bars—chain, engine bolt and staybolt quality; muck bar. Rerolled Rail Steel; bedstead angles and plain bars.

Semi-Finished Steel

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Steel Plate Work and Construction

Tanks, towers, gas plant equipment, oil-refinery and chemical-plant equipment. Barges and hulls.

Alloy Steels

Open-hearth and electric-furnace alloy steels for all purposes. Blooms and billets. Bars, hot-rolled, cold-drawn; black-as-rolled, centerless-ground, normalized, annealed or heat-treated. Special Sections, MAYARI nickel-chromium steels; MAYARI engine bolt and staybolt steels; Silico-manganese spring steel; SUPERTEMP, for superior physical properties at high-temperatures.

Bolts and Nuts—Rivets—Spikes

Machine, Carriage, Lag and Specialty Bolts, Plain and Galvanized, Carbon and Alloy; Hot Forged, Cold Punched and Semi-Finished Nuts; Iron and Steel Rivets, Fitting-up Bolts; Track Bolts, Drive Spikes, and Screw Spikes; Plain and Upset Rods, Turnbuckles, Boat and Wharf Spikes, Pipe and Tank Bands—Silo Rods.

Pig Iron

Basic, Bessemer, foundry, low phosphorous, malleable, malleable Bessemer; STANDARD MAYARI and SILVER MAYARI alloy iron.

Ferro-Manganese

Forgings

Carbon and alloy; hammered and hydraulically pressed; drop and upsetter; seamless vessels for oil refineries; high-pressure seamless boiler drums and chemical vessels.

Castings

Carbon and alloy steel (open-hearth and electric), manganese steel, iron, brass and bronze, rough as cast or machined; abrasion-resisting castings. Centrifugal cast bronze sleeves and liners; ingot moulds.

Hydraulic Machinery

Wheels and Axles

Wrought steel wheels and axles for freight and passenger cars and engine, tender and trailer trucks; for electric cars; for mine locomotives and mine cars; for cinder, ore and other industrial cars; crane wheels.

Rolled Steel Blanks

For gears, pinions and flywheels. Tire moulds and mould rings, shaft couplings, brake wheels and drums, pipe flanges, pistons and other circular forgings.

Tin Plate

Coke tin plate; black plates; galvanizing, enameling and lithographing stock.

Tool Steels

High-speed tool steels; carbon and alloy tool steels; cobalt magnet steel; hot-work tool steels; die steels; valve steels; rivet set and pneumatic chisel steels; special tool steels; nitralloy; tool steel billets of all grades. Rock and mine drill steels, hollow and solid.

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Tools

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Wire and Wire Products

Plain, bolt, screw, chain, extra-soft rivet and hard bright nail wire; bright processed, lime-bright and black-annealed, normalized, heading wire; BETHANIZED telephone wire; galvanized wire; high-carbon and low-carbon wire rods; BETHANIZED (special zinc-coated) wire; clothes-line wire; soft processed wire; box, stapling and binding wire; spring wire; barbed wire; SILVER STAR bale ties. BETHANIZED field and poultry fence. BETHANIZED LAWN FENCE. Nails, staples.

Steel Fence Posts and Gates

Posts and gates for farm, garden, lawn and poultry fencing; snow fence posts; highway sign posts.

Structural Shapes

Bethlehem wide-flange beams and H-column sections; rolled joists and stanchions; standard beams, channels and angles; car and shipbuilding shapes.

Building Specialties

Bethlehem open-web steel joists, steel studs, steel door frames, metal lath. Insulating wool.

Concrete Reinforcement Products

Steel reinforcing bars, spirals, and concrete accessories.

Steel for Highway Construction

Bar mats, expansion joints, contraction joints (road strip), steel highway guards.

Steel H-Piling

Steel Sheet Piling

Bethlehem steel sheet piling for temporary work, as in cofferdams, and permanent work, as in retaining walls, cut-off walls, and jetties.

Steel Plates

Universal and sheared plates, for all purposes; slabs.

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Tank heads, boiler heads, dome sheets, man-heads, yokes, bolts and saddles; miscellaneous flanged plate work.

Oil-Burning Equipment

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for Steam, Electric, Mine and Industrial Railways

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Steel Freight and Passenger Cars Mine Cars

Railway Turntables

Rails and Accessories

Standard tee, girder, girder-guard and high-tee rails; light rails; splice bars, rail clips, tie plates.

Steel Pipe

Butt-welded and lap-welded pipe, standard and line, black and galvanized; copper-bearing pipe. Welded steel pipe for water-distribution systems.

Boiler Tubes

Genuine old-fashioned knobbed charcoal-iron tubes; double-pass steel tubes. Double-pass copper-bearing steel tubes.

Steel Sheets

Hot-rolled, hot-rolled annealed, cold-rolled, heavy cold-rolled sheets; furniture, heavy furniture, automobile sheets; porcelain enameling sheets; tack plate; galvanized, flat and formed sheets; painted formed sheets; special-finish sheets. Sheets of BETH-CU-LOY (copper-bearing steel).

Steel Strip

Cold-rolled strip, hot-rolled strip, lamp stock, crown-fender stock.



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Ford Engine Parts Are Cast From Alloy Iron and Steel

INCLUDED in the current \$20,000,-000 expansion program at the River Rouge plant of the Ford Motor Co., Dearborn, Mich., is an item of \$675,000 for changes and improvements in the foundry, notable among which is an alloy steel casting department.

Melting and molding equipment in the north end of the foundry formerly devoted to the production of non-ferrous castings has been removed and replaced by more extensive equipment for the production of brake drums, clutch pedals and other parts in alloy steels melted in three 4-ton electric furnaces. The molding equipment includes six sandslinger units with turntables, roll-over machines and conveyors.

In another part of the foundry, production of cylinder blocks has been accelerated by the installation of an air furnace and rearrangement of the melting and pouring equipment. Under the new setup it no longer is necessary to carry metal in ladles from the furnace to the molds. A constant supply is available at the pouring station and the molds are filled in rapid succession. The reservoir furnace serves two conveyor units simultaneously to the extent of 400 to 450 molds per hour, 3200 to 3600 per 8-hour day, between 6000 and 7000 on the usual double shift or 16-hour day, and approximately 10,000 on a triple shift or 24-hour day basis.

Melting Practice Improved

Although alloy steels of various compositions have been developed successfully for the production of many parts of the automobile engine, cast iron still is found most satisfactory for the cylinder block. Composition of this iron shows: Total carbon, 3.20-3.40; silicon, 1.90-2.10; sulphur, 0.10 maximum; phosphorus, 0.25-0.32; manganese, 0.60-0.80; and copper, 0.75 per cent.

Iron for the cylinder blocks is a mixture of direct metal from the blast furnace and metal melted in the cupola. With the analysis of both metals known, a sufficient quantity of each, usually 60 per cent direct metal and 40 per cent cupola metal, is

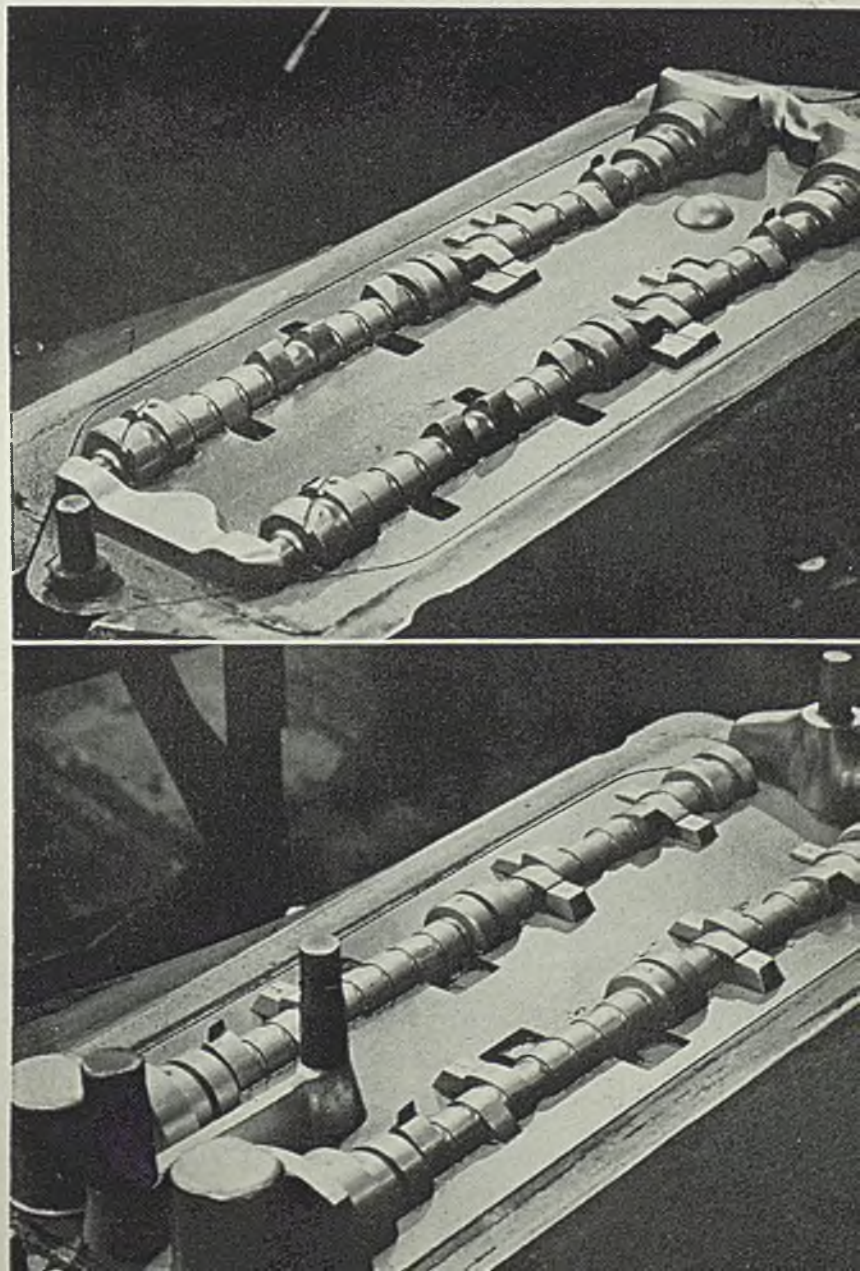
poured into a 400-ton mixer where the metal assumes the composition required in the castings. At this stage the temperature of the metal is not high enough for pouring into thin-wall castings. To obtain the desired temperature, the metal is transferred by ladle from the mixer to a 15-ton electric furnace where it is superheated to a temperature of approximately 2900 degrees Fahr. Formerly this superheated metal was poured into small ladles suspended from a monorail and transferred to the molds as they moved along.

Under the latest arrangement, the metal leaves the electric furnace and flows through a long spout into an air furnace located close to the ends of two adjacent conveyor units. The

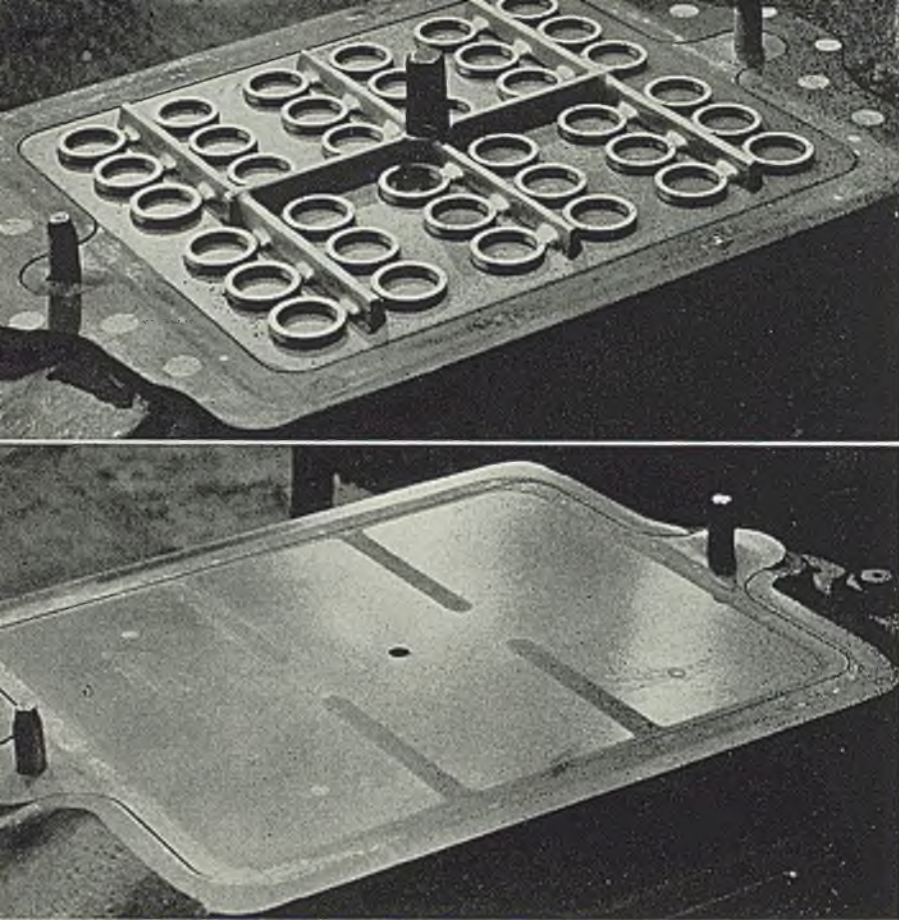
air furnace is fired with powdered coal and has a normal holding capacity of 35 tons of molten metal. To a certain extent this furnace may be compared to the forehearth on a cupola since it simply is a chamber where the metal is collected from one side, discharged at the opposite side and maintained at a constant high temperature.

A batch of superheated metal from the electric furnace is discharged into this reservoir furnace every 15 minutes. On the opposite side of the furnace the metal flows in a steady stream through two spouts, one near each end. The spouts discharge the metal into two trough-shaped ladles suspended from a short monorail over the end of each mold conveyor unit. Each of these ladles is provided with a pouring lip at the far end over which the metal is poured into each mold. The ladle is not fixed, but is free to travel a short distance to coincide with the movement of the mold.

Introduction of this method represents the culmination of a long series



Figs. 1 and 2—Drag and cope patterns for camshafts showing the sprue, runner, gate and shrink bobs at the left and the additional feeder at the right



Figs. 3 and 4—Drag and cope pattern plates for valve insert rings. The molds are stacked and poured three high

of experiments designed to eliminate the gap between the furnace and the mold while maintaining the desired composition and temperature of the metal. Possibly an adaptation of this process eventually will be developed on other units in the foundry devoted to the production of crankshafts, camshafts, brake drums, and other component cast parts of the engine.

Faced with the problem of producing castings to meet hitherto undreamed physical, chemical and mechanical specifications, the automobile industry consistently since its inception has discarded tradition and boldly pioneered in mechanical, industrial and metallurgical fields. Initial expense has been subordinated to anticipated final results. This feature has characterized the operation of the Ford foundry to a marked extent. In addition to its function as a huge production shop, the foundry is an experimental laboratory constantly in a state of transition. Changes are made without letdown in daily production of over 2000 tons.

Cumulative experience over a

period of years has resulted in the development of special metals in the border line between iron and steel. Successful application of these metals for specific castings involves subsequent heat treatment to bring out their full possibilities. Varying analyses of the metal in these castings are shown in the accompanying table.

Close Control Exercised

Cylinder blocks are cast from a mixture of cupola and direct metal. Metal for the camshafts is melted in the cupola. Metal for the other castings is melted in a battery of electric furnaces ranging in capacity from 250 pounds to 15 tons per charge. Four 15-ton electric furnaces supply over 400 tons per 16-hour day for the daily output of approximately 8000 crankshafts. The castings in groups of four are cast in a vertical position in a mold built up of 16 individual dry sand cores. Each casting weighs 80 pounds or a total of 320 pounds for the group of four. A heavy central feeding sprue and an

individual riser on each casting increase the gross weight of metal in each mold to 420 pounds.

Close control of cupola operation including the make up of the charge is required in the production of metal for the camshafts. The same degree of accuracy is observed in making and pouring the molds. The analyses of the metal is nicely adjusted to produce a slight chill or white surface on the casting while the interior or core of the casting is gray. The degree of accuracy attained in the production of the castings is indicated by the fact that the only machine finish they receive is a surface grinding on the working faces. Brinell hardness on these faces is held at 418 minimum.

Molds Designed for Speed

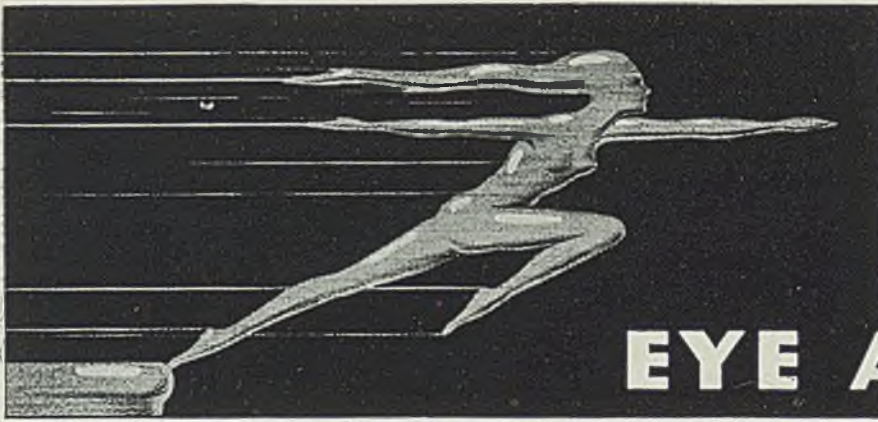
The metal from the furnace is tapped into a 1000-pound ladle and a test bar is poured from each batch. The bar is cooled and broken and from the appearance of the fracture the attendant in charge decides whether the metal is suitable for the intended purpose, or if the composition has to be adjusted slightly by small ladle additions of ferrosilicon or ferromanganese. Usually no adjustment is necessary.

Molds for the camshafts are made from split patterns, with the halves mounted on individual plates as shown in Figs. 1 and 2. The plates in turn are mounted on a battery of jolt-squeeze machines arranged in pairs, one for the drag and one for the cope. Each mold contains two castings connected by gates right in Fig. 1 and left in Fig. 2 which deliver the metal through shrink bobs at one end in the cope, Fig. 2. These gates are fed by a runner from the central sprue. A somewhat smaller gate at the opposite end of each casting is connected to a single large riser located midway, shown right in Fig. 2.

The molds are placed on a moving conveyor and the metal is poured while the molds are in transit a short distance from the molding machines. The castings are shaken out almost immediately after

Analysis of Various Alloy Iron and Steel Castings

	Carbon, per cent	Silicon, per cent	Sulphur, per cent	Phosphorus, per cent	Manganese, per cent	Copper, per cent	Chromium, per cent	Nickel, per cent	Tungsten, per cent
Crankshafts	1.30-1.65	0.45-0.55	0.08 max.	0.05 max.	0.15-0.35	2.50-3.00	.....	.....	.....
Cylinder blocks	3.15-3.35	1.80-2.10	0.10 max.	0.25-0.32	0.60-0.80	0.75	.....	.....	.....
Valve insert rings.....	1.20-1.40	0.30	0.05 max.	0.05 max.	0.25	1.50-2.00	2.50-3.50	14.00
Valve stems	0.95-1.20	2.00-3.50	0.05 max.	0.05 max.	14.00-16.00	13.00-15.00



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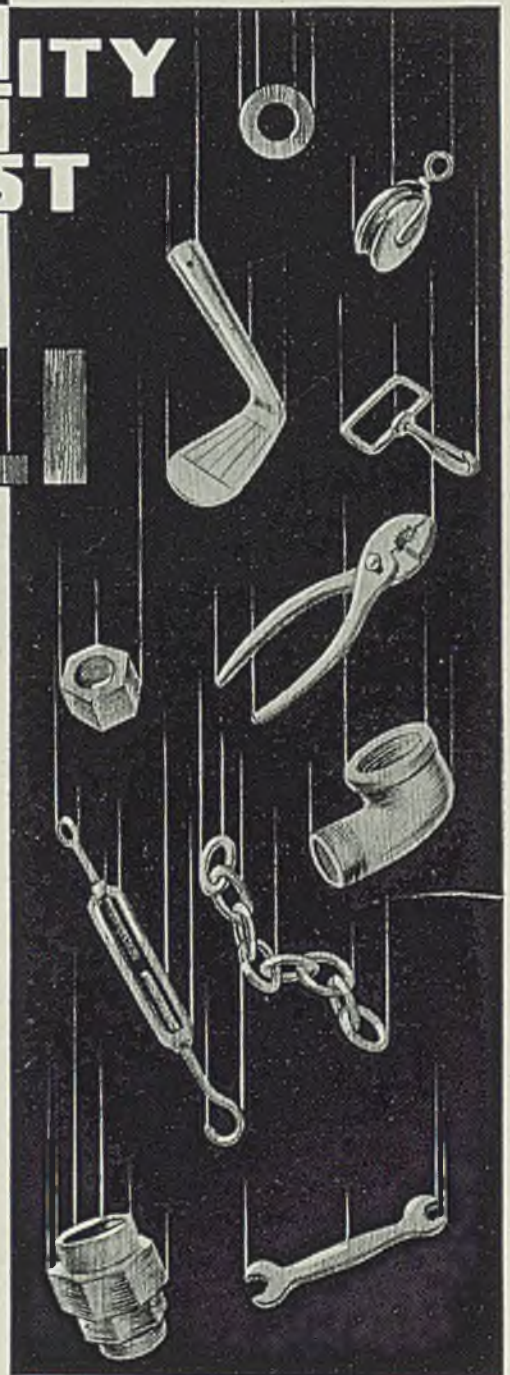
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ZINC PLATING—Anodes • Salts • Bright Dip.

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they have solidified and the oval conveyor returns the flasks to the vicinity of the molding machines. This routine is standard and applies to practically all castings made in this foundry. With this arrangement, a comparatively small number of flasks serves the plant throughout the day.

Valve seat insert rings Fig. 3 are made from a high speed tool steel of the following analysis: Carbon, 1.20-1.40; sulphur and phosphorus, 0.05; copper, 1.50-2.00; silicon, 0.30-0.60; tungsten, 14-17; and chromium 2.50-3.50 per cent. Patterns are arranged 36 on a plate and are molded in shallow flasks. The cope is molded on flat plate Fig. 4. The flasks are stacked three high and a total of 108 rings are poured from a central sprue. On an 8-hour shift the production is 700 stacks, a total of 75,600 individual rings.

Valve stems are molded from split

patterns, mounted on flat plates in two opposing rows and gated in the ends from a long runner in the center. These molds are not stacked. Electrically melted steel for these castings contains: Carbon, 0.95-1.20; silicon, 2.00-3.50; sulphur and phosphorus, 0.05 maximum; nickel, 13-15; and chromium, 14-16 per cent.

This is an exceedingly hard, tough, wear-resisting metal. The rings show from 38 to 46 on the Rockwell C scale, while the valve stems are held between 31 and 32. Metal for the rings and valve stems is melted in four electric furnaces, two of 1000 pounds capacity, one of 500 pounds and one of 250 pounds. The pourers catch the metal direct from the spout of the furnace in hand ladles holding about 60 pounds. The furnaces are located close to the conveyor units so that the metal may be poured immediately after it leaves the furnace.

to sherardizing except that much higher temperatures (1500 to 1800 degrees Fahr.) are necessary to produce the aluminum coating than for the zinc alloy sherardize coating. Calorized finishes are highly resistant to high temperatures and are used principally for finishing such articles as annealing and carburizing pots, oil still tubes, gas burners and pyrometer tubes. The recent work of Dr. Colin G. Fink of Columbia university on an aluminum dip process in which precautions are taken to guard against oxide formation at the base metal-coating interface promises the commercial availability of another method of applying aluminum as a coating (STEEL, Dec. 30, 1935, p. 27).

Silver and Gold

Aside from the use of silver and gold coatings on jewelry and tableware, these metals have been used for plating electrical contacts, particularly wiping contacts. Although silver tarnishes rapidly in most exposures due to reaction of the coating with sulphur bearing gases in the air, the tarnish product formed not only has a low electrical resistance but also is easily removed by normal use of a wiping contact. In this connection, it should be kept in mind that these are soft metals which will wear rapidly if high contact pressures are used.

SUMMARY

TWO classes of nonferrous metals, which are inherently more corrosion resistant than iron or steel, are widely used to protect ferrous base metals. In the first class, which protects because of its electrochemical properties with respect to iron and steel, the thickness of coat or weight of coating applied is the important factor. In the second class, which protects by providing a continuous barrier of corrosion resistant metal between the base metal and the corroding influences, the continuity of coating is of considerable importance, as well as the ability of the coating metal to produce a protective film on itself. This film, by increasing the durability of the coating, adds appreciably to the protection afforded the base metal.

In addition to corrosion resistance, which is always the most important factor considered in the selection of a metallic coating, it is possible to obtain a wide range of properties such as hardness, wear resistance, heat reflection or absorption, coefficient of friction, electrical contact resistance and, last but not least, appearance.

(Part III of this series, which will discuss organic finishes for metal, will start in an early issue).

Selection of Finishes for Metal

(Concluded from Page 49)

to impede tarnishing. Copper is easily colored by several so-called "oxidizing" procedures which in many cases are subsequently brushed, grained or relieved and finally lacquered. A variety of brown lustrous shades can be obtained in this manner. The "oxidizing" consists of immersion in solutions containing sulphur which react to produce copper sulphide on the surface. These sulphide coatings are not durable and should always be protected by clear lacquer or varnish coatings.

Copper protects iron parts against corrosion in the same way as nickel, chromium and tin, that is, by separating the iron from corroding influences. Sufficient weight of copper should be used to produce a pore-free coating for a good quality of finish. If not protected by lacquer or varnish, copper will tarnish quickly.

Tin

Probably the widest use of tin coatings is in the hot dipped and rolled coatings on tinned sheet used for making cans. Aside from this, heavy hot dipped coatings are used on milk cans and pails and on ice cube trays. Heavy hot dipped tin coatings are remarkably free from pinholes which is the important factor with respect to corrosion resistance of the coating in this case.

Tin is readily applied by electroplating and is used in some cases on inside hardware. A much more effective coating, however, is produced if the electroplated parts are heated above the melting point of tin and "fused" after plating. This operation,

which can easily be carried out in a hot oil bath, closes any pinholes in the plated coating and therefore permits the effective use of thin electroplated coatings with comparative safety. Electrodeposited tin is also used extensively on cast iron automobile engine pistons.

Brass

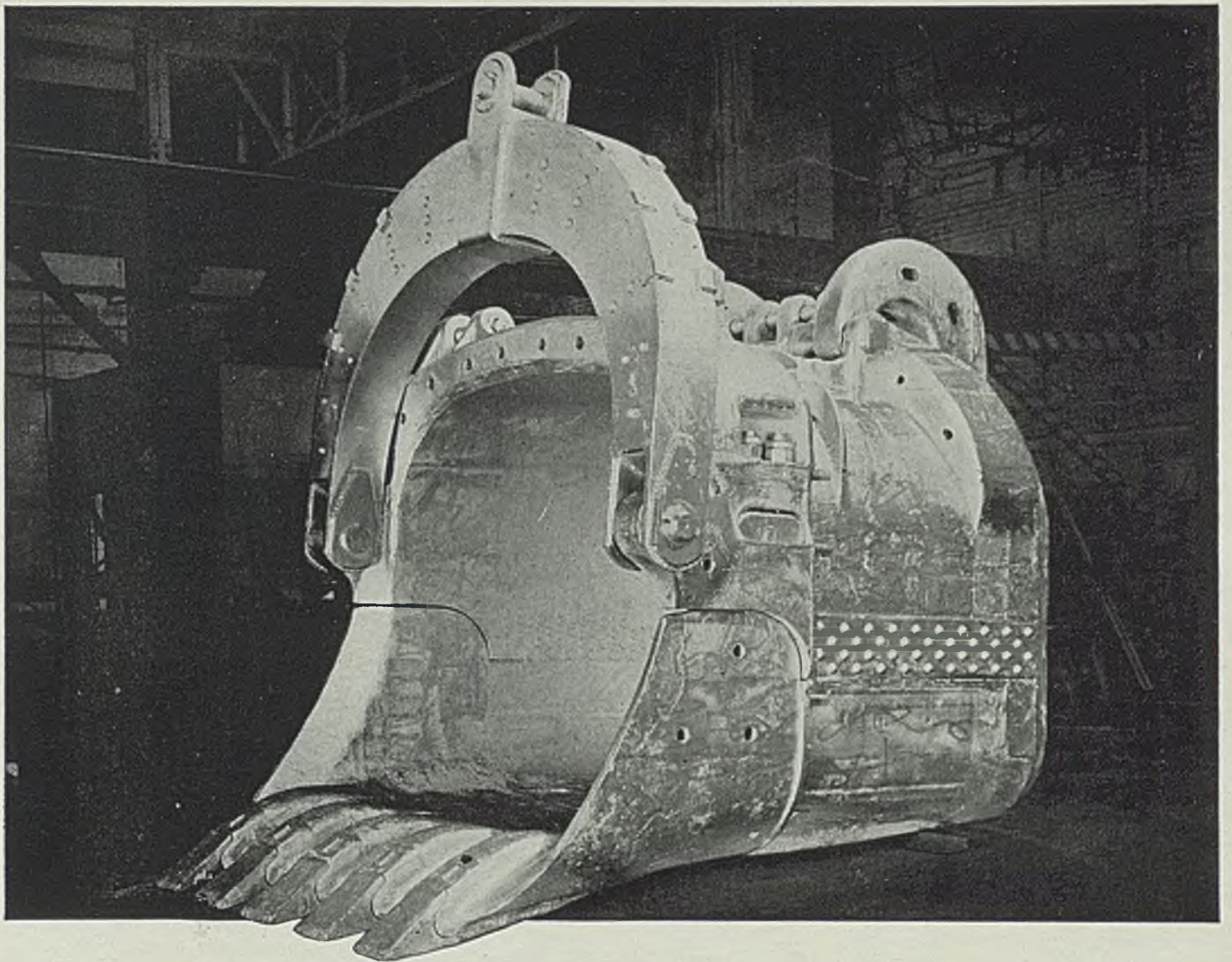
Brass coatings are used primarily for the decoration of hardware and fixtures. Such coatings are easily colored by immersion in solutions containing sulphur and present a pleasing appearance when brushed, grained, relieved, or otherwise treated, either with or without coloring. Brass is usually plated from a combination zinc and copper bath and the color is controlled by the relative content of the two metals in the bath. Brass coatings can also be produced by first plating the part with copper, then with zinc and finally alloying the coatings into brass by heating the parts.

Lead

The principal use of metallic lead as a finishing agent is on terne plate which is a lead and tin coated sheet iron ore steel used in oven linings for acid resistance, and other similar purposes.

Aluminum

The only commercially available methods for the application of aluminum at present are by metal spray (STEEL, Feb. 25, 1935) and by calorizing (STEEL, March 2, p. 50). Calorizing is a process somewhat similar



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In many other applications, alloy steel has made a better product. No matter what properties you specify—high strength, light weight...wear-resistance, shock-resistance . . . hardness, tough-

ness . . . corrosion-resistance, heat-resistance . . . fatigue-resistance—there is an alloy steel that answers the purpose and does a better job. It will pay you to consider whether alloy steel can improve your equipment or product.

Electromet, through years of practical experience with ferro-alloys and alloy steels, can help you determine which alloy steel is best for your particular application. Avail yourself of this service. It may save you much and will cost you nothing.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation



CARBIDE & CARBON BUILDING

Electromet
Ferro-Alloys & Metals

30 EAST 42nd ST., NEW YORK, N. Y.

Progress in Steelmaking



Tilting Table for Modern Pickling System Handles 6-Ton Coils

IN THE modern system of continuous pickling of broad sheets and strip steel two mechanisms, such as shown in the accompanying illustration, are employed for handling the coils. One is located at the receiving end of the pickle line to tilt the coils into a reel feed device, and the other at the discharge end to tilt off into storage those coils which are ready for subsequent cold finishing operations.

Mechanisms Operated Pneumatically

These units are designed to handle coils which weigh approximately 6 tons. The rollers are 5 9/16 inches diameter and 12 inches long with a continuous load rating of 8000 pounds per roller. The mechanisms are operated pneumatically on three cradles, the latter be-

ing mounted on flanged rollers 5 9/16 inches diameter.

Each tilting table is incorporated in a section of a troughed roller conveyor and receives the coils one at a time, stopping them abruptly against a spring bumper, made adjustable so that coils of any length may be tilted. The units tilt at 30 degrees, discharging the coils at right angles and immediately return to the normal position ready to receive the next coil. Tilting tables of this type are manufactured by the Mathews Conveyer Co., Ellwood City, Pa.

Quantity of Water Varies

Water for lubricating laminated roll neck bearings should be used

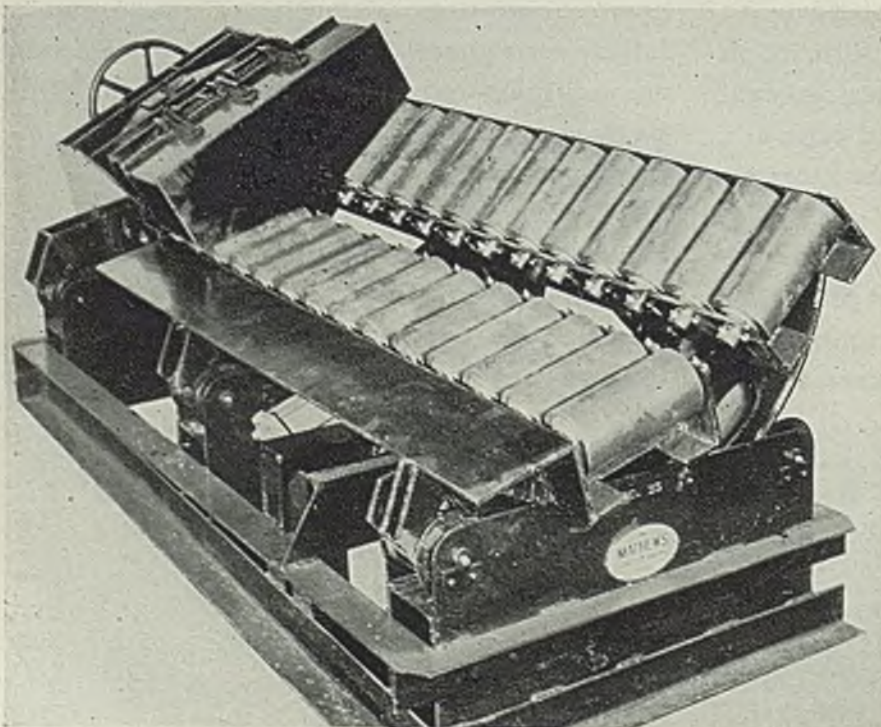
in such quantities as to keep the roll neck well flooded and to maintain a fairly constant temperature. This obviously depends upon the rolling speed, pressure, bearing area, neck diameter and temperatures of the water, and is determined by experience. Provision should be made to supply at least 1 gallon of water per minute for each 5 square inches of bearing area, according to an authority on bearings.

Affords Savings in Steel

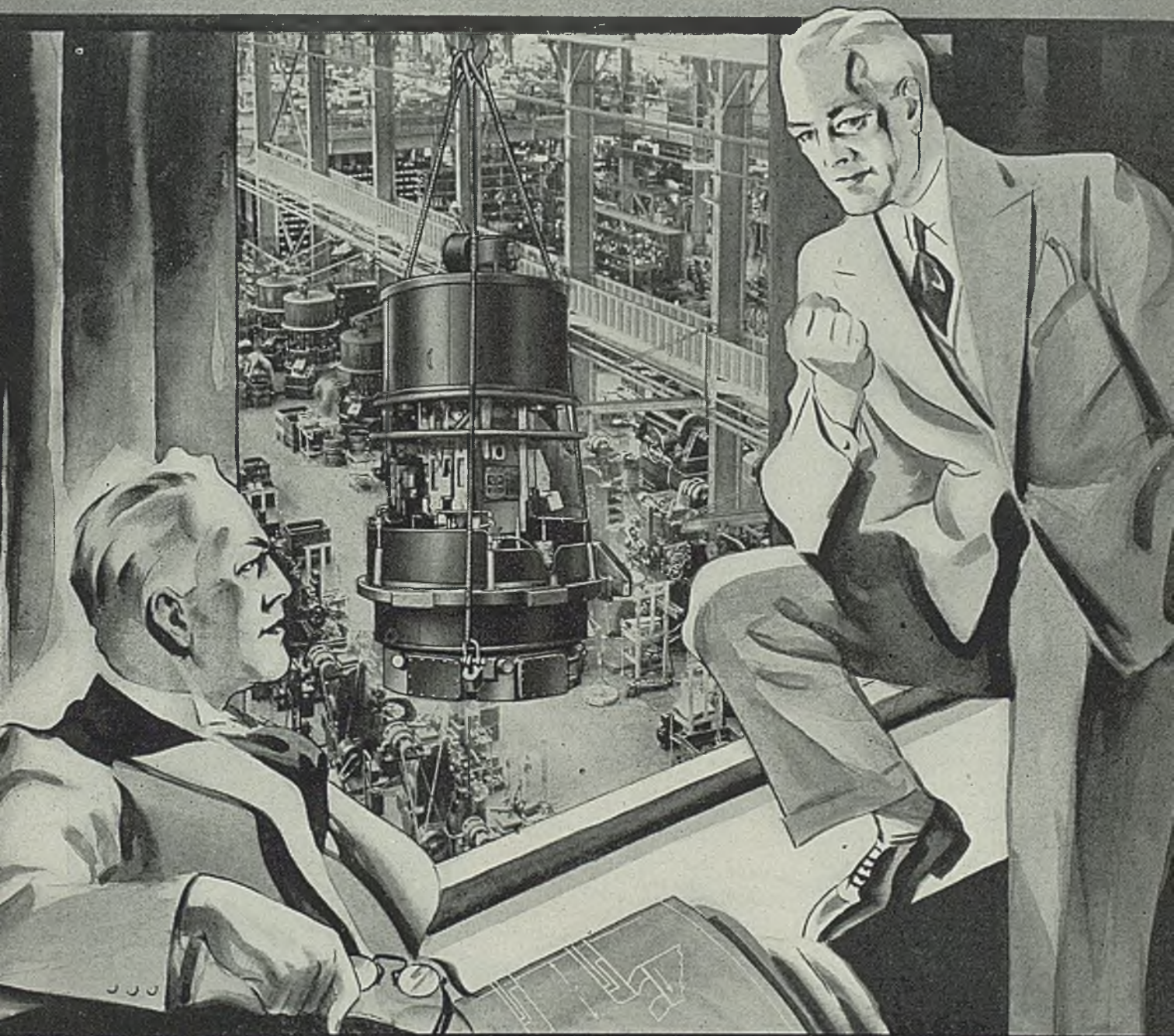
A new process of making casing involves actual compression of the pipe which raises the compression yield point of the steel in the circumferential direction. The process starts with casing pipe which has a larger circumference than the desired finished circumference and which has proportionately thinner walls. The pipe is compressed in a 10,000-ton press to the desired diameter; at the same time the wall thickness is increased to the desired dimension. The casing affords the use of a lighter weight section for a specified depth while maintaining the present safety factor which in turn results in savings in steel and freight costs.

Etching Action Is Rapid

Stainless steels are among the most troublesome to etch since they resist all ordinary reagents. But this has been remedied by a new method which permits etching prior to a microscope study of the grain structure. The stainless steel is etched electrolytically in oxalic acid (10 grams dissolved in 100 milliliters of water), the specimen being the anode and a piece of platinum the cathode. Current is supplied from four dry cells in series of from a 6-volt storage battery. The carbides are revealed in from 15 to 30 seconds' etching time, while an additional 30 to 45 seconds will reveal the grain boundaries of the 18-8 type of stainless steel. The solution is relatively rapid in etching action and does not stain the specimen.



The **POWER**
BEHIND THE PURCHASE
is a Power because of his Ability to Produce



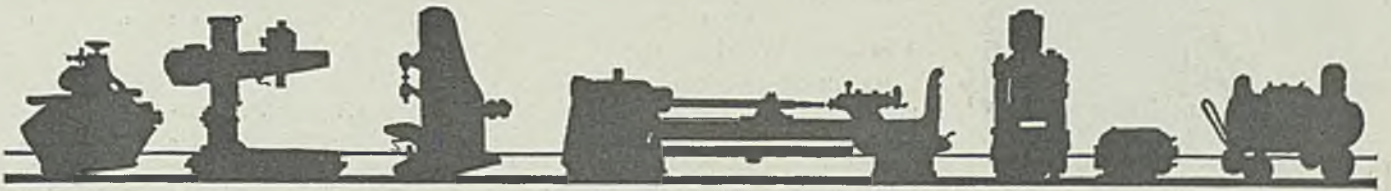
Production requirements on a Cost Saving and Profit making basis demand Machines of Power and Ability. Therefore, selection of Bullard Multi-Au-Matics by Powers of Purchase speaks of Confidence and Experience.

Let us submit for your Comparison and Approval Estimates and Time Studies of your Jobs as applied to Bullard Multi-Au-Matics—Type "D" in 8 and 12" sizes with 6 or 8 spindles - 16" size with 8 spindles - Type "J" in 7" size with 8 spindles for small High Speed work.

Time Saved is Money Earned

THE BULLARD COMPANY

New Equipment

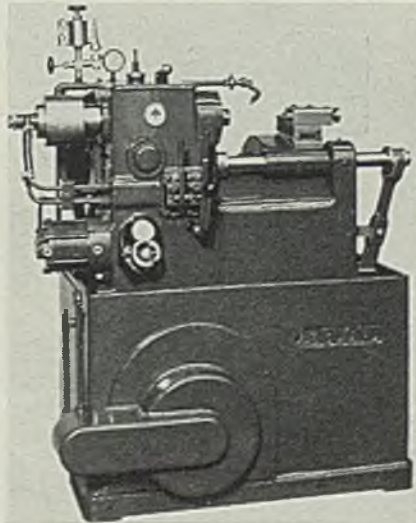
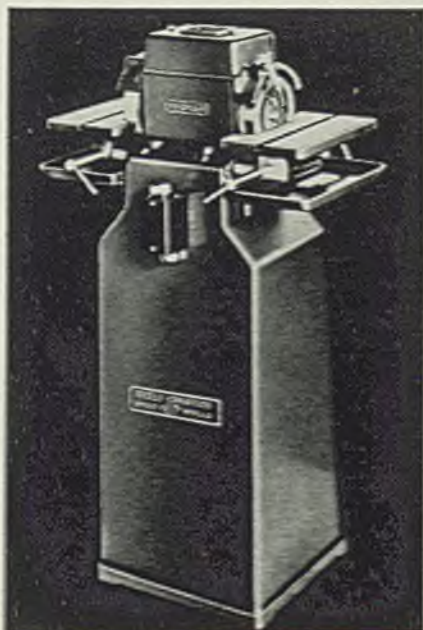


Carbide Tool Grinders—

EX-Cell-O Aircraft & Tool Corp., 1200 Oakman boulevard, Detroit, is announcing two new carbide tool grinders. In Fig. 1 is shown style No. 46 designed for rapid grinding and lapping of single point cemented carbide tipped turning, facing and boring tools. Diamond wheels, silicon carbide vitrified cup wheels or diamond lapping disks can be used. Three different methods of grinding are possible on this machine: A roughing and finishing cut can be taken with two silicon carbide cup wheels; roughing with silicon carbide cup wheel and finishing with diamond wheel; or roughing with silicon carbide vitrified cup wheel and lapping with a diamond lapping disk.

Tools with shanks up to $\frac{5}{8}$ inch square can be rough and finish ground with silicon carbide vitrified wheels. When grinding with diamond wheels or lapping with the lapping disk, larger size tools can be handled. An adjustable tool support table is located at each end of the machine with a 2-inch adjustment for wheel wear and to obtain the correct rake and angle on tools to be sharpened. The protractor tool guide is adjustable through a full range of 180 degrees.

The second new grinder, designated



LeBlond lathe grooves ball bearing races for oil seals

style No. 48, shown in Fig. 2, is designed for grinding all sizes of single point turning, facing and boring tools, right or left hand, high speed steel and cemented carbide tools in the larger size range. Both peripheral grinding on straight type vitrified wheels and face grinding on cup type vitrified wheels can be done on this machine.

Like style No. 46, this grinder also is of the double-end type. Adjustable tool tables are provided for each end of the machine, one for using a straight wheel and the other for a cup wheel. If it is desirable to replace the cup wheel with a straight wheel, another table furnished as extra equipment is used.

Chucking Lathe—

R. K. LeBlond Machine Tool Co., Cincinnati, is bringing out an 11-

Fig. 1—Left—Ex-Cell-O style No. 46 carbide tool grinder for use with diamond wheels, vitrified cup wheels and lapping disks

Fig. 2—Right—Style No. 48 carbide tool grinder for peripheral and face grinding on vitrified straight and cup wheels

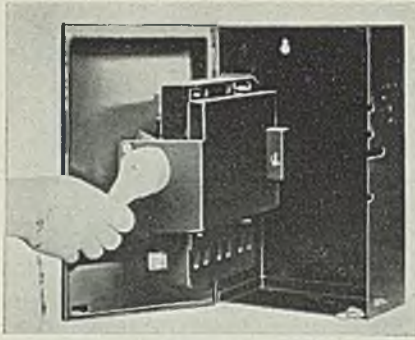
inch special automatic lathe for turning a grease retainer groove in the bore of a ball bearing race. The tool carrier is moved forward and returned by air. A variable speed unit drives the spindle through V-belts. Cross feed drive is taken off the clutch shaft, coarse changes being obtained through pickoff gears, and three fine increments through a sliding gear. This arrangement provides feed rates of 0.0015 to 0.010 per revolution of spindle. The feed is engaged by a tool slide, brought up to working position by an air cylinder arrangement. A feed cam is carried in the tool arm and engages a clutch in the headstock, giving about $\frac{1}{8}$ inch crossfeed. When the groove has been turned the tool slide drops clear of the work, whereupon the cam trips a trigger to reverse the air cylinder which put the slide in loading position. The work is held in an air-operated collet controlled by a small handle on the left.

♦ ♦ ♦

Swing-Out Interior Switches—

Square D. Co., Detroit, has announced that the swing-out interior feature now is incorporated in its type C and general purpose 60-ampere switches. This design permits the entire base and operating mech-



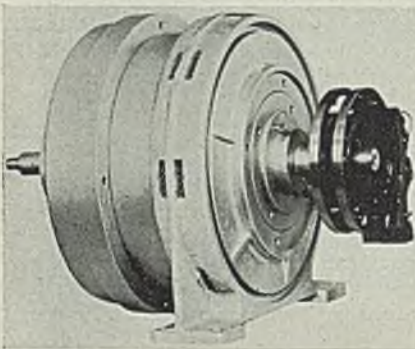


Swing-out interior is new feature of Square D switches

anism to be swung out and away from the box, leaving the entire box area accessible for bringing in conduit and wires, as shown herewith. When the wiring has been completed the base is swung back into normal position and secured by a set screw. The base also is elevated from the back of the box so that wires may be run underneath it, providing greater wiring space and permitting a neater job.

Magnetic Clutch-Brake—

Magnetic Mfg. Co., Milwaukee, recently developed a style E combination magnetic clutch-brake that de-



Combination magnetic clutch-brake built by Magnetic Mfg. Co.

velops a clutch torque of 4500 pounds feet and a brake torque of 1500 pounds feet. The brake is mechanically actuated through springs and thus will stop the drive whenever the electric circuit is opened. The unit, shown herewith, is approximately 24 inches in diameter.

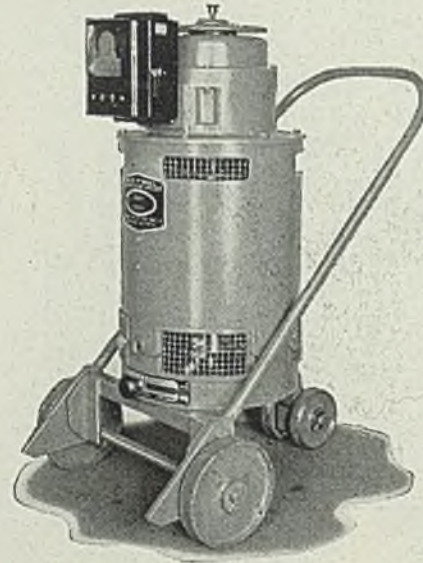
Wire Twister—

M & M Wire Clamp Co., 983 Seventeenth avenue S.E., Minneapolis, is marketing a wire twister that is a simple efficient tool for twisting tie wires around reinforcing rods or for other purposes. One end of the straight wire is placed between plates and the end of the wire is bent into a notch. The thumb is held on the bent end while the other end of the wire is drawn around the rods. Sub-

sequently, the wire is bent into the opposite notch, the handle of the tool is turned and pulled up slightly. To complete the operation and release the twister the ends of the wire are bent back.

Vertical Welder—

Harnischfeger Corp., Milwaukee, announces that the outstanding feature of its new 75-ampere vertical welder is the extremely stable high-speed arc. Mounted on top of the generator is a heavy-duty 5 horse-

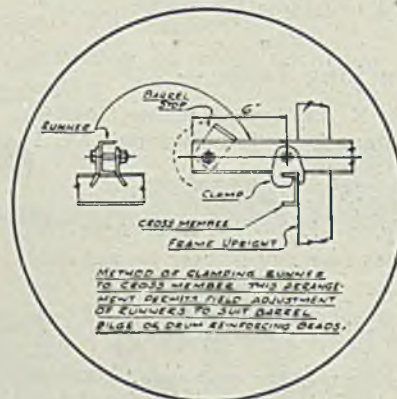


Harnischfeger 75-ampere vertical welder has stable arc

power squirrel cage motor. Connections are available for 110 to 550 volts or for special voltages of 2 and 3-phase, 60 and 50 cycles. Single control is provided for current settings over the entire welding range. The unit, shown herewith, is capable of handling work as light as 24 gage.

Barrel Rack—

Barrett-Cravens Co., 3255 West Thirtieth street, Chicago, is announcing a new rail clip that permits adjustment of barrel runners so that



Adjustable clamp embodied in Barrett barrel rack design

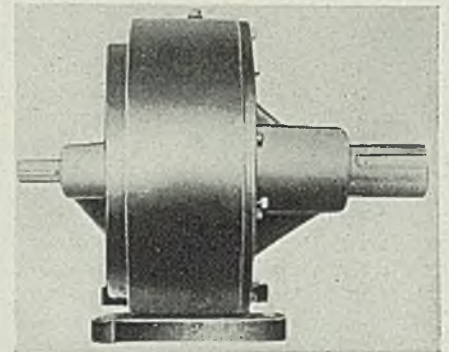
any type of drum or barrel may be stored in a standard storage rack. The adjustable clamp, illustrated herewith, eliminates bolting of the barrel runners in position. Another new feature of the rack is the tie rod that also insures stronger construction.

Centrifugal Pumps—

Pennsylvania Pump & Compressor Co., Easton, Pa., is marketing double suction, single-stage, sleeve bearing centrifugal pumps designated class SHD, SMD and SLD. Standard construction is cast iron, but the casing can be furnished in special alloys if required. In the larger sizes, a balancing port, cast in the lower casing, connects the two suction chambers at the impeller inlet. Any difference in pressure at these points will cause a flow through this port, equalizing the pressure and preventing end thrust.

Planetary Speed Reducers—

Winfield H. Smith Inc., 108 Eaton street, Springville, Erie Co., N. Y. is offering a new line of planetary speed reducers. Ratios from 20-1 to infinity-1 are available. Compactness



Smith planetary speed reducer

and high efficiency are outstanding features of the new units, one of which is shown herewith.

Horizontal Drilling Unit—

Rockford Drilling Machine Co., Rockford, Ill., recently developed a new horizontal drilling machine with an automatic hydraulic operating cycle. The unit, shown on page 64, is equipped with a five-station fixture and tooling for performing the machining operations on the flange of a large crankshaft. At station No. 1 the workpieces are loaded and unloaded; six holes are drilled and the center of the flange milled out at station No. 2; two locating holes are drilled at station No. 3; six holes are countersunk and two locating holes reamed at station No. 4; six holes are tapped at station No. 5.

On the front of the head is a de-

The NEWPORT ROLLING MILL CO.

IRON AND STEEL SHEETS

TO select the right sheet metal is no longer a process of trial and error, guess or experiment. Today you may safely and profitably depend on one source of supply for iron and steel sheets of the exact quality any job may require. The resources of The Newport Rolling Mill Company make instantly available **GLOBE BRAND** Sheets for those who want a dependable grade of steel at a low price; **KENTUCKY** Copper-Bearing Steel for those requiring a higher quality than commercial steel; **GOHI** Pure Iron-Copper Alloy for those demanding a sheet metal that will give unfailing service and satisfaction under the most difficult conditions. Each of these metals is produced by the same organization; to exacting standards of quality and uniformity. Each is outstanding in its class and represents superlative sheet metal value. Samples and full details of these metals on request.



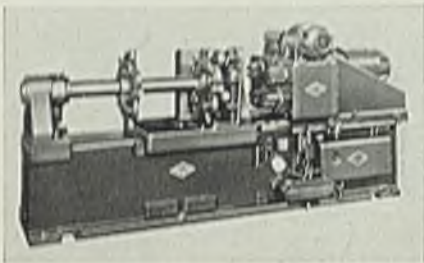
GOHI is pure iron alloyed with the right amount of copper to give maximum resistance to wear, weather and corrosion. Proved through a quarter century of service to be the longest-lasting, low-cost ferrous metal. Produced exclusively by The Newport Rolling Mill Co., Newport, Kentucky.

The **NEWPORT ROLLING MILL CO.**
NEWPORT, KENTUCKY.

Since 1891 Producers of High Grade Iron and Steel Sheets

tachable plate containing 23 spindles arranged in four clusters. This construction makes it possible to adapt the machine to engineering changes in workplaces, or to use it for many other types of work merely by making suitable changes in spindle arrangement, tooling, etc.

Easily adjusted dogs on the lower



Rockford horizontal drilling machine

edge of the traveling head govern its automatic operating cycle. Manual control for setting up purposes is provided by a conveniently placed lever.

♦ ♦ ♦

All-Welded Press Brake—

Boom Boiler & Welding Co., Cleveland, recently built an all-welded steel press brake of 500 tons capacity. The unit, shown herewith, is capable of bending materials 16 feet long. Revolutionary in design,



All-welded steel press brake developed by Boom Boiler & Welding Co.

the mechanism pulls two leaves together, permitting easy adjustment for bending by raising or lowering the bottom leaf which is moved by a worm drive controlled by a switch mounted on the front of the machine. All driving mechanism, adjustment shafts, etc., are below floor level, leaving the entire top clear. The two leaves of the brake are 17 feet, 7 inches long, 4 feet high, 10 inches thick and weigh 8 tons. All welding was done by the shielded arc process with equipment supplied by Lincoln Electric Co., Cleveland.

♦ ♦ ♦

Automatic Recloser—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is marketing a

new motor-operated timing recloser featuring an Integrating lockout device for automatically reclosing alternating or direct-current electrically operated breakers on alternating-current systems. It is housed in a metal case with a glass window and has rear connected terminals. The unit is suitable for mounting on any of the usual panel materials.

♦ ♦ ♦

Transformer Speed Regulators For Capacitor Motors—

General Electric Co., Schenectady, N. Y., is offering a new line of manually-operated transformer speed regulators for high and low torque capacitor motors, with and without full voltage starting for single phase and polyphase fan motors. The unit, shown herewith, consists of a tapped



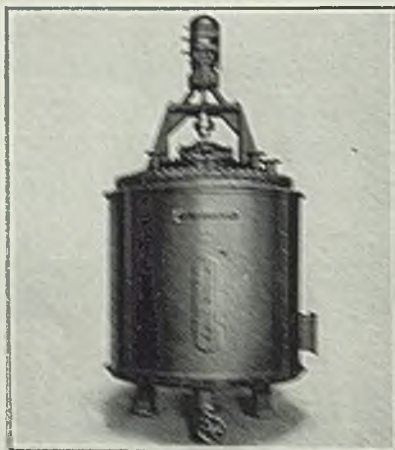
Manually - operated transformer speed regulator for high and low torque capacitor motors has been developed by General Electric Co.

autotransformer and a snap switch, and, for providing full voltage starting, a relay that affords automatic transfer to the desired running position.

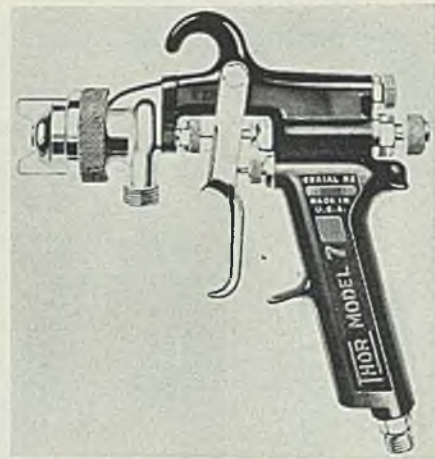
♦ ♦ ♦

Process Kettles—

Patterson Foundry & Machine Co., East Liverpool, O., has placed on the market a new line of electrically heated process kettles for oil treating, manufacture of synthetics, food



Patterson electrically heated process kettle has automatic control



Binks model 7 spray gun

and chemical process work. These units, one of which is shown herewith, can be supplied in stainless steel, aluminum, etc. They are equipped with Unipower drives and with stirrers of any type, as well as with automatic control. The kettles are built in 100, 250, 500 and 1000-gallon sizes.

♦ ♦ ♦

Spray Gun—

Binks Mfg. Co., 3114 Carroll avenue, Chicago, recently introduced a new Thor model 7 spray gun. In this development, shown above, color has been introduced into the gun body which is drop forged aluminum with a black electrolytic coating for surface protection. Increased speed, less air consumption and perfect atomization are some of the improvements incorporated in the device.

♦ ♦ ♦

Safety Transformer—

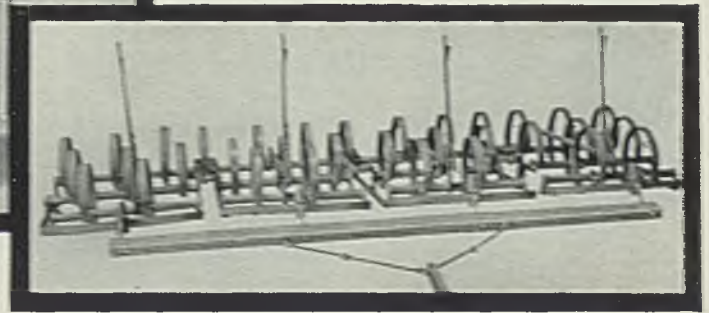
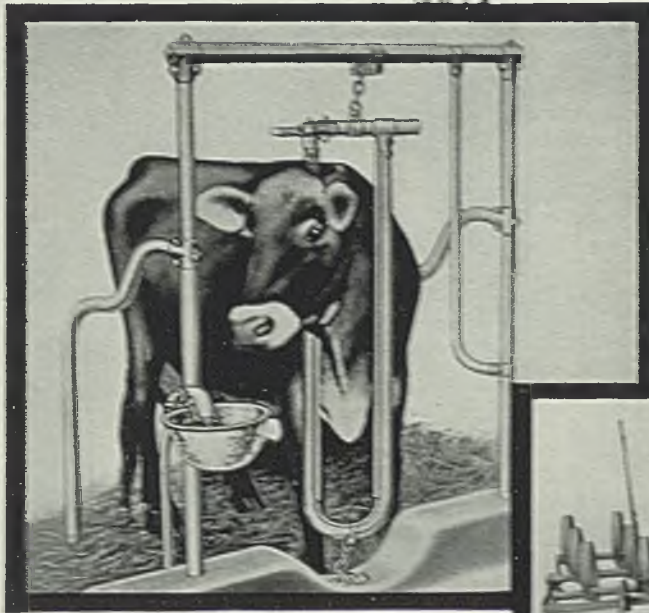
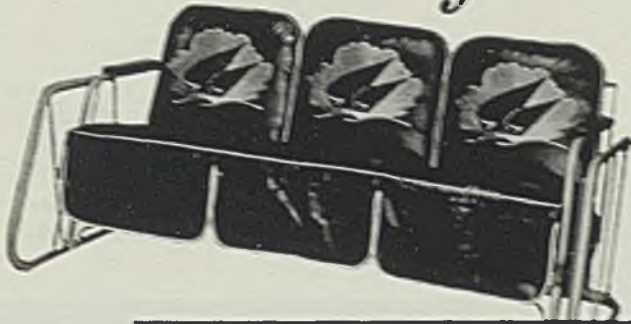
Acme Electric & Mfg. Co., Cleveland, is bringing out a new type of safety transformer for inspection or



Acme safety transformer

maintenance service. It is particularly designed for use in plants or in service where inspections or maintenance work must be done with electric illumination and in moist or damp places in buildings permeated with explosive vapor or fumes. As shown herewith, the unit is compact and portable.

Economical for every structural use-



New products now just in the development stage—old products now being redesigned for greater strength, increased sales appeal, lighter weight or lower cost—all may be materially improved if the designer is familiar with Steel and Tubes Rail Carbon Steel Tubing.

Analysis is the same as that of the finest quality high carbon rail-road rails, with the same high tensile strength, toughness and rigidity. Repeated tests on rail carbon tubing prove it to be approximately 37% stronger than tubing made of ordinary steel.

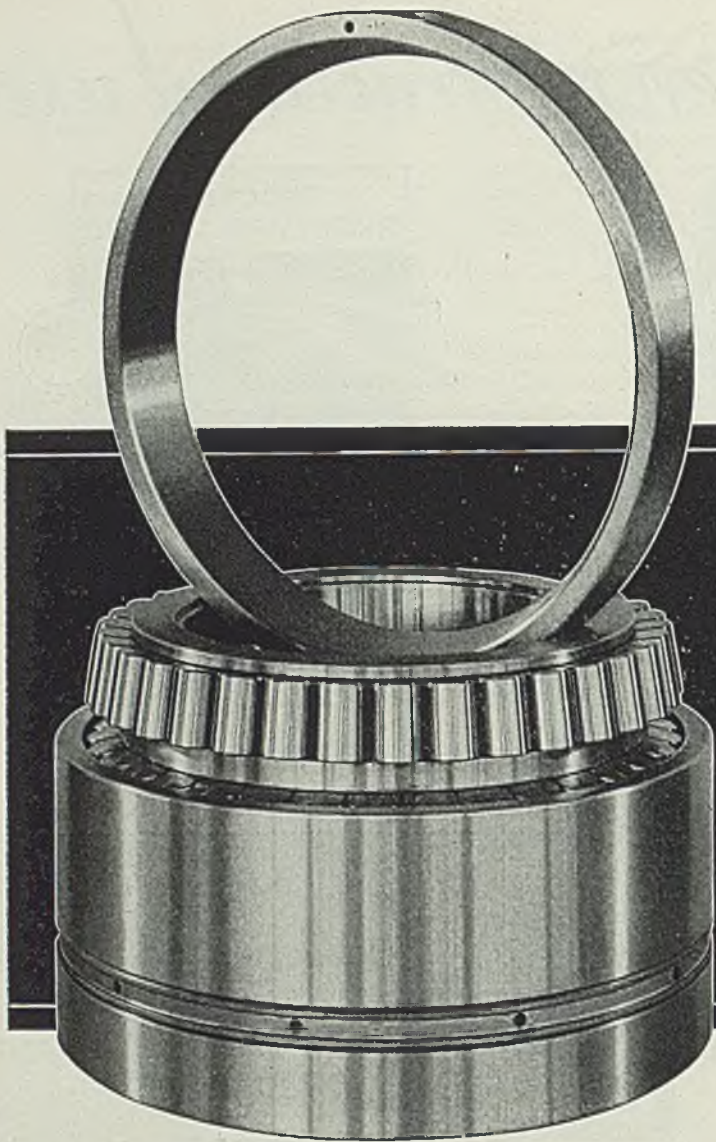


Steel and Tubes Inc.
WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING
CLEVELAND . . . OHIO

Steel and Tube's Handbook No. 200-RC devotes 32 pages to this interesting material—illustrates and lists the various forms and sizes of rolled shapes and electric resistance welded tubing available, with engineering data. A copy will be sent on request if you are interested in this greatest steel value obtainable today.



When writing Steel & Tubes, Inc. for further information, please address Dept. S T



BANTAM

Four Row — Full Complement Taper Roller Bearing — 16" ID x 26½" OD x 16" long.

**Our
Hats are off
to the
STEEL MEN!**

LEAVE it to them—the backbone of American industry—to invariably find the better, more economical way of doing a given job. When improved methods are found—when better equipment is devised—they are the men who quickly adopt them.

Probably that's the reason why in buying heavy duty roller bearings during 1935 there were, according to the September report in Iron and Steel Engineer:

MORE NEW BANTAM INSTALLATIONS LISTED THAN ALL OTHER MAKES COMBINED

We knew we were making real bearings for you. We knew they were doing an exceptional job. But we didn't know how well the industry knew it until the annual report came out.

If you have not as yet availed yourself of the service that has caused this splendid recognition, accept our standing invitation—*take your toughest bearing job to Bantam!*



THE BANTAM BALL BEARING CO.

(Subsidiary of The Torrington Co.)

SOUTH BEND, INDIANA

CHICAGO YOUNGSTOWN DETROIT NEW YORK NEW ORLEANS
PHILADELPHIA PITTSBURGH ROCHESTER, N. Y. SEATTLE
TOLEDO WASHINGTON, D. C. MILWAUKEE HARTFORD INDIANAPOLIS

In Canada—Dominion Engineering Works, Limited, Montreal

TAKE YOUR TOUGHEST BEARING JOB TO BANTAM

Steel Rate Gains as New Buying Tapers

Pressure for Delivery

Still Strong; Records

In Ingots, Motorcars

WHILE steelworks operations again advanced sharply last week, new commitments for finished steel are in lighter volume than in March, suggesting that production may soon begin to level off.

Backlogs acquired last month are sufficient to support mill activities close to current levels through April. However, consumers' stocks are low, and strong pressure for deliveries, especially from automobile manufacturers, may carry the steel rate still higher, in the effort to complete first quarter contracts by May 1. Steelmakers do not anticipate any abrupt change.

Steelworks operations last week rose 3 points to 66½ per cent, highest since the second week of June, 1930, at 68. Pittsburgh made the principal gain, up 5 to 57, and this week is expected to cross 60. One reason for the 11½-point rise at Pittsburgh in the past two weeks is that United States Steel Corp. units have overtaken many of the independents, and are close to the industry's general average. At Pittsburgh, also, two more blast furnaces were blown in, the 29 now active being the largest number in six years.

At Youngstown the steel rate was up 2 points to 76; eastern Pennsylvania 1½ to 42; Chicago ½-point to 68; Cleveland 5 to 86; New England 6 to 78; Cincinnati 21 to 76, while others were unchanged.

March was the first month in the whole recovery period in which daily average ingot output exceeded that for the full year 1930, 128,711 gross tons comparing with 127,500 tons. It was the largest for any month since June, 1930, with 136,000. The March average was 8.4 per cent better than February's, while the total, 3,346,489 tons, exceeded February's output by 12.7 per cent.

Production in the first quarter, 9,363,731 tons was 9.9 per cent larger than that for the first three months last year, but it failed by 17,769

MARKET IN TABLOID

DEMAND . . . New commitments lighter than in March.

PRICES . . . Steady; scrap easier.

PRODUCTION . . . Steelworks operations up 3 points to 66½ per cent.

SHIPMENTS . . . Heavier, in completing first quarter contracts.

tons to equal the fourth quarter, when new automobile models were introduced.

Automobile assemblies last week increased 4400 units to 112,800, highest since August, 1929, and comparing with the all-time record of 140,000 in 1929. It appears that April will be a 500,000-car month, and that May output will equal this.

Railroads awarded 31,000 tons of rails, bringing the total for rolling this year to 542,534 tons. Railroads estimate their rail orders this year will total 1,000,000 tons, 40 per cent more than produced in 1935.

Structural awards rose to 18,507 tons. Most of last year's PWA funds have been spent or allocated and public work has been tapering off, while industrial construction has increased.

The new prices so far have been put to only moderate test. Not all steelmakers have followed the open price plan. Some are considering a change in price conditions—"for shipment to one point at one time"—to allow more than one point of shipment to be specified, and delivery to be spread over ten days. Scrap shows further weakness at Chicago.

STEEL's iron and steel price composite is off 2 cents to \$33.11; the finished steel index remains \$52.20, while the scrap composite is down 13 cents to \$14.37.

Strong as the recovery in steel appears to be in this country, it is even more impressive in Great Britain. STEEL's London editor cables that the March ingot output of 980,100 gross tons established an all-time record, for any month, and that blast furnaces as well as steelworks are operating at practical capacity.

COMPOSITE MARKET AVERAGES

	April 11	April 4	March 28	One Month Ago March, 1936	Three Months Ago Jan., 1936	One Year Ago April, 1935	Five Years Ago April, 1931
Iron and Steel	\$33.11	\$33.13	\$33.13	\$33.20	\$33.34	\$32.29	\$31.47
Finished Steel	52.20	52.20	52.20	52.32	53.70	54.00	49.22
Steelworks Scrap....	14.37	14.50	14.50	14.48	13.15	10.05	10.12

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.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	April 11, 1936	March 1936	Jan. 1936	April 1935		April 11, 1936	March 1936	Jan. 1936	April 1935
Finished Material					Pig Iron				
Steel bars, Pittsburgh	1.85c	1.85c	1.85c	1.80c	Bessemer, del. Pittsburgh	\$20.8132	20.8132	20.8132	19.76
Steel bars, Chicago	1.90	1.90	1.90	1.85	Basic, Valley	19.00	19.00	19.00	18.00
Steel bars, Philadelphia	2.16	2.16	2.16	2.09	Basic, eastern del. East. Pa.	20.8132	20.8132	20.8132	19.76
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75	No. 2 fdry., del. Pittsburgh	20.3132	20.3132	20.3132	19.26
Shapes, Pittsburgh	1.80	1.80	1.80	1.80	No. 2 fdry., Chicago	19.50	19.50	19.50	18.50
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½	Southern No. 2, Birmingham.....	15.50	15.50	15.50	14.50
Shapes, Chicago	1.85	1.85	1.85	1.85	Southern No. 2, del. Cincinnati....	20.2007	20.2007	20.2007	19.23
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80	No. 2X eastern, del. Phila.	21.6882	20.6882	21.6882	20.63
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½	Malleable Valley	19.50	19.50	19.50	18.50
Tank plates, Chicago	1.85	1.85	1.85	1.85	Malleable, Chicago	19.50	19.50	19.50	18.50
Sheets, No. 10, hot rolled, Pitts...	1.85	1.85	1.85	1.85	Lake Sup., charcoal, del. Chi.....	25.2528	25.2528	25.2528	24.15
Sheets, No. 24, hot ann., Pitts....	2.40	2.40	2.40	2.40	Ferromanganese, del. Pitts.	80.13	80.13	90.13	89.85
Sheets, No. 24, galv., Pitts.....	3.10	3.10	3.10	3.10	Gray forge, del. Pittsburgh.....	19.6741	18.6741	19.6741	18.63
Sheets, No. 10, hot rolled, Gary....	1.95	1.95	1.95	1.95	Scrap				
Sheets, No. 24, hot anneal., Gary	2.50	2.50	2.50	2.50	Heavy melting steel, Pittsburgh..	\$15.75	\$15.75	\$14.50	\$11.70
Sheets, No. 24, galvan., Gary.....	3.20	3.20	3.20	3.20	Heavy melt, steel, No. 2, east. Pa.	12.75	12.55	11.37½	9.12½
Plain wire, Pittsburgh	2.40	2.30	2.30	2.30	Heavy melting steel, Chicago	14.25	14.75	13.40	10.05
Tin plate, per base box, Pitts.....	5.25	5.25	5.25	5.25	Rails for rolling, Chicago	15.75	15.75	14.25	11.05
Wire nails Pitts.	2.10	2.15	2.40	2.60	Railroad steel specialties, Chicago	15.75	16.25	14.45	11.25
Semifinished Material					Coke				
Sheet bars, open-hearth, Youngs.	\$28.00	\$28.50	\$30.00	\$28.00	Connellsville, furnace, ovens	\$3.50	\$3.50	\$3.50	\$3.60
Sheet bars, open-hearth, Pitts....	28.00	28.50	30.00	28.00	Connellsville, foundry, ovens	4.25	4.10	4.00	4.60
Billets, open-hearth, Pittsburgh....	28.00	28.40	29.00	27.00	Chicago, by-product foundry, del.	9.75	9.75	9.75	9.25
Wire rods, Pittsburgh	40.00	40.00	40.00	38.00					

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel		Tin Mill Black No. 28		Corrosion and Heat-Resistant Alloys				Structural Shapes	
Prices Subject to Quantity Extras and Deductions		Pittsburgh	2.75c	Pittsburgh base, cents per lb.				Pittsburgh	1.80c
Hot Rolled No. 10, 24-48 in.		Gary	2.85c	Chrome-Nickel				Philadelphia, del.	2.01½c
		St. Louis, delivered	3.08c	No. 302 No. 304				New York, del.	2.06½c
				Bars				Boston, delivered....	2.20½c
				Plates				Bethlehem	1.90c
				Sheets				Chicago	1.85c
				Hot strip				Cleveland, del.	2.00c
				Cold strip				Buffalo	1.90c
				Straight Chromes				Gulf Ports	2.20c
				No. No. No. No.				Birmingham	1.95c
				410 430 442 446				Pacific ports, f.o.b. cars, dock	2.35c
				Bars				Bars	
				Plates				Soft Steel	
				Sheets				(Base, 3 to 25 tons)	
				Hot strip				Pittsburgh	1.85c
				Cold stp				Chicago or Gary....	1.90c
								Duluth	2.00c
								Birmingham	2.00c
								Cleveland	1.90c
								Buffalo	1.95c
								Detroit, delivered....	2.00c
								Pacific ports, f.o.b. cars, dock	2.40c
								Philadelphia, del....	2.16c
								Boston, delivered....	2.27c
								New York, del.	2.20c
								Pitts., forg. qual....	2.10c
								Rail Steel	
								To Manufacturing Trade	
								Pittsburgh	1.70c
								Chicago or Gary	1.75c
								Moline, Ill.	1.75c
								Cleveland	1.75c
								Buffalo	1.80c

Iron	
Troy, N. Y.	1.70c
Terre Haute, Ind....	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined..	2.75-7.50c

Reinforcing		
New billet, straight lengths, quoted by distributors.		
Pittsburgh	1.95c-2.05c	
Chicago, Gary, Buffalo, Cleve., Birm., Young. ..	2.10c	
Gulf ports	2.45c	
Pacific coast ports f.o.b. car docks		2.45c
Philadelphia, del.....	2.11c-2.16c	
Rail steel, straight lengths, quoted by distributors		
Pittsburgh	1.90c	
Chicago, Buffalo, Cleve-land, Birm., Young.	1.95c	
Gulf ports	2.30c	

Wire Products

(Base, 3 to 25 tons)	
(Prices apply to straight or mixed carloads; less carloads \$4 higher; less carloads fencing \$5 over base column.)	
Base Pitts.-Cleve. 100 lb. keg. Stand. wire nails....	2.10c
Cement c'd nails....	2.10c
Galv. nails, 15 gage and coarser	4.10c
do. finer than 15 ga.	4.60c
(Per pound)	
Polished staples.....	2.80c
Galv. fence staples	3.05c
Barbed wire, galv....	2.60c
Annealed fence wire	2.65c
Galv. fence wire.....	3.00c
Woven wire fencing (base column, c.l.)	\$58.00
To Manufacturing Trade	
Plain wire, 6-9 ga.	2.40c
Anderson, Ind. (merchant products only) and Chicago up \$1; Duluth up \$2; Birmingham up \$3.	
Spring wire, Pitts. or Cleveland	3.05c
Do., Chicago up \$1, Worc. \$2.	

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination	
10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over.....	1.97½c
Gary, Ind., Cleve., Chi., up 5c	
Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c	

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons.)		
Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem		2.45c
Alloy		
S.A.E. Diff. S.A.E. Diff.		
2000.....0.25	3100.....0.55	
2100.....0.55	3200.....1.35	
2300.....1.50	3300.....3.80	
2500.....2.25	3400.....3.20	
4100 0.15 to 0.25 Mo.	0.50	
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni.....	1.05	
5100 0.80-1.10 Cr.....	0.45	
5100 Cr. spring	base	
6100 bars	1.20	
6100 spring	0.70	
Cr., Ni., Van.	1.50	
Carbon Van.	0.95	
9250.....carbon base plus extras		

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

(Base, hot rolled, 25-1 ton)	
(Base, cold-rolled, 25-3 tons)	
Hot strip to 23½-in.	
Pittsburgh	1.85c
Chicago or Gary..	1.95c
Birmingham base	2.00c
Detroit, del.	2.05c
Philadelphia, del.	2.16c
New York, del....	2.20c
Cooperage hoop,	
Pittsburgh	1.95c
Chicago	2.05c
Cold strip, Pitts.	
Cleveland	2.60c
Detroit, del.	2.81c
Worcester, Mass....	2.80c

Rails, Track Material

(Gross Tons)	
Standard rails, mill	\$36.37½
Relay rails, Pitts.	
20-45 lbs.	\$28.00
45-50 lbs.	\$25.00
50-60 lbs.	\$26.00
70-75 lbs.	\$24.50
80-90 lbs.	\$26.00
100 lbs.	\$27.00
Light rails, billet	
qual. Pitts., Chi....	\$35.00
Do., reroll, qual....	34.00
Angle bars, billet,	
Gary, Ind., So. Chi.	2.55c
Do., axle steel.....	2.10c
Spikes, R. R. base	2.60c
Track bolts, base....	3.60c
Tie plates, base	1.90c
Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up \$2; 16 and 20 lbs., up \$1; 12 lbs. up \$2; 8 and 10 lbs., up \$5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.	

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.	
Carriage and Machine	
½ x 6 and smaller....	70-10-5 off
Do. larger	70-10 off
Tire bolts	55 off
Plow Bolts	
All sizes	70-10 off
Stove Bolts	
In packages with nuts attached 72½-10 off; in packages with nuts separate 72½-10-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Step bolts	65-5 off
Elevator bolts	65-5 off
Nuts	
S. A. E. semifinished hex.: ½ to ¾-inch	60-20-15 off
Do., ½ to 1-inch	60-20-15 off
Do., over 1-inch	60-20-15 off
Hexagon Cap Screws	
Milled	80-10-10 off
Upset, 1-in., smaller.....	85 off
Square Head Set Screws	
Upset, 1-in., smaller.....	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pitts- burgh, Cleveland	2.90c	
Struc., c. l., Chicago	3.00c	
¾-in. and smaller, Pitts., Chi., Cleve. 70 and 50 off		
Wrought washers, Pitts., Chi., Phila. to jobbers & large nut, bolt mfrs....		\$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	\$2.75
Do. less carloads, 5 kegs or more, no discount on size extras.....	\$3.05

Do., under 5 kegs; no disc. on size extras..... \$3.20

Pipe and Tubing

Base \$200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld Steel			
In.		Blk.	Galv.
¼ and ¾.....	60	44½	
½.....	64½	55	
¾.....	67½	59	
1-3.....	69½	61½	
Iron			
½.....	31½	15	
¾.....	36½	20½	
1-1¼.....	39½	25½	
2.....	41½	26	
Lap Weld Steel			
2.....	62	53½	
2½-3.....	65	56½	
3½-6.....	67	58½	
7 and 8.....	66	56½	
9 and 10.....	65½	56	
Iron			
2.....	37	22½	
2½-3½.....	38	25	
4-8.....	40	28½	
Line Pipe Steel			
½, butt weld.....	56		
¼ and ¾, butt weld.....	59		
½, butt weld.....	63½		
¾, butt weld.....	66½		
1 to 3, butt weld.....	68½		
2, lap weld.....	61		
2½ to 3, lap weld.....	64		
3½ to 6, lap weld.....	66		
7 and 8, lap weld.....	65		
Iron			
½-1½ inch, black and galv. take 4 pts. over; 2½-6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8-12 inch, no extra.			

Boiler Tubes
C. L. Discounts, f.o.b. Pitts.
Lap Weld Charcoal
Steel Iron
2-2¼.....33 1¾.....8
2½-2¾.....40 2-2¼.....13
3.....47 2½-2¾.....16
3¼-3½.....50 3.....17
4.....52 3¼-3½.....18
4½-5.....42 4.....20
4½.....21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.
Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%.
Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes
Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1,000, on a dollars and cents basis per 100 feet and per pound. Less-carloads

revised as of July 1, 1935, carload Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, including, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc
100 ft. or 150 lbs. 32%
15,000 ft. or 22,500 lbs..... 70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton	
6-in. & over, Birm.....	\$39.00-40.00
4-in., Birmingham.....	42.00-43.00
4-in., Chicago.....	50.40-51.40
6 to 24-in. Chicago.....	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4 in.	16.00
Class A pipe \$3 over Class B	
Std. ftgs., Birm. base.....	\$100.00

Semifinished Steel

Billets and Blooms	
4 x 4-inch base; gross ton	
Pitts., Chi., Cleve., Buffalo & Youngs- town	\$28.00
Philadelphia	34.67
Duluth	30.00
Forging Billets	
6 x 6 to 9 x 9-in., base	
Pitts., Chi., Buff....	35.00
Forging, Duluth	37.00
Sheet Bars	
Pitts., Cleve., Young., Chi., Buff., Can- ton, Sparrows Pt.	28.00
Slabs	
Pitts., Chi., Cleve., Young.	28.00
Wire Rods	
Pitts., Cleve., No. 4 to 5	\$38.00
Do., No. 5 to 15/32-inch	40.00
Do., over 15/32 to 47/64-inch	42.00
Chicago up \$1; Worcester up \$2	
Skelp	
Pitts., Chi., Young., Buff., Coatesville, Sparrows Point....	1.80c

Coke
Price Per Net Ton
Beehive Ovens

Connellsville, fur....	\$3.50-3.65
Connellsville, fdry....	4.25-4.35
Connell prem. fdry....	5.35-5.50
New Itiver fdry.....	6.00
Wise county fdry....	4.45-5.00
Wise county fur....	4.00-4.50
By-Product Foundry	
Newark, N. J., del.	9.70-10.15
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del....	11.50
St. Louis, del.	10.00-10.50
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50-8.00
Detroit, ov., out. del.	9.00
Philadelphia, del.	9.38

Coke By-Products

Per gallon, producers' plants	
Tank lots	
Pure and 90% benzol.....	18.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylof	30.00c
Per lb. f.o.b. New York	
Phenol (200 lb. drums). ..	16.30c
Do. (100 lbs.)	17.30c
Eastern Plants, per lb.	
Naphthalene flakes and balls, in bbls., to jobbers 6.75c	
Per 100 lb. Atlantic seaboard	
Sulphate of ammonia....	\$1.25
†Western prices, ½-cent up.	

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; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
Bethlehem, Pa.....	\$20.50	\$21.00	\$20.00	\$21.50
Birdsboro, Pa.....	20.50	21.00	20.00	21.50
Birmingham, Ala., southern del.	15.50	15.50	14.50	21.00
Buffalo.....	19.50	20.00	18.50	20.50
Chicago.....	19.50	19.50	19.00	20.00
Cleveland.....	19.50	19.50	19.00	20.00
Detroit.....	19.50	19.50	19.00	20.00
Duluth.....	20.00	20.00	.....	20.50
Erie, Pa.....	19.50	20.00	19.00	20.50
Everett, Mass.....	20.50	21.00	20.00	21.50
Hamilton, O.....	19.50	19.50	19.00	.....
Jackson, O.....	20.25	20.25	19.75	.....
Neville Island, Pa.....	19.50	19.50	19.00	20.00
Provo, Utah.....	17.50	.....	17.00	.....
Sharpsville, Pa.....	19.50	19.50	19.00	20.00
Sparrows Point, Md.....	20.50	.....	20.00	.....
Swedeland, Pa.....	20.50	21.00	20.00	21.50
Toledo, O.....	19.50	19.50	19.00	20.00
Youngstown, O.....	19.50	19.50	19.00	20.00

Delivered from Basing Points:

Akron, O., from Cleveland.....	20.76	20.76	26.26	21.26
Baltimore from Birmingham.....	21.08	.....	19.96	.....
Boston from Birmingham.....	20.62	.....	20.50	.....
Boston from Everett, Mass.....	21.00	21.50	20.50	22.00
Boston from Buffalo.....	21.00	21.50	20.50	22.00
Brooklyn, N. Y., from Bethlehem.....	22.93	23.43	.....	.....
Brooklyn, N. Y., from Bmghm.....	22.50	.....	.....	.....
Canton, O., from Cleveland.....	20.76	20.76	20.26	21.26
Chicago from Birmingham.....	↑19.72	.....	19.60	.....
Cincinnati from Hamilton, O.....	20.58	20.58	20.08	.....
Cincinnati from Birmingham.....	20.20	.....	19.20	.....
Cleveland from Birmingham.....	19.62	.....	19.12	.....
Indianapolis from Hamilton, O.....	21.93	21.93	21.43	22.43
Mansfield, O., from Toledo, O.....	21.26	21.26	20.76	21.76
Milwaukee from Chicago.....	20.57	20.57	20.07	21.07
Muskegon, Mich., from Chicago	.....	.....	.....	.....
Toledo or Detroit.....	22.60	22.60	22.10	23.10
Newark, N. J., from Birmingham.....	21.61	.....	.....	.....
Newark, N. J., from Bethlehem.....	21.99	22.49	.....	.....
Philadelphia from Birmingham.....	20.93	.....	20.81	.....
Philadelphia from Swedeland, Pa.....	21.31	21.81	20.81	.....
Pittsburgh district from Neville base plus 67c, 81c and 1.21 switching charges	.....	.....	.....	.....
Saginaw, Mich., from Detroit.....	21.75	21.75	21.25	21.25

Delivered from Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
St. Louis, northern.....	20.00	20.00	19.50	.....
St. Louis from Birmingham.....	↑19.62	.....	19.50	.....
St. Paul from Duluth.....	21.94	21.94	.....	22.44

↑Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., \$24.00, Phila. base, standard and copper bearing, \$25.13.

Gray Forge	Charcoal	
Valley furnace.....	19.00 Lake Superior fur.....	\$22.00
Pitts. dist. fur.....	19.00 Do., del. Chicago.....	25.25
	Lylees, Tenn.....	22.50

Silvery†

Jackson county, O., base; 6-6.50 per cent \$22.75; 6.51-7—\$23.25; 7-7.50—\$23.75; 7.51-8—\$24.25; 8-8.50—\$24.75; 8.51-9—\$25.25; 9-9.50—\$25.75. 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	timore bases (bags)....	40.00
Fire Clay Brick	Domestic dead-burned	.....
Super Quality	gr. net ton f.o.b. Che-	.....
Pa., Mo., Ky.....	welach, Wash. (bulk)..	22.00
First Quality	Basic Brick	.....
Pa., Ill., Md., Mo., Ky.....	Net ton, f.o.b. Baltimore, Ply-	.....
Alabama, Ga.,.....	mouth Meeting, Chester, Pa.	.....
Second Quality	Chrome brick.....	\$45.00
Pa., Ill., Ky., Md., Mo.....	Chemically bonded	.....
Ga., Ala.....	chrome brick.....	45.00
Ohio	Magnesite brick.....	65.00
First quality.....	Chemically bonded mag-	.....
Intermediary.....	nesite brick.....	55.00
Second quality.....		.....
Malleable Bung Brick		.....
All bases.....		50.00
Silica Brick		.....
Pennsylvania.....		\$45.00
Joliet, E. Chicago.....		54.00
Birmingham, Ala.....		48.00
Magnesite		.....
Imported dead-burned		.....
grains, net ton f.o.b.		.....
Chester, Pa., and Bal-		.....
timore bases (bags).....		\$45.00
Domestic dead-burned		.....
grains, net ton f.o.b.		.....
Chester, Pa., and Bal-		.....

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton.....	\$20.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all-rail.....	\$18.00
Do., for barge.....	\$19.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid.....	75.00
Do., Balti., base.....	75.00
Do., del. Pittsb'gh	80.13
Spiegeleisen, 19-20% dom. Palmer-	.....
ton, Pa., spot.....	26.00
Do., New Orleans	26.00
Ferrosilicon, 50%	.....
freight all, cl.	77.50
Do., less carload.....	85.00
Do., 75 per cent.....	126-130.00
Spot, \$5 a ton higher.	.....
Silicomane, 2½ carb.	85.00
2% carbon, 90.00; 1%, 100.00	.....
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.....	10.00
Ferrotungsten, stand., lb. con. del.	1.30- 1.40
Ferrovandium, 35 to 40% lb., cont.....	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. aHow., net ton.....	137.50
Spot, 1 ton, frt. allow., lb.	7.00
Do., under 1 ton.....	7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, \$3 unitage.....	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% \$3 unitage.....	75.00
Ferromolybdenum, stand., 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
†Carloads, Quan. diff. apply.	.....

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper			Straits Tin		Lead	Alumi-	Antimony	Nickel	
Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	New York Spot	Lead Futures N. Y.	East St. L.	num St. L.	Chinese Spot, N. Y.	Cath-odes	
Apr. 4 9.25	9.37½	8.95	47.62½	46.55	4.60	4.45	4.90 *19.00	13.50	35.00
Apr. 6 9.25	9.37½	8.95	47.50	46.40	4.60	4.45	4.90 *19.00	13.50	35.00
Apr. 7 9.25	9.37½	8.95	47.12½	46.10	4.60	4.45	4.90 *19.00	13.50	35.00
Apr. 8 9.25	9.37½	8.95	46.95	45.87½	4.60	4.45	4.90 *19.00	13.50	35.00
Apr. 9 9.25	9.37½	8.95	46.87½	45.85	4.60	4.45	4.90 *19.00	13.50	35.00
Apr. 10 9.25	9.37½	8.95	47.00	46.00	4.60	4.45	4.90 *19.00	13.50	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets	
Yellow brass (high)	14.62½
Copper hot rolled.....	16.50
Lead cut to jobbers.....	8.25
Zinc, 100-lb. base.....	9.50
Tubes	
High yellow brass.....	16.87½
Seamless copper.....	17.00
Rods	
High yellow brass.....	13.12½
Copper, hot rolled.....	13.50
Anodes	
Copper untrimmied.....	14.00
Wire	
Yellow brass (high)	15.12½

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
New York.....	6.00- 6.25
Cleveland.....	6.75- 7.00
Chicago.....	6.12½-6.37½
St. Louis.....	6.00- 6.50
Heavy Copper and Wire	
New York, No. 1.....	7.37½-7.62½
Chicago, No. 1.....	7.12½-7.62½
Cleveland.....	7.00- 7.25
St. Louis, No. 1.....	7.25- 7.75
Composition Brass Borings	
New York.....	5.25- 5.75
Light Copper	
New York.....	6.25-6.37½
Chicago.....	5.62½-6.12½
*Cleveland.....	6.00- 6.25
St. Louis.....	5.75- 6.25

Light Brass	
Chicago.....	3.62½-3.87½
Cleveland.....	3.50- 3.75
St. Louis.....	3.50- 4.00
Lead	
New York.....	3.50- 3.75
Cleveland.....	3.50- 3.75
Chicago.....	3.37½-3.62½
St. Louis.....	3.50- 4.00
Zinc	
New York.....	2.37½-2.62½
Cleveland.....	2.50- 2.75
St. Louis.....	2.50- 3.00
Aluminum	
Borings, Cleveland..	9.00- 9.50
*Mixed, cast, Cleve..	13.25-13.50
Mixed, cast, St. L...	12.75-13.25
*Clips, soft, Cleve...	15.00-15.50
SECONDARY METALS	
Brass ingot, 85-5-5-5	9.50
Stand. No. 12 alum.	17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL	
Birmingham	10.00-11.50
Boston, dock, expt.	11.50-11.75
Boston, domestic	10.25
Buffalo, No. 1	13.50-14.00
Buffalo, No. 2	12.25-12.75
Chicago, No. 1	14.00-14.50
Cleveland, No. 1	15.00-15.50
Cleveland, No. 2	14.00-14.50
Detroit, No. 1	11.50-12.00
Detroit, No. 2	10.25-10.75
Eastern Pa., No. 1	13.50-14.00
Eastern Pa., No. 2	12.50-13.00
Federal, Ill.	11.50-12.00
Granite City, R. R.	12.50-13.00
Granite City, No. 2	10.75-11.25
N. Y., deal. No. 2	8.50-9.00
N. Y., deal. barge (No. 1 for export)	9.75-10.00
Pitts., No. 1 (R. R.)	16.00-16.50
Pitts., No. 1 (dlr.)	15.50-16.00
Pittsburgh, No. 2	14.50-15.00
St. Louis	11.50-12.00
Toronto, dealers	7.50
Valleys, No. 1	16.00-16.50
COMPRESSED SHEETS	
Buffalo, dealers	12.25-12.75
Chicago, factory	13.25-13.75
Chicago, dealer	12.75-13.25
Cleveland	14.75-15.25
Detroit	12.50-13.00
E. Pa., new mat.	13.00-13.50
Pittsburgh	15.50-16.00
St. Louis	9.00-9.50
Valleys	15.25-15.75
BUNDLED SHEETS	
Buffalo	11.00-11.50
Cincinnati, del.	8.75-9.25
Cleveland	11.90-11.50
Pittsburgh	14.50-15.00
St. Louis	7.25-7.75
Toronto, dealers	4.50
SHEET CLIPPINGS, LOOSE	
Chicago	9.50-10.00
Cincinnati	8.25-8.75
Detroit	9.00-9.50
St. Louis	6.50-7.00
STEEL RAILS, SHORT	
Birmingham	12.50-13.00
Buffalo	15.75-16.25
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	17.00-17.50
Cincinnati, del.	14.75-15.25
Detroit	15.00-15.50
Pitts., open-hearth, 3 ft. and less	17.25-17.75
St. Louis, 2 ft. & less ..	14.25-14.75
STEEL RAILS, SCRAP	
Boston	9.00-9.50
Chicago	14.00-14.50
Pittsburgh	16.25-16.75
St. Louis	13.25-13.75
Buffalo	14.00-14.50
Toronto, dealers	8.50
STOVE PLATE	
Birmingham	7.00-7.50
Boston, dealers	6.25-6.50
Buffalo	11.00-11.50
Chicago	8.00-8.50
Cincinnati, dealers ..	8.25-8.75
Detroit, net	9.00-9.50
Eastern Pa.	11.50
N. Y., deal. fdry.	7.50-7.75
St. Louis	7.50-8.00
Toronto, dealers, net ..	5.50

COUPLERS, SPRINGS	
Buffalo	14.75-15.25
Chicago, springs	15.50-16.00
Eastern Pa.	17.00-17.50
Pittsburgh	17.75-18.25
St. Louis	14.00-14.50
ANGLE BARS—STEEL	
Chicago	15.50-16.00
St. Louis	14.00-14.50
Buffalo	14.50-15.00
RAILROAD SPECIALTIES	
Chicago	15.50-16.00
LOW PHOSPHORUS	
Buffalo, billet and bloom crops	15.00-15.50
Cleveland, billet, bloom crops	17.50-18.00
Eastern Pa., crops	17.00-17.50
Pittsburgh, billet, bloom crops	18.00-18.50
Pittsburgh, sheet bar crops	17.50-18.00
FROGS, SWITCHES	
Chicago	14.00-14.50
St. Louis, cut	13.25-13.75
SHOVELING STEEL	
Chicago	14.00-14.50
Federal, Ill.	11.50-12.00
Granite City, Ill.	10.75-11.25
Toronto, dealers	6.50
RAILROAD WROUGHT	
Birmingham	7.50-8.00
Boston, dealers	7.25-7.50
Buffalo, No. 1	12.25-12.75
Buffalo, No. 2	13.50-14.00
Chicago, No. 1, net.	13.00-13.50
Chicago, No. 2	14.00-14.50
Cincinnati, No. 2	11.75-12.25
Eastern Pa.	14.00-14.50
St. Louis, No. 1	11.00-11.50
St. Louis, No. 2	12.50-13.00
Toronto, No. 1. dlr.	7.00
SPECIFICATION PIPE	
Eastern Pa.	12.50
New York, dealers	7.75
BUSHELING	
Buffalo, No. 1	12.25-12.75
Chicago, No. 1	13.00-13.50
Cinci., No. 1, deal.	8.50-9.00
Cincinnati, No. 2	5.75-6.25
Cleveland, No. 2	9.00-9.50
Detroit, No. 1, new.	11.00-11.50
Valleys, new, No. 1.	14.75-15.25
Toronto, dealers	6.00
MACHINE TURNINGS	
Birmingham	6.00-7.00
Boston, dealers	4.00-4.25
Buffalo	7.00-7.50
Chicago	7.50-8.00
Cincinnati, dealers ..	6.25-6.75
Cleveland	8.50-9.00
Detroit	7.00-7.50
Eastern Pa.	8.50
New York, dealers	5.00-5.25
Pittsburgh	10.75-11.25
St. Louis	4.50-5.00
Toronto, dealers	4.00
Valleys	11.50-12.00
BORINGS AND TURNINGS	
<i>For Blast Furnace Use</i>	
Boston, dealers	2.50-2.75

Buffalo	8.25-8.75
Cincinnati, dealers ..	6.25-6.75
Cleveland	9.00-9.50
Detroit	7.00-7.50
Eastern Pa.	6.50-7.00
New York, dealers	3.25-3.75
Pittsburgh	8.75-9.25
Toronto, dealers	4.00
CAST IRON BORINGS	
Birmingham, plain.	5.00-6.00
Boston, chemical	7.25-7.75
Boston, dealers	3.50-4.00
Buffalo	8.50-8.75
Chicago	7.50-8.00
Cincinnati, dealers ..	6.25-6.75
Cleveland	9.00-9.50
Detroit	7.00-7.50
E. Pa., chemical	11.00-13.00
New York, dealers	4.50-5.00
St. Louis	4.00-4.50
Toronto, dealers	5.00
PIPE AND FLUES	
Cincinnati, dealers ..	8.25-8.75
Chicago, net	8.00-8.50
RAILROAD GRATE BARS	
Buffalo	10.50-11.00
Chicago, net	9.00-9.50
Cincinnati	7.25-7.75
Eastern Pa.	11.50-12.00
New York, dealers	7.00-7.50
St. Louis	7.50-8.00
FORGE FLASHINGS	
Boston, dealers	7.75-8.00
Buffalo	12.25-12.75
Cleveland	13.50-14.00
Detroit	10.50-11.00
Pittsburgh	14.50-15.00
FORGE SCRAP	
Boston, dealers	6.00-7.00
Chicago, heavy	16.00-16.50
Eastern Pa.	12.50-13.00
ARCH BARS, TRANSOMS	
St. Louis	13.50-14.00
AXLE TURNINGS	
Boston, dealers	7.00-7.25
Buffalo	10.50-11.00
Chicago, elec. fur.	14.00-14.50
Eastern Pa.	12.00-12.50
St. Louis	9.00-9.50
Toronto	4.50
STEEL CAR AXLES	
Birmingham	12.00-13.00
Boston, ship. point.	11.00-11.25
Buffalo	15.50-16.00
Chicago, net	15.00-15.50
Eastern Pa.	17.00
St. Louis	13.50-14.00
Toronto	8.50
SHAFTING	
Boston, ship point.	13.75-14.00
Eastern Pa.	19.00-19.50
New York, dealers	14.75-15.25
St. Louis	13.50-14.00
CAR WHEELS	
Birmingham	11.00-12.50
Boston, iron deal.	8.75-9.00
Buffalo, iron	13.50-14.00
Buffalo, steel	15.75-16.25

Chicago, iron	14.00-14.50
Chicago, rolled steel ..	15.50-16.00
Cincinnati, iron	11.75-12.25
Eastern Pa., iron	15.00-15.50
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	17.50-18.00
St. Louis, iron	11.50-12.00
St. Louis, steel	14.75-15.25
Toronto, net	8.50
NO. 1 CAST SCRAP	
Birmingham	11.00-12.00
Boston, No. 1 mach.	9.25-9.75
Boston, No. 2	9.25-9.75
Boston, tex. con.	11.50-12.00
Buffalo, cupola	13.00-13.50
Buffalo, mach.	13.75-14.25
Chicago, agri. net.	10.50-11.00
Chicago, auto	12.00-12.50
Chicago, mach. net.	13.50-14.00
Chicago, rail'd net.	12.00-12.50
Cincl. mach. cup.	11.25-11.75
Cleveland, mach.	16.00-16.50
Eastern Pa., cupola	14.50-15.00
E. Pa., mixed yard.	13.00
Pittsburgh, cupola.	15.00-15.50
San Francisco, del.	13.50-14.00
Seattle	7.50-9.00
St. Louis, No. 1	11.50-12.00
St. L., No. 1 mach.	13.00-13.50
Toronto, No. 1, mach., net	9.00
HEAVY CAST	
Boston, del.	8.25-8.50
Buffalo, break.	11.25-11.75
Cleveland, break	12.50-13.00
Detroit, No. 1 mach. net	12.50-13.00
Detroit, break.	11.00-11.50
Detroit, auto net.	12.50-13.00
Eastern Pa.	13.50-14.00
N. Y., break, deal.	9.50-9.75
Pittsburgh	13.25-13.75
MALLEABLE	
Birmingham, R. R.	11.50-12.50
Boston, consum.	15.00-16.00
Buffalo	16.00-16.50
Chicago, R. R.	17.75-18.25
Cincinnati, agri. del.	13.50-14.00
Cleveland, rail	17.75-18.00
Detroit, auto, net.	14.50-15.00
Eastern Pa., R. R.	17.50-18.50
Pittsburgh, rail	18.50-19.00
St. Louis, R. R.	15.25-15.75
Toronto, net	7.00
RAILS FOR ROLLING	
<i>5 feet and over</i>	
Birmingham	12.00-13.00
Boston, dealers	9.00-9.50
Buffalo	13.50-14.00
Chicago	15.50-16.00
Eastern Pa.	15.00-15.50
New York, dealer.	10.25-10.50
St. Louis	14.25-14.75
LOCOMOTIVE TIRES	
Chicago (cut)	16.00-16.50
St. Louis, No. 1	12.00-12.50
LOW PHOS. PUNCHINGS	
Buffalo	15.00-15.50
Chicago	16.50-17.00
Eastern Pa.	16.00-16.50
Pittsburgh (heavy)	18.00-18.50
Pittsburgh (light)	17.00-17.50

Iron Ore

Lake Superior Ore	
<i>Gross ton, 51½%</i>	
Lower Lake Ports	
Old range bessemer	\$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore	
<i>Cents, unit, del. E. Pa.</i>	
Foundry and basic	
56-63% con. (nom.)	8.00-9.00
Cop.-free low phos.	
58-60% (nom.)	10.00-10.50
Foreign Ore	
<i>Cents per unit, f.a.s. Atlantic ports (nominal)</i>	
Foreign manganif- erous ore, 45.55%	

iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	\$15.85-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore

<i>(Nominal)</i>	
<i>Prices not including duty, cents per unit cargo lots</i>	
Caucasian, 52-55%	26.00
So. African, 52%	26.50
So. Afr., 49-51%	25.50
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	Cincinnati 3.25c	Buffalo 3.37c	Pittsburgh(h) 2.95c	Seattle 5.60c
Baltimore* 3.00c	Houston 3.25c	Chattanooga.. 3.56c	San Francisco 3.35c	St. Louis 3.55c
Boston†† 3.10c	Los Ang., cl.. 2.45c	Chicago 3.20c	Seattle 3.70c	St. Paul 3.55c
Buffalo 3.00c	New Orleans 3.50c	Cincinnati 3.42c	St. Louis 3.45c	
Chattanooga.. 3.36c	Pitts. plain (h) 3.05c	Cleveland. ¼- in. and over 3.31c	St. Paul 3.30c	
Chicago (j)..... 3.00c	Pitts. twisted squares (h) 3.175c	Detroit 3.42c	Tulsa 3.70c	COLD FIN. STEEL
Cincinnati 3.22c	San Francisco 2.45c	Detroit, ½-in. 3.65c		Baltimore (c) 3.75c
Cleveland 3.00c	Seattle 2.45c	Houston 3.00c	NO. 24 BLACK	Boston 3.90c
Detroit 3.09c	St. Louis 3.25c	Los Angeles.. 3.60c	Baltimore*† 3.60c	Buffalo (h)..... 3.55c
Houston 3.00c	Tulsa 3.25c	Milwaukee ... 3.31c	Boston (g) 3.95c	Chattanooga* 4.13c
Los Angeles.. 3.60c	Young 2.30c-2.60c	New Orleans 3.55c	Buffalo 3.25c	Chicago (h)..... 3.50c
Milwaukee ... 3.11c-3.26c		New York†(d) 3.40c	Chattanooga.. 4.16c	Cincinnati 3.72c
New Orleans.. 3.35c	SHAPES	Philadelphia* 2.98c	Chicago 3.85c	Cleveland (h) 3.50c
New York†(d) 3.31c	Baltimore* 3.00c	Phila. floor... 4.95c	Cincinnati 4.02c	Detroit 3.79c
Pitts. (h)..... 2.95c-3.10c	Boston†† 3.19c	Pittsburgh(h) 3.15c	Cleveland 3.91c	Los Ang. (f) (d) 5.85c
Philadelphia* 3.03c	Buffalo 3.25c	Portland 3.35c	Detroit 3.94c	Milwaukee ... 3.61c
Portland 3.50c	Chattanooga.. 3.56c	San Francisco 3.25c	Los Angeles.. 4.35c	New Orleans 4.50c
San Francisco 3.25c	Chicago 3.20c	Seattle 3.55c	Milwaukee ... 3.96c	New York†(d) 3.81c
Seattle 3.70c	Cincinnati 3.42c	St. Louis 3.45c	New Orleans 4.50c	Philadelphia.. 3.76c
St. Louis 3.25c	Cleveland 3.31c	St. Paul 3.45c	New York†(d) 3.89c	Pittsburgh... 3.50c
St. Paul 3.25c-3.40c	Detroit 3.42c	Tulsa 3.50c	Philadelphia*† 3.60c	Portland (f) (d) 6.15c
Tulsa 3.25c	Houston 3.00c		Pitts.** (h)..... 3.55c	San Fran.(f) (d) 5.95c
IRON BARS	Los Angeles.. 3.60c	NO. 10 BLUE	Portland 4.10c	Seattle (f) (d) 6.15c
Portland 3.40c	Milwaukee ... 3.31c	Baltimore* 3.10c	San Francisco 4.00c	St. Louis..... 3.75c
Chattanooga.. 3.86c	New Orleans 3.55c	Boston†† 3.30c	Seattle 4.40c	St. Paul 4.02c
Baltimore* 3.05c	New York†(d) 3.37c	Buffalo 3.62c	St. Louis 4.10c	Tulsa 4.65c
Chicago 2.75c	Philadelphia* 2.98c	Chattanooga.. 3.56c	St. Paul 3.90c	COLD ROLLED STRIP
Cincinnati 3.22c	Pittsburgh (h) 3.15c	Chicago 3.05c	Tulsa 4.75c	Boston, 0.100- in., 500 lb. lots 3.245c
New York†(d) 3.36c	Portland (i)..... 3.50c	Cincinnati 3.22c		Buffalo 3.39c
Philadelphia* 2.93c	San Francisco 3.25c	Cleveland 3.11c	NO. 24 GALV. SHEETS	Chicago 3.27c
St. Louis 3.25c	Seattle (i)..... 3.70c	Det., 3-10 ga. 3.14c	Baltimore*†... 4.30c	Cincinnati (h) 3.22c
Tulsa 3.25c	St. Louis 3.45c	Houston 3.85c	Buffalo 4.00c	Cleveland (b) 2.55c
REINFORCING BARS	St. Paul 3.45c	Los Angeles.. 3.75c	Boston (g)..... 4.65c	Detroit 3.18c
Buffalo 2.60c	Tulsa 3.50c	Milwaukee ... 3.16c	Chattanooga.. 4.86c	New York†(d) 3.36c
Chattanooga.. 3.36c		New Orleans 3.55c	Chicago (h)..... 4.55c	St. Louis 3.45c
Chicago 2.10c-2.60c	PLATES	New York†(d) 3.31c	Cincinnati 4.72c	
Cleveland (c) 2.10c	Baltimore* 3.00c	Portland 3.85c	Cleveland 4.61c	TOOL STEELS
	Boston†† 3.21c	Philadelphia* 3.08c	Detroit 4.72c	(Applying on or east of Mississippi river; west of Mississippi 1c up)

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Apr. 9

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

British gross tons U. K. ports	Continental Channel or North Sea ports, metric tons		Quoted in gold pounds sterling	
	£ s d	Quoted in dollars at current value	£ s d	**Quoted in gold pounds sterling
PIG IRON				
Foundry, 2.50-3.00 Silicon	\$15.47	3 2 6	\$14.14	1 15 0
Basic bessemer	15.47	3 2 6*	12.13	1 10 0
Hematite, Phos. .03-.05	17.61	5 11 0		
SEMIFINISHED STEEL				
Billets	\$28.92	5 17 6	\$18.99	2 7 0
Wire rods, No. 5 gage	44.39	8 19 0	56.39	4 10 0
FINISHED STEEL				
Standard rails	\$40.92	8 5 0	\$44.17	5 10 0
Merchant bars	1.71c	7 15 0	1.15c to 1.18c	3 2 6 to 3 5 0
Structural shapes	1.66c	7 10 0	1.12c	5 1 6
Plates, ¼ in. or 5 mm.	1.79c	8 1 3	1.55c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.17c	9 15 0	2.12c	5 16 0††
Sheets, galv., 24 gage, corr.	2.60c	11 15 0	2.29c	6 5 0
Bands and strips	1.92c	8 15 0	1.42c	4 0 0
Plain wire, base	2.17c	9 15 0	1.92c	5 3 0
Galvanized wire, base	2.53c	11 10 0	2.15c	5 17 6
Wire nails, base	2.62c	12 0 0	1.74c	4 15 0
Tin plate, box 105 lbs.	\$ 4.65	0 18 9		

British ferromanganese \$75 delivered Atlantic seaboard, duty-paid. German ferromanganese 49 0s Qd \$ (43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs	Belgian Francs	Reich Marks
Fdy. pig iron, St. 2.5	\$17.36	5 10 0(a)	\$17.15	260
Basic bessemer pig iron	17.36	5 10 0(a)	11.62	190
Furnace coke	5.21	1 1 0	5.36	95
Billets	28.92	5 17 6	28.53	450
Standard rails	1.82c	8 5 0	2.01c	671
Merchant bars	2.00c	9 1 0	1.67c	560
Structural shapes	1.93c	8 15 0	1.64c	580
Plates, ¼ in. or 5 mm.	2.00c	9 1 3	2.08c	700
Sheets, black	2.53c	11 10 0	1.77c	600
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.98c	13 10 0	2.83c	950
Plain wire	3.75c	9 15 0	2.68c	900
Bands and strips	2.16c	9 16 0	1.98c	650

*Basic, †British ship-plates. Continental bridge plates. ‡24 ga. †1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. a det. Middleshrough. b hematite. ††Close annealed. **Gold pound sterling carries a premium of 66.00 per cent over paper sterling.

BANDS	
Baltimore*.....	3.20c
Boston††.....	3.30c
Buffalo.....	3.42c
Chattanooga..	3.61c
Chicago.....	3.30c
Cincinnati.....	3.47c
Cleveland.....	3.36c
Detroit, ½-in. and lighter	3.39c
Houston.....	3.25c
Los Angeles..	4.10c
Milwaukee ...	3.41c
New Orleans	3.95c
New York†(d)	3.56c
Philadelphia..	3.18c
Pittsburgh (h)	3.20c
Portland.....	4.25c
San Francisco	4.10c
Seattle.....	4.25c
St. Louis.....	3.55c
St. Paul.....	3.55c
Tulsa.....	3.45c

HOOPS	
Baltimore.....	2.30c
Boston††.....	4.50c
Buffalo.....	3.42c
Chicago.....	3.30c
Cincinnati.....	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles..	5.85c
Milwaukee ...	3.41c
New York†(d)	3.56c
Philadelphia..	3.45c
Pittsburgh (h)	3.70c
Portland.....	5.60c
San Francisco	6.15c

BOLTS AND NUTS
(100 pounds or over)
Discount

Chicago (a)..... 70
Cleveland..... 70
Detroit..... 70-10
Milwaukee ... 70
Pittsburgh..... 70

(a) Under 100 pounds, 65 off.
(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) shapes other than rounds, flats, fillet angles, 3.15c.

†Domestic steel; *Plus quan. extras; **Under 25 bundles; ††50 or more bundles; ‡ New extras apply; †††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs and over, 35 cts. under base.

Bars

Bar Prices, Page 68

Pittsburgh—Producers of bars are considering practicability of placing a more liberal interpretation on the clauses "for shipment to one destination" and "for shipment at one time". Inasmuch as the quantity deduction system of pricing was established to conform to mill producing costs, it seems immaterial to bar makers to what point or points shipments are specified and whether shipments are all made at once or within a reasonable period, as long as no abuses are involved. Meanwhile, the volume of bar buying last week was as good as any week of the year. The 1.85c. base, on merchant bars is firm and without change.

Cleveland — The broadest diversification in demand for steel bars in many months is reported by producers and sellers here. The general opinion is that there may be some slowing after the present bulge in automotive requirements, but that there will not be an abrupt let-down, owing to the increasing number of miscellaneous orders. Prices are firm.

Chicago—Automotive buying is principally responsible for a further upturn in steel bar sales. Carbon, alloy and forging material also is moving well to miscellaneous consumers, with farm implement manufacturers continuing active production. Prices are steady.

Boston—Fair current buying features the steel bar market here. Practically all of this is new business as few consumers in New England are under contract for the quarter. Altogether, the volume of business in April is well ahead of that in March which, in turn, exceeded the February rate.

Philadelphia — Commercial bars, never a particularly active product in this district, are moving at about the same rate as in recent weeks, with specifications scattered.

Plates

Plate Prices, Page 68

Pittsburgh — Fairfield-Campbell Creek Coal Co., Cincinnati, is circulating an inquiry for 10 to 25 welded or riveted standard steel coal barges, requiring about 1000 to 1750 tons. Another important plate inquiry is for a large tonnage to replace tanks which damaged by fire and explosion March 13, belonging to the Waverly Oil Works, Coraopolis, Pa. William B. Seife Co., Oakmont, Pa., recently

NEW DEVELOPMENTS in the STEEL and TINPLATE industries require refillable SPIRAL WOUND BRUSHES

Brushes for Continuous strip processing developed for this purpose by Pittsburgh Plate Glass Co.

Brushes giving complete satisfaction in production

Pittsburgh, March 1—Revolutionary changes in large scale production of light gauge steel and continuous strip tin plate have brought the need for special brushes into sharp focus. The Brush Division of the Pittsburgh Plate Glass Company has developed a number of new refillable spiral wound brushes of wire, as well as tampico and horsehair, in collaboration with designers and manufacturers of machinery for these new processes. Brushes in service on a commercial scale are giving results far beyond expectations. New methods for speeding up production and obtaining more satisfactory finishes are being given searching attention by the leaders of the sheet steel and tin plate industries. There can be no trifling; the processes are undergoing fundamental changes and the significance of spiral wound refillable brushes in the new process cannot be overlooked.



SPIRAL WOUND TAMPOCO SHEET SCRUBBER

Thoroughly schooled in the new developments, our representatives will be glad to place their experience at your disposal and show you how you can improve product and production—and lower brush costs—by the use of refillable spiral wound brushes. Write today to:

PITTSBURGH }
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STEEL

ordered 129 boiler plates from Carnegie-Illinois Steel Corp. for construction of air tanks to be placed on seagoing vessels and tested for 250 to 400-pound air pressure. The market is firmly quoted at 1.80c, base, Pittsburgh.

Cleveland — Increasing activity is noted in the market for plates, but consumers continue to buy in small lots. A substantial tonnage was placed here for fabrication of concrete mixers. Orders are more fre-

quent for general construction purposes.

New York—Demand for steel plates is sluggish although some railroad tonnage is pending and fuel oil tank manufacturers are specifying fairly liberally. Action on the United States liner requiring 15,000 tons of hull steel is still indefinite.

Chicago—Plate buying is principally of a miscellaneous character except for demands of structural fabricators. Moderate tonnages are be-

ing taken by railroad equipment builders and repair shops, though these usually involve small individual lots. Tank fabricators show little improvement in their operations, while inquiries for both industrial and municipal tanks are light.

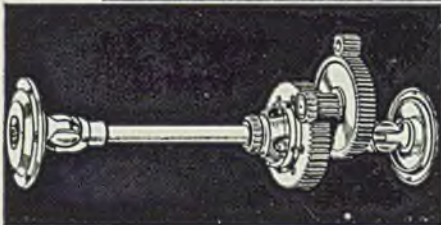
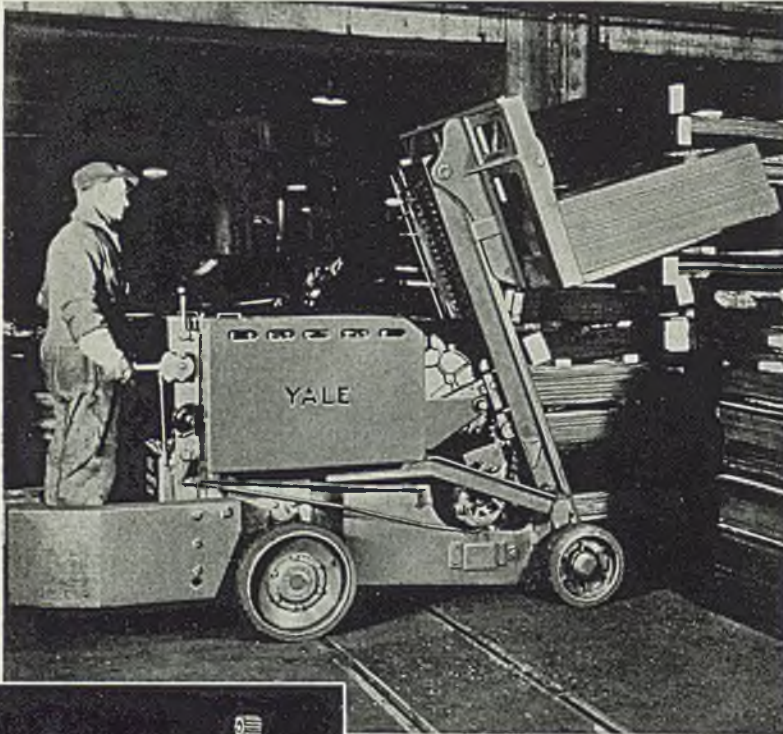
Boston—Current plate bookings are small, but tonnage exceeds that in March. The market continues 1.90c, base, Coatesville, Pa., equivalent to 2.22c, delivered, Boston. Some business recently went below this figure but apparently there is no shading at present.

Philadelphia — Plate tonnage is lagging. Apart from the Norfolk & Western distribution, railroad demand is light; building remains at a halting pace; and little is coming out from shipyards. Manufacturers of certain specialties requiring plates, such as fuel oil tanks and burners, are expected to specify more freely from now on, as their season is getting under way. Plates are steady at 1.90c, Coatesville, Pa., or 1.995c Philadelphia.

Birmingham, Ala.—Local fabricators are beginning to specify against contracts placed some time ago and plate mills are on three shifts a day. New business in sight will add materially to tonnage on books and prospects are for continuous activity through the summer.

San Francisco—To date this year 49,104 tons of plates have been booked, compared with 13,687 tons for the corresponding period in 1935. Pending business calls for more than 19,000 tons.

Seattle—There is fair demand for light plates in small tonnages for service station construction, tank and repair work. Proposed ship construction offers prospects for increased volume.



TRADE **YALE** MARK
MADE THIS MAN AN
EFFICIENCY EXPERT

The illustration above shows the Axle, Differential, Spur Gears, Universal and Driving Flanges as used in the POWER AXLE of this series Yale Trucks . . . Brute power under the constant control of the operator.

A visitor to a large industrial organization was being conducted through the plant by the works manager. As the tour progressed, he noted the steady, orderly flow of materials through the factory—from stock to machines, to assembly, to shipping—and remarked:

"You must have a real efficiency man here."

"We have several of them," was the reply. "There goes one now," as a workman guided a heavily loaded Yale Truck through the finishing room.

"Our Yale Truck System has made efficiency experts of all the men who handle the jobs of lifting and hauling materials. They have done away with all lost time and lost motion, all wasted effort. They have simplified many difficult and expensive jobs and actually save us thousands of dollars each year."

Would you like to know just how you can save time and money by making your materials handling men efficiency experts?

A Yale representative will gladly demonstrate.

THE YALE & TOWNE MFG. CO.
Philadelphia Division, Philadelphia, Pa., U. S. A.
Makers of Yale Hand and Electric Chain Hoists, Trolleys, Hand Lift Trucks and Skid Platforms.

Send for this illustrated folder which gives descriptions and engineering details of Yale High Lift Electric Trucks.



Contracts Placed

170 tons, two fuel flats, for Campbell Transportation Co., Pittsburgh, to Dravo Contracting Co., Neville Island, Pa.

100 tons or more, ship fuel carrying tanks, for Shaver Transportation Co., Portland, Oreg., to King Bros., Portland, Oreg.

Contracts Pending

3000 to 3750 tons, 20 or 25 welded or riveted standard steel coal barges, for Hatfield-Campbell Creek Coal Co., Cincinnati.

300 tons, two tank barges, 175 x 35 x 8 feet, for Standard Oil Co. of Louisiana, New Orleans.

Unstated, two 14,500-ton steel freighters for Matson Navigation Co.; bids at San Francisco, May 4.

Unstated, \$100,000 water tunnel project, Pearl Harbor, T. H.; bids to reclamation bureau, June 3.

Unstated, 190-foot, shallow draft motorship for Columbia river service; bids to C. J. Nordstrom, Seattle, April 10.

Unstated tonnage, tanks for Waverly Oil Works, Coraopolis, Pa.

Sheets

Sheet Prices, Page 68

Pittsburgh—Sheet producers claim that all shipments against first quarter contracts will have been completed by April 30. Some will have finished shipments prior to that date. With these heavy backlogs to work down, sheet mill operations were higher last week at 65-70 per cent of capacity, an advance of over 5 points. However, new specifications have fallen off, although those placed since April 1 have tested the new quantity differential system of quoting in a satisfactory manner. Pittsburgh base prices are firm.

Cleveland — Sheet mills in this district, continuing to operate at capacity, will complete practically all first quarter contracts this week. Orders are coming in strong on business placed since April 1, and the outlook for this month is highly favorable. Substantial tonnages have been placed by automobile manufacturers and partsmakers at the higher prices. Electric refrigerator manufacturers have increased their production schedules and are taking more material.

Chicago—Sheet shipments continue in excess of incoming business, due to the heavy movement of low priced material. Delivery of the latter will be cleaned up shortly and in the meantime mills are receiving some business on the new price basis. Quotations are reported firm on such transactions. Requirements of the automotive industry predominate, though shipments to miscellaneous consumers are holding well.

Boston—Because mills took heavy sheet specifications from consumers and jobbers on first quarter contracts, it is unlikely that these commitments will be disposed of before April 30. The tonnage of sheets going into tunnel liner construction continues substantial. Concrete Steel Co., New York, booked 1500 tons of sheet steel tunnel lining for work at Medford, Mass., in connection with sewer section 112, metropolitan district commission, Boston.

New York—While action is expected momentarily, no announcement as yet has been made of the award of the shelving contract for the Archives building, Washington. As noted previously, approximately 6000 tons of light steel, mainly sheets, are required. General business is light.

Philadelphia—Current sheet business continues to reflect the heavy buying in the closing weeks of last quarter, although some business is being placed at the new price schedules. Flood replacements have not

The "Boss" gave me a pat on the back this morning!



"He slapped me back of the ear with a sheaf of cost sheets. 'Look, Joe,' he grinned. 'Here it is in black and white. That "correct lubrication" hunch of yours saved us just \$350 a month on cutting oil costs alone last year!'"

A Standard Oil Engineer started the ball rolling for that superintendent—helped him earn his "pat on the back." How? With advice on selection and application of cutting oils better fitted for the particular work his tools had to handle—Free suggestions, which, coupled with the superintendent's own experience, made new savings possible.

The situation was different at a large box plant. Here, the lubricants themselves were well-fitted for the work they had to do. Lubrication costs were not excessively high. But a wide-awake management, wanting to make sure no economy "bets" were being missed, called in a Standard Oil Engineer. Changes in application methods and a new schedule of lubrication supervision brought costs down 30 percent the following year!



You may have to take the initiative to start your men searching for possible savings. There could be, however, no more convenient way than just calling your local Standard Oil (Indiana) office—or suggesting to one of your department men: "Why not call in a Standard Oil Engineer?"



Write for "The Lubrication Engineer—His Value to You"—know how these men work, and how you can profit by their free service. Address: STANDARD OIL COMPANY (Indiana) (302) 910 South Michigan Avenue, Chicago, Illinois

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STANDARD OIL COMPANY (Indiana)

CORRECT LUBRICATION

as yet come out in an appreciable volume.

Relative to steel damaged in transit by floods, it is understood that under the steel code a regulation was enacted vesting ownership with the producers until the steel was delivered. This was to rectify certain unfair practices. As a result, it is understood many contracts today specifically state that tonnage is the producers' property until delivered, and at least one seller has been replacing the steel thus damaged in transit, without cost to the purchaser.

Buffalo—Sheet demand is steady,

and there is increasing pressure for quick deliveries to automobile manufacturers. Production for the next six weeks is expected to hold or exceed the present 75 per cent rate.

Cincinnati—New business is in fair volume although for near requirements chiefly. Demand points upward and mill interests are confident of a continuance of near-capacity operations. Rolling schedules have been restored throughout the Cincinnati district recently threatened by high river stages.

Birmingham, Ala.—Sheet mills of this district are operating on three

shifts daily, and there is not much stock in their warehouses. Prospects are bright for continued activity for some weeks.

Pipe

Pipe Prices, Page 69

Pittsburgh—National Tube Co. is proceeding with production against the 44,000-ton line pipe order, which it closed on three weeks ago for the Panhandle Eastern Pipe Line Co. Tubular products in general are reflecting a healthy volume of specifications, outstanding among which is demand for oil country goods. In connection with the aforementioned line, S. R. Dresser Mfg. Co., Bradford, Pa., has received the contract for couplings.

Cleveland — Awards of cast iron pipe for public works projects are tapering off, as most of the original PWA allotment made last year has been spent or obligated. Until additional funds are allowed few new jobs will become available for figures. The market for steel pipe is fairly active, mainly through jobbers.

Chicago—While shipments against old orders for cast pipe are somewhat heavier, market activity still is far from being brisk. Practically all new business and inquiries are for WPA projects. For a sewage treatment works extension, 330 tons are pending, with several hundred tons yet to be placed on a previous inquiry of the sanitary district.

Boston—Demand for cast pipe is fairly active. Awards the past week aggregated close to 1000 tons, and pending business was increased by some 2000 tons. Bids will be taken soon on 1600 tons for Harwich, Mass. Prices are unchanged.

New York—Awards of cast pipe last week aggregated about 2500 tons. New inquiries are coming out slowly. Volume of tonnage pending is relatively small. Prices are unchanged.

San Francisco—Activity in cast pipe remains exceptionally quiet, and only three projects, of size, are pending. The tonnage involved is less than 800 tons. The largest inquiry calls for 498 tons of 6 and 8-inch, for Pasadena, Calif., on which bids have been opened.

Seattle—Inquiry is slow and new projects are lacking. Bids were opened April 8 for about 225 tons of 4, 6 and 8-inch cast pipe for district No. 3, King county, Washington. Yellowstone county, Montana, opened bids April 9 at Billings, Mont., for

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THE TYPE "AM"

A highly efficient separator for concentrating gangue, magnetite, roasted hematite, sponge iron, powdered substances that are very magnetic. This separator is the only commercial machine capable of concentrating material of this character advantageously, providing high cleansing and purification of the gangue with very little loss in the tails. Energized by A.C. instead of conventional D.C.—available in various sizes and styles.

More than thirty years' experience in magnetic equipment of all



types, including magnetic power transmission—clutches and brakes—qualifies us to make practical installations. Put your magnetic problem up to us, the type AM shown here is but one of fifty different types of Stearns Separators for various services.

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HIGH
STEARNS
DUTY

MAGNETIC EQUIPMENT

2200 feet of cast pipe and accessories.

Cast Pipe Placed

- 1100 tons, water line, New York, to United States Pipe & Foundry Co., Burlington, N. J., through procurement division, treasury department, New York.
- 480 tons, Goshen, N. Y., to United States Pipe & Foundry Co., Burlington, N. J., through W. G. Fritz, South Orange, N. J.
- 475 tons, Westchester sanitary sewer commission, White Plains, N. Y., to United States Pipe & Foundry Co., Burlington, N. J. through Inter-county Construction Corp., Rye, N. Y.
- 300 tons, 10-inch, Barnstable, Mass., to Warren Foundry & Pipe Corp., Phillipsburg, N. J., through L. Capaldi, Providence, R. I.
- 150 tons, Fall River, Mass., to United States Pipe & Foundry Co., Burlington, N. J.
- 100 tons, Pittsfield, Mass., to Warren Foundry & Pipe Corp., Phillipsburg, N. J.
- 100 tons, Andover, Mass., to Warren Foundry & Pipe Corp., Phillipsburg, N. J.
- 100 tons, Bellevue, O., to James B. Clow & Sons, Chicago.

Cast Pipe Pending

- 800 tons, Cotuit, Mass.; bids soon.
- 330 tons, north side sewage treatment works extension, Chicago sanitary district; bids April 23.
- 225 tons, 4, 6 and 8-inch, King county, Washington, district No. 3; bids in at Seattle.
- 200 tons, 6 and 8-inch, Waterbury, Conn.; bids taken.
- 200 tons, filtration plant, Athol, Mass.; bids taken.
- 145 tons, 12-inch, WPA work, Boston; bids taken.
- 130 tons, 12-inch, WPA work, Boston; bids taken.
- 100 tons, 6 and 8-inch, Concord, N. H.; bids taken.
- Unstated, 2200 feet, various sizes, for Billings, Mont.; bids in.

Wire

Wire Prices, Page 69

Pittsburgh—Shipments of some volume continue through this month on first quarter contracts for plain manufacturing and spring wire, on which a price change went into effect officially April 1. However, by May 1 the market will doubtless be on a uniform level with these backlogs cleaned up. Many jobbers of merchant products are actively in the market and nails, fencing and other merchant items are moving at a good pace. Nails are quoted \$2.10 per keg, Pittsburgh, plain wire, 2.30c and spring wire, 3.05c.

Cleveland — Wire mills here are close to capacity, mainly on specifications received before April 1. Little contracting has been done for second quarter. Bolt and nut manufacturers have increased production, some operating on day and night

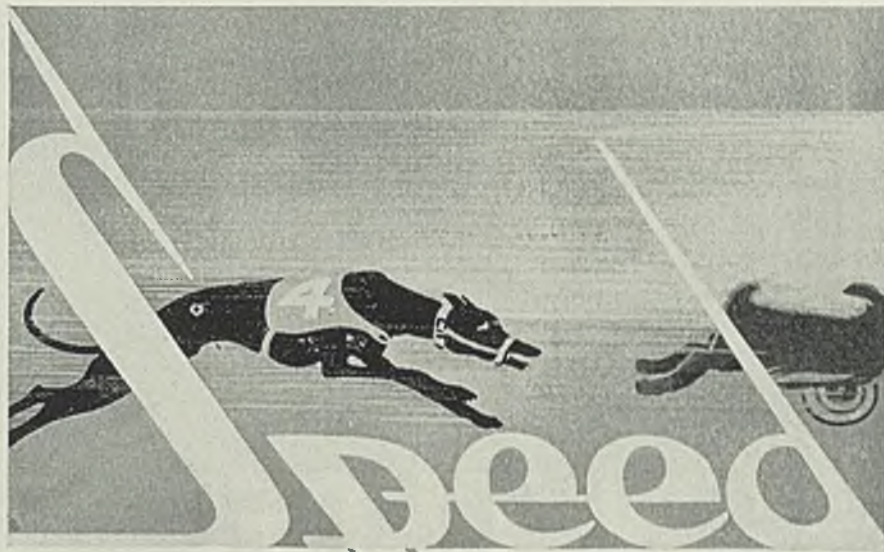
schedules, and are taking substantial shipments of wire. Jobbers are laying in stocks, and demand from agricultural areas for plain wire and fencing material is strong.

Chicago—Wire shipments continue fairly heavy, aided by delivery of low-price material placed before April 1. Jobber demand for merchant products is increasing, as also is rural buying.

Boston—Little new buying features the market in steel wire and wire products as specifications during first quarter will take care of require-

ments for some time, at least until June 1 in most cases. Little second quarter contracting is noted for manufacturers' wire, which holds at 2.50c, base, Worcester, Mass. Spring wire continues 3.15c, base, Worcester.

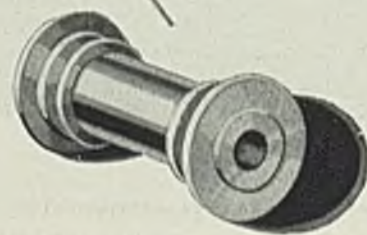
Philadelphia—Merchant wire is being consumed in increasing quantities, partly due to flood rehabilitation, but largely because of open weather conditions which have facilitated general construction. However, little of this is being reflected on mill books at this time, as most



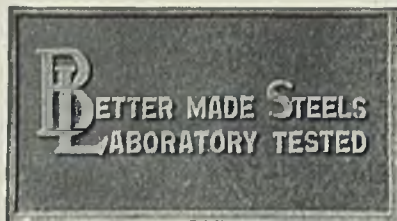
JUST as the fleet whippet streaks around the track, so Ultra-Cut Steel races under the tool, setting new records in production, and winning the enthusiastic approval of industry.

This high sulphur grade of B & L screw stock almost doubles the output of automatic screw machines without sacrifice of quality in the finished parts. Its use insures longer tool life, and less "down time" of machines, an advantage that every operator appreciates.

Try Ultra-Cut Steel on your next order for screw stock. You will like its machinability and profit from its economy.



A typically fine part, fabricated from $\frac{3}{8}$ " Round Ultra-Cut on B & S Automatic at 239 S.F.M. Machined and drilled at a rate of 90 pieces per hour with tool life of 24 hours.



Cold Drawn Bars • Shafting • Special Sections • Alloy Steels

BLISS & LAUGHLIN, INC.
HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.

distributors placed substantial orders at the concessions prevalent in the closing weeks of last quarter. Manufacturers' wire is moving in fair volume.

Quicksilver

New York—Scattered small lot buying has featured the quicksilver market, some sellers reporting increased interest in lots up to 25 flasks. Supplies of domestic metal here still are light. Lots of 15 to

25 flasks are unchanged at \$78 to \$79 a flask.

Semifinished

Semifinished Prices, Page 69

Pittsburgh—A trend toward more forward buying in sheet bars, rerolling billets and wire rods is in evidence in the market and on current sales. Prices are well maintained on the basis of \$28, f.o.b. Pittsburgh, for sheet bars, blooms and slabs, as well as rerolling billets. The wire rod

market, Nos. 4 and 5 base, holds at \$38, and forging quality billets continue to take the \$35 base for 6 x 6 to 9 x 9-inch sizes. Heavier demand for oil country goods is resulting in a marked improvement in shipments of tube rounds.

Boston—Moderate sales of billets in carload lots feature the semifinished steel market here. These are at \$28, base, Buffalo, equivalent to \$33.885, delivered Boston, for rerollers. The wire rod market continues \$40, base, Worcester, for Nos. 4 to 5. There has not been much forward contracting for semifinished steel and considerable buying for current consumption is expected.



Transportation

Track Material Prices, Page 69

Buying of steel rails continues to be the current important development in steel for railroad use. Placing of 25,000 tons by the Baltimore & Ohio and 6000 tons by the Chicago, Rock Island & Pacific, in addition to the 18,099 tons by the Erie, the later noted last week, makes a fairly imposing total. Building of a section of 111 miles by the Santa Fe is estimated to require close to 19,000 tons, which is expected on the market shortly. The Erie also distributed about 2000 tons of accessories.

Distribution of 11,000 tons of steel by the Norfolk & Western, all but 2000 tons of which is for construction of 1000 coal cars in its own shops, has been completed. Plain carbon steel products totaled 5100 tons, divided among nine producers. Pipe for these cars has been awarded to Wheeling Steel Corp., Wheeling, W. Va. About 2000 tons for maintenance work was divided between Carnegie-Illinois Steel Corp., Pittsburgh, Central Iron & Steel Co., Harrisburg, Pa., and Jones & Laughlin Steel Corp., Pittsburgh. About 1400 tons of car parts and 2400 tons of high tensile steel also have been distributed. Construction of 12 locomotives by this road will require 500 tons of plates, which have not been placed. New York Central is distributing its quarterly steel requirements.

Car buying is less active than a short time ago. Santa Fe has placed an eight-car stainless steel, diesel-electric driven train from Edward G. Budd Mfg. Co., Philadelphia. Chicago, Milwaukee, St. Paul & Pacific has started on its program of building 1500 freight, 37 passenger cars and one locomotive.

Distribution of 500 box cars and 300 automobile cars by the Erie and

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be your metallurgist in
the selection of your
special steels

When you want guaranteed machining performance, exactness to size, straightness, definite tensile strength or any other combination of desired physical characteristics, put your problem up to Wyckoff metallurgical

experts,—let them determine the exact chemical and physical values you require for economy and dependability. They offer you the advantages of many years of intensive specialization in meeting industry's most difficult steel problems.

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General Offices: First National Bank Bldg., Pittsburgh, Pa.

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Manufacturers of Cold Drawn Steels

Turned and Polished Shafting Turned and Ground Shafting

777 freight cars by the Nickel Plate is expected this week.

Domestic freight car awards during March involved 632 cars, and brought the total for the first three months to 9582 cars. Further comparisons follow:

	1936	1935	1934	1933
Jan.	2,050	24	152	3
Feb.	6,900	806	19,725	0
March	632	0	30	5
3 mos.	9,582	830	19,907	8
April		350	800	50
May		2	717	8
June	5,151	1,835	500	
July	500	19	306	
Aug.	200	105	202	
Sept.	875	7	23	
Oct.	1,250	75	514	
Nov.	100	254	533	
Dec.	10,050	110	318	
Total	19,308	23,829	2,460	

Car Orders Placed

Atchison, Topeka & Santa Fe, eight-car stainless steel, passenger train to Edward G. Budd Mfg. Co., Philadelphia.

Locomotives Placed

Chicago, Milwaukee, St. Paul & Pacific, one streamlined locomotive, to American Locomotive Co., New York.

Louisiana & Arkansas, five freight locomotives, to Lima Locomotive Works, Lima, O.

New York Central, seven diesel-electric switching locomotives to Electro-Motive Corp., Chicago.

Rail Orders Placed

Chicago, Rock Island & Pacific, 3000 tons each to Carnegie-Illinois Steel Corp. and Inland Steel Co., Chicago; eventually expects to take 40,000 tons.

Baltimore & Ohio, 25,000 tons; Carnegie-Illinois Steel Corp., Pittsburgh, 15,600 tons; Bethlehem Steel Co., Bethlehem Pa., 8400 tons; and Inland Steel Co., Chicago, 1000 tons. Erie railroad, 18,099 tons; Carnegie-Illinois Steel Corp. awarded 14,099 tons, Bethlehem Steel Co., 2462 tons and Inland Steel Co., 1538 tons.

Strip Steel

Strip Prices, Page 69

Pittsburgh—Specifications covering hot and cold rolled strip steel have declined considerably the past week but producers are working off heavy backlogs accumulated before April 1. Some tonnage which has been placed since that time has tested the new quantity differential system of quoting.

Chicago—Strip producers have not yet completed shipment of tonnages ordered before the application of new prices. This situation curtails necessity for new buying, but quotations are reported well observed on fresh commitments.

Cleveland — Strip mill continue at capacity, and in addition to heavy

shipments to automobile manufacturers and partsmakers there is a strong demand from miscellaneous consumers. New buying for the automobile industry, however, is in lighter volume than last month. Prices are steady.

Boston—March bookings were the heaviest since 1928. Practically no new tonnage is being placed as material specified against first quarter contracts will meet consuming requirements generally until around June 1.

New York—Cold-rolled high-car-

bon spring steel with a carbon content in excess of 0.25 now is offered generally on a new price basis. The extras for high carbon content, heretofore included in the standard list of cold-rolled strip steel extras, will be eliminated from that list which, it is understood will apply only to material with a carbon content of 0.25 or less.

Base prices for cold-rolled high carbon spring steel are as follows: carbon 0.26 to 0.50, 2.60c, Pittsburgh and Cleveland, and 2.80c, Worcester, Mass.; carbon 0.51 to 0.75, 3.45c, Pittsburgh and Cleveland, and

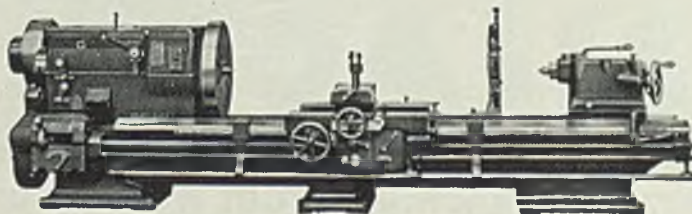
UNIQUE CONSTRUCTION

Typical of LeBlond advanced design is the double-walled box type apron. The leadscrew, double bevel pinion and half-nut brackets cast integral with nothing to work loose or get out of alignment. All shafts supported on both ends. The positive jaw feed clutch—another LeBlond creation—with single control for both longitudinal and cross feed, is unfailing in operation, dependable under all conditions, and eliminates the usual troublesome feed friction. Apron lubrication is by "one-shot" force feed.

Years of continuous accurate and speedy production will confirm your buying judgment when you select a LeBlond Lathe. Write for descriptive literature.

The R. K. LeBlond Machine Tool Company
Cincinnati, Ohio

30-inch
Heavy Duty
Engine Lathe



Reinforcing

Reinforcing Bar Prices, Page 69

700 tons, Bedford, O., bids April 17, to state highway commission, Columbus, O.; 1200 tons, Lorain street; 300 tons, Triskett road; 300 tons, Warner road, bids shortly.
 2100 tons, state bridges, Missouri.
 1650 tons, state bridges, Texas.
 1600 tons, Kings county hospital nurses home, Brooklyn, N. Y.; bids April 20.
 1400 tons, state bridges, Indiana.
 900 tons, Livernois avenue grade elimination, Detroit.
 800 tons, Michigan avenue bridge over Baltimore & Ohio railroad tracks, Washington.
 600 tons, bascule bridge over Shark river, Monmouth county, New Jersey; bids open April 18.
 600 tons, Wagner building addition, Grand Concourse and Fordham road, New York; C. T. Wills Inc., New York, general contractor.
 600 tons, building, Dayton Power & Light Co., Dayton, O.; bids in April 13.
 575 tons, state bridges, Minnesota.
 520 tons, various projects for Missouri highway commission.
 503 tons, three-span plate girder bridge, Kingston borough, Luzerne county, Pennsylvania; bids taken by state highway department, Harrisburgh, Pa., April 9.
 500 tons, dredge, St. Paul.
 500 tons, building for Starcor Realty Co., 55-15 Grand street, Queens, N. Y.
 500 tons, four bridges, scattered locations, state of Wisconsin; bids April 17.
 430 tons, state highway bridge, Glenville, N. Y.
 400 tons, state highway bridge, Schenectady, N. Y.
 339 tons, viaduct, Butler county, Pennsylvania; McCrady Construction Co., Pittsburgh, low. Bids April 9, to include 161 tons bars.
 345 tons, deck plate girder and deck truss underpass bridge, Montgomery-Philadelphia counties, Pennsylvania; Merritt, Chapman & McLean Corp., Baltimore, low at \$98,067.60.
 243 tons, under-crossing, Oregon City, Clackamas county, Oregon; bids April 17.
 230 tons, Pasco-Kennewick state bridge, Washington; bids at Olympia, Wash., April 21.
 230 tons, bridge in Franklin Benton county, Washington; bids April 21.
 223 tons, plate girder bridge, Paradise township, Monroe county, Pennsylvania; bids to state highway department, Harrisburgh, Pa., April 24.
 170 tons, state highway bridge, Newfields, N. H.
 168 tons, crossing, Black River Junction, King county, Washington; bids April 21.
 150 tons, grade crossing elimination, Hopewell Junction, N. Y.
 100 tons, foundry addition, Draper Corp., Hopedale, Mass.
 100 tons, highway bridge, Ellis county, Kansas.
 100 tons, miscellaneous, Frenchtown canal project; bids to reclamation bureau, Missoula, Mont., April 27.
 100 tons, state buildings, Olympia and Medical Lake, Wash.; Sheble Construction Co., Seattle, general contractor.
 Unstated, state span, Clackamas county, Oregon; bids at Portland, Ore., April 17.
 Unstated, state viaduct, 632 feet long, Flathead county, Montana; Massman Construction Co., Kansas City, Mo., low.
 Unstated, four hangars for Hickman Field, Hawaii; bids at Fort Mason, Calif., April 28.

New York—Awards continue small, the only sizable business being comprised in one lot of 300 tons. Several new projects are swelling the volume of tonnage pending. Indications are that a heavy volume of business will be placed over the next month. The market on new billet bars continues at 2.20c to 2.40c base, delivered, New York, to which prices the usual \$2 a

ton charge is added for trucking to the building site.

Boston—Several hundred tons of reinforcing bars were awarded during the week. New projects are developing slowly. The current market usually is 2.10c, base, Buffalo, equivalent to 2.46c, delivered, Boston, with \$2 a ton customarily added to cover trucking to the building site.

Philadelphia—The Philco Radio project involving 500 tons, at one time reported placed, has been indefinitely withdrawn. Approximately 500 tons are now pending for superstruc-

Industry's Black Sheep

N.P.L.
[NEEDLESS POWER LOSS]

BANISH this black sheep N. P. L. (Needless Power Loss) from your plant. Stop letting him feed on your profits . . . interrupting your production . . . burdening your maintenance costs. It's easy to get rid of him. The nearest Morse sales engineer will help you.

First cost of Morse Chain drives is actually less than other drives in most applications. Before you buy any drive, compare prices. And remember, more value in a positive chain drive than any other — lower maintenance as well as low first cost.



MORSE CHAIN COMPANY
ITHACA • NEW YORK
 Division of Borg-Warner Corporation

MORSE Positive DRIVES
 SILENT CHAIN and ROLLER CHAIN DRIVES • COUPLINGS • CLUTCHES

3.65c, Worcester; carbon 0.76 to 1.00, 4.95c, Pittsburgh and Cleveland and 6.70c, Worcester.

A new list of extras applying only to cold-rolled spring steel has been compiled and published, effective April 1 and it is believed will be adopted by all producers.

Although this change in computing prices constitutes no change in the resulting net prices, the new schedules simplify the method of computing them, it is said.

Philadelphia—Strip buying is featureless, with most consumers

covered at the concessions which ruled over the closing weeks of last quarter. The new prices appear firm on such small new tonnage as is coming out.

Ferroalloys

Ferroalloy Prices, Page 70

New York—Ferromanganese shipments this month are expected to be the best so far this year in view of the increasing rate of steelmaking op-

erations. Prices are unchanged at \$75, duty paid, Atlantic and Gulf ports. Domestic spiegeleisen, 19 to 21 per cent, is also moving well at the unchanged prices of \$26, Palmerton, Pa., for quantities up to 50 tons, and \$24 for lots of 50 tons and over.

Shapes

Structural Shape Prices, Page 68

New York—Awards are light. New projects are coming out at a faster rate than that at which business is placed, so that the pending total continues to mount. There are indications, however, that action will be taken within the next two weeks. Plain structural shapes continue to be quoted at 1.90c base Bethlehem, Pa., equivalent to 2.06 1/2c, delivered. New York. Some of the erected jobs recently placed in New York have gone at around \$78 to \$80 per net ton and this level appears to represent the current erected market, although in some cases in the past month or two lower figures have been used.

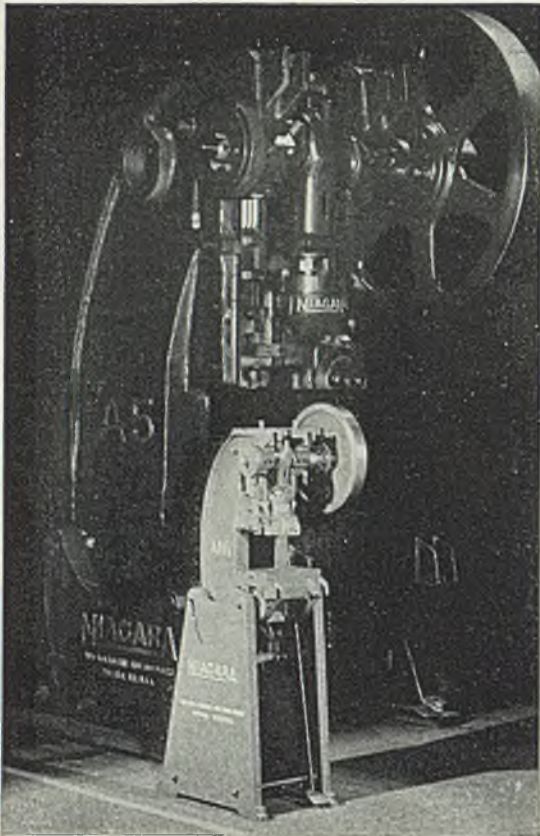
Pittsburgh—Wisconsin Bridge & Iron Co. has taken a contract for the fabrication of 2030 tons for a bridge at Charleston, W. Va., over the Kanawha river. In the April 3 Pennsylvania state letting, Holmes Construction Co. is low bidder on a plate girder bridge in Lawrence county, taking 916 tons, and Merritt, Chapman & McLean Corp., Baltimore, are low for the 345-ton deck plate girder and deck truss underpass bridge. Montgomery-Philadelphia counties. On April 17 bids are asked by the state for 1262 tons for county jobs, while bids were taken April 9 on 840 tons for Butler and Luzerne counties work. The market on plain structural shapes is firm at 1.80c, base. Pittsburgh.

Cleveland — The market is more active in respect to the number of public works private projects being figured, and purchase of material for

Shape Awards Compared

	Tons
Week ended April 10	18,507
Week ended April 3	14,900
Week ended March 28	10,988
This week, 1935	27,997
Weekly average, 1935	17,081
Weekly average, 1936	20,516
Weekly average, March	15,069
Total to date, 1935	237,236
Total to date, 1936	307,744

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stock. Four grade elimination jobs in Cuyahoga county (Cleveland), Ohio, will require approximately 2500 tons of shapes, and fabricators are bidding on 900 tons for one in Detroit. Chrysler Motor Corp. has awarded 600 tons for a machine shop at Detroit, and 600 tons are pending for the Dayton (O.) Power & Light Co. Fabricated structural prices are firmer.

Chicago—State bridges comprise the larger portion of new inquiries. Such work in Indiana, Missouri, Minnesota and Texas will take approximately 5700 tons. Awards are light, with private building furnishing only small individual orders. Shipments of both plain and fabricated material are somewhat in excess of incoming business.

Boston—Structural awards in this district the past week aggregated about 1500 tons, comprised mainly of about 1300 tons involved in six individual jobs. Fabricating shops in this district have booked some substantial orders for repairing bridges damaged by floods. About 6000 tons of steel piling originally slated to be purchased for the Passamoquoddy tidal project in Maine will not be bought, due to revision of the original scope of this project. The market continues 1.90c, base, Bethlehem, Pa., equivalent to 2.20 1/2 c, delivered, Boston. Foreign shapes are obtainable at less.

Philadelphia—Inquiry for 5000 tons for an 8-story vocational school is outstanding in the market. Several bridge projects are pending which aggregate a sizeable tonnage. Included in these is a 600-ton bascule bridge in Monmouth county, New Jersey, on which bids were closed last week. Relatively little private work is actively pending, and actual awards have been light. Shapes continue steady at 1.90c, Bethlehem, Pa., or 2.01 1/2 c, Philadelphia.

Birmingham, Ala.—Bids are out on several contracts and fabricators are expecting considerable business placed during this month. Few specifications have been received on contracts placed some weeks back and much tonnage is due contractors. Ingalls Iron Works Co. has contract for 1000 tons for a kraft paper mill at Crossett, Ark.

San Francisco—Structural awards were the smallest for any week of the year so far and aggregated only 835 tons. Over 25,000 tons are either up for figures or pending. Bids have just been opened on 1596 tons for gates and valves for the Bartlett dam, Salt river project, Arizona.

Seattle—New projects are developing and prospects for fabricating plants are improved. Considerable tonnage is pending. Pacific Car

& Foundry Co., Seattle, was awarded 250 tons for a state bridge in Skagit county, Washington. Bids were opened last week on 200 tons for portal assembly for draft tubes at the Coulee, Wash., dam.

Shape Contracts Placed

2030 tons, Kanawha river bridge, Charleston, W. Va., to Wisconsin Bridge & Iron Co., Milwaukee.

1780 tons, 298 transmission towers, Wheeler dam, Tennessee Valley authority, to Blaw-Knox Co., Blawnox, Pa.

1350 tons, Bronx Industrial high school

for girls, New York, to Harris Structural Steel Co., New York.

1225 tons, International Harvester Co. garage, 560 West Forty-second street, New York, to Joseph T. Ryerson & Son Inc., Chicago.

1600 tons, exposition building, San Francisco, to Bethlehem Steel Co., Bethlehem, Pa.

1200 tons, bridge over Black river, Lorain, O., to unstated fabricator, through Holmes Construction Co., Wooster, O.

600 tons, machine shop, Chrysler Motor Corp., Detroit, to R. C. Mahon Co., Detroit.

510 tons, 350 tons for foundry addition, 160 tons for coal and coke bins, Packard Motor Co., Detroit.


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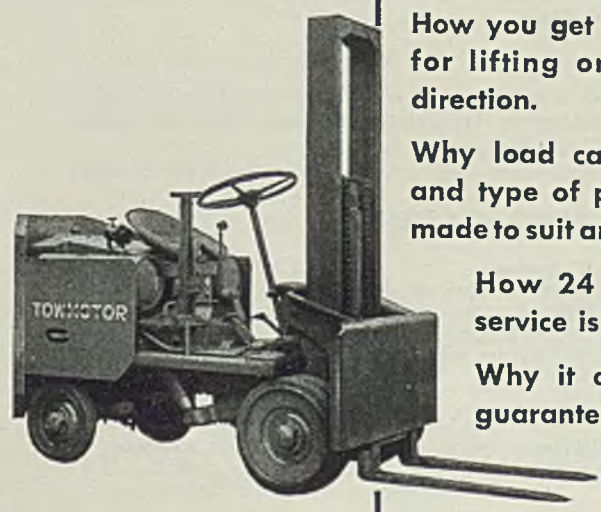
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to unstated fabricators.
 500 tons, high school, Nashua, N. H., to Groisser & Shlager Iron Works, Somerville, Mass.
 455 tons, overpass in Jim Wells county, Texas, to Mosher Steel & Machinery Co., Dallas, Tex.
 400 tons, storage deck supports, section Steinway tunnel, Flushing, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.
 375 tons, auditorium, Michigan City, Ind., to Mississippi Valley Structural Steel Co., Decatur, Ill.
 350 tons, Mallets Bay road bridge, Burlington-Colchester, Vt., to Bethlehem Steel Co., Bethlehem, Pa., through Charles I. Hosmer, Greenfield, Vt.
 310 tons, bridge, El Paso county, Colorado, to unnamed interest.

270 tons, state highway bridge, Streator, Ill., to Joseph T. Ryerson & Son Inc., Chicago.
 265 tons, bridge section, Streator and La Salle counties, Illinois, to Joseph T. Ryerson & Son Inc., Chicago.
 250 tons, bridge, Grant and Lafayette counties, Wisconsin, to Wausau Iron Works, Wausau, Wis.
 235 tons, highway bridge work, Harris county, Texas, to Peden Steel Co., Rawley, N. C.
 225 tons, bridge, Appanoose county, Iowa, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
 220 tons, state highway bridge, Centerville, Iowa, to Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh.
 200 tons, building for Branch Wool Combing Co., Smithfield, R. I., to New England Structural Co., Everett, Mass.

215 tons, overpass, Leavenworth, Kans., to Missouri Valley Bridge & Iron Co., Leavenworth.
 210 tons, bridge section, Effingham and Fayette counties, Illinois, to Stupp Bros. Bridge & Iron Co., St. Louis.
 200 tons, piling, United States bureau of reclamation, Denver, to Inland Steel Co., Chicago.
 180 tons, state highway bridge, Unadilla, N. Y., to Lackawanna Steel Construction Co., Buffalo.
 180 tons, girls dormitory, Grafton, N. Dak., to American Bridge Co., Pittsburgh.
 180 tons, underpass, Medina county, Texas, to Virginia Bridge Co., Roanoke, Va.
 175 tons, dormitory, South Bend, Ind., to Mississippi Valley Structural Co., Decatur, Ill.
 175 tons, two fuel flats, Leetsdale, Pa., to Dravo Contracting Co., Pittsburgh.
 165 tons, bridge, Dunn county, Wisconsin, to Worden-Allen Co., Milwaukee.
 165 tons, trestle at Crescent mine No. 2, near Spears, Pa., to Fort Pitt Bridge Works, Pittsburgh.
 160 tons, state highway bridge, Coweta county, Georgia, to Bethlehem Fabricators Inc., Bethlehem, Pa.
 160 tons, state bridge, Richland-Ashland county, Ohio, to Bethlehem Steel Co., Bethlehem, Pa.
 160 tons, bridge, Allen Park, Mich., to American Bridge Co., Pittsburgh.
 150 tons, printing plant for Macquay Co., Schenectady, N. Y., to American Bridge Co., Pittsburgh.
 150 tons, highway bridge, Spokane, to Pacific Car & Foundry Co., Seattle.
 145 tons, school, Glens Falls, N. Y., to James McKinney & Sons.
 140 tons, grade separation, Riverside, Ill., to Midland Structural Steel Co., Cicero, Ill.
 125 tons, municipal building, Kenmore, N. Y., to R. S. McMannus Structural Steel Co., Buffalo.
 125 tons, plant addition, All-Metal Products Co., Wyandotte, Mich., to Whitehead & Kales Co., Detroit.
 125 tons, school, gymnasium and auditorium, Collingdale, Pa., to Norris Iron & Wire Co., Bridgeport, Pa.
 120 tons, floor repairs, Williamsburg bridge, New York, through procurement division, Treasury department, New York, to Eggleston Bros. & Co. Inc., Long Island City, N. Y.
 115 tons, elevated switch track, Richmond, Ind., to Insley Mfg. Co., Indianapolis.
 115 tons, school, Collingdale, Pa., to Norris Iron & Wire Co., Bridgeport, Pa.
 112 tons, road project in Kenton county, Kentucky, to Jones & Laughlin Steel Corp., Pittsburgh.
 110 tons, city hall, Cranston, R. I., to Providence Steel & Iron Co., Providence, R. I.
 100 tons, bridge, Stark county, Illinois, to Vierling Steel Works, Chicago.
 100 tons, continued treatment ward for men, Cranston, R. I., to Bethlehem Fabricators Inc., Bethlehem, Pa., through New England Concrete Co., Providence, R. I.
 100 tons, approximately, factory building, Langstone Co., Camden, N. J., to Morris Wheeler & Co., Philadelphia.

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CHROMAX Cast Chromax is a nickel-chromium-iron alloy suitable for operation at temperatures up to 1900°F. This alloy resists corrosion, heat and oxidation to a marked degree.

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 Glass rolls

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 Burner tubes
 Diesel Engine Valves
 Oil Burner parts, etc.

CHROMAX

Furnace parts such as trays, pushers, rails, hangers, bearings.

CIMET

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 Radiant tubes and Support brackets
 Oil burner parts
 Walking Beam furnace parts
 Shaft-Normalizing furnace parts
 Roller Shafts

Parts for electric gas and oil furnaces

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Shape Contracts Pending

10,000 tons, bridge superstructure, Port Arthur, Tex.; bids to be asked by Ash, Howard, Needles & Tammen, New York, in May.
 5000 tons, vocational school, Ninth and Mifflin streets, Philadelphia; bids to be opened April 22 including 500 tons of reinforcing bars.
 2500 tons, grade eliminations in Cuyahoga county, (Cleveland), Ohio;

Reinforcing

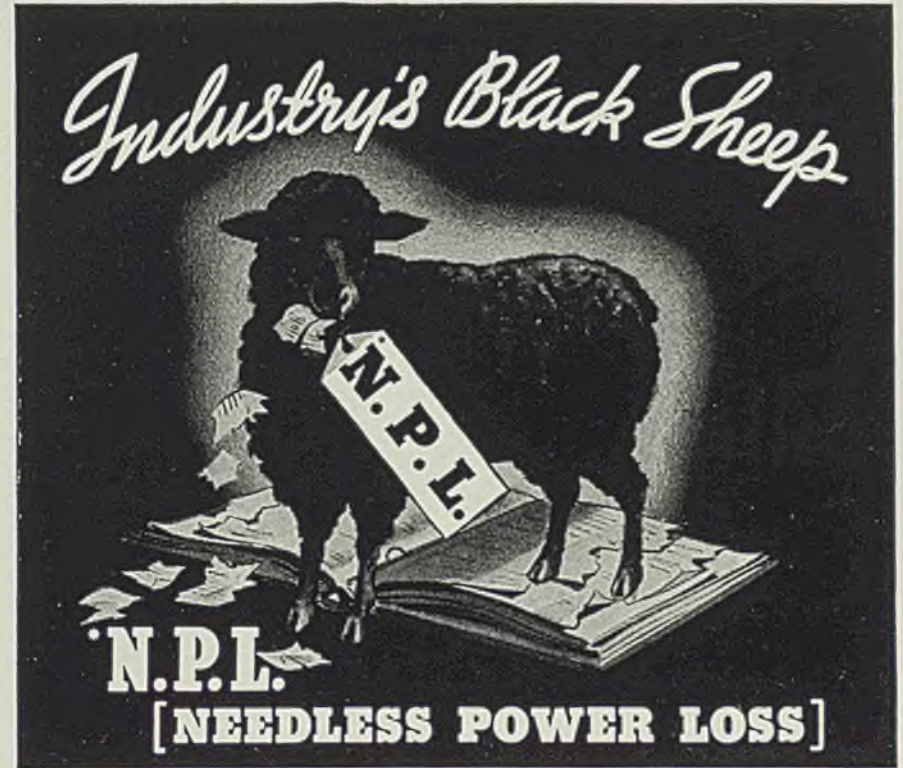
Reinforcing Bar Prices, Page 69

- 700 tons, Bedford, O., bids April 17, to state highway commission, Columbus, O.; 1200 tons, Lorain street; 300 tons, Triskett road; 300 tons, Warner road, bids shortly.
- 2100 tons, state bridges, Missouri.
- 1650 tons, state bridges, Texas.
- 1600 tons, Kings county hospital nurses home, Brooklyn, N. Y.; bids April 20.
- 1400 tons, state bridges, Indiana.
- 900 tons, Livernois avenue grade elimination, Detroit.
- 800 tons, Michigan avenue bridge over Baltimore & Ohio railroad tracks, Washington.
- 600 tons, bascule bridge over Shark river, Monmouth county, New Jersey; bids open April 18.
- 600 tons, Wagner building addition, Grand Concourse and Fordham road, New York; C. T. Wills Inc., New York, general contractor.
- 600 tons, building, Dayton Power & Light Co., Dayton, O.; bids in April 13.
- 575 tons, state bridges, Minnesota.
- 520 tons, various projects for Missouri highway commission.
- 503 tons, three-span plate girder bridge, Kingston borough, Luzerne county, Pennsylvania; bids taken by state highway department, Harrisburgh, Pa., April 9.
- 500 tons, dredge, St. Paul.
- 500 tons, building for Starcor Realty Co., 55-15 Grand street, Queens, N. Y.
- 500 tons, four bridges, scattered locations, state of Wisconsin; bids April 17.
- 430 tons, state highway bridge, Glenville, N. Y.
- 400 tons, state highway bridge, Schenectady, N. Y.
- 339 tons, viaduct, Butler county, Pennsylvania; McCrady Construction Co., Pittsburgh, low. Bids April 9, to include 161 tons bars.
- 345 tons, deck plate girder and deck truss underpass bridge, Montgomery-Philadelphia counties, Pennsylvania; Merritt, Chapman & McLean Corp., Baltimore, low at \$98,067.60.
- 243 tons, under-crossing, Oregon City, Clackamas county, Oregon; bids April 17.
- 230 tons, Pasco-Kennewick state bridge, Washington; bids at Olympia, Wash., April 21.
- 230 tons, bridge in Franklin Benton county, Washington; bids April 21.
- 223 tons, plate girder bridge, Paradise township, Monroe county, Pennsylvania; bids to state highway department, Harrisburg, Pa., April 24.
- 170 tons, state highway bridge, Newfields, N. H.
- 168 tons, crossing, Black River Junction, King county, Washington; bids April 21.
- 150 tons, grade crossing elimination, Hopewell Junction, N. Y.
- 100 tons, foundry addition, Draper Corp., Hopedale, Mass.
- 100 tons, highway bridge, Ellis county, Kansas.
- 100 tons, miscellaneous, Frenchtown canal project; bids to reclamation bureau, Missoula, Mont., April 27.
- 100 tons, state buildings, Olympia and Medical Lake, Wash.; Sheble Construction Co., Seattle, general contractor.
- Unstated, state span, Clackamas county, Oregon; bids at Portland, Oreg., April 17.
- Unstated, state viaduct, 632 feet long, Flathead county, Montana; Massman Construction Co., Kansas City, Mo., low.
- Unstated, four hangars for Hickman Field, Hawaii; bids at Fort Mason, Calif., April 28.

ton charge is added for trucking to the building site.

Boston—Several hundred tons of reinforcing bars were awarded during the week. New projects are developing slowly. The current market usually is 2.10c, base, Buffalo, equivalent to 2.46c, delivered, Boston, with \$2 a ton customarily added to cover trucking to the building site.

Philadelphia—The Philco Radio project involving 500 tons, at one time reported placed, has been indefinitely withdrawn. Approximately 500 tons are now pending for superstruc-



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ture for a vocational school at Ninth and Mifflin streets; bars for the foundation were reported placed some time ago. Awards at present are confined to scattered lots. Prices are easy.

Pittsburgh—Heavy specifications for new billet steel from jobbers and distributors are a market feature and some mills have booked more tonnage of this character in the first quarter than in any quarter for six years. State highway work is a high-light and currently includes lettings for April 9, 17 and 24, which agree-

gate close to 1000 tons of bars. The market on new billet steel bars ranges 1.95c to 2.05c, base, Pittsburgh.

Cleveland — Rail steel reinforcing bar prices have strengthened, 1.95c, delivered, Cleveland, now being quoted generally. The sag in prices of this product in recent months was due to sharp competition on public works projects. New billet steel bars quoted by distributors hold at 2.00c, Cleveland, for stock lengths, and 2.10c for cut lengths. Bending extras have been advanced \$2 a ton

to \$6 for ½-inch and larger, and \$4 to \$16 for ¾-inch and smaller. Small orders are fairly numerous.

Chicago—Sanitary district work is taking the largest tonnage of concrete bars. For one section 1300 tons has been placed, while 750 and 400 tons are pending for other units. Bids close next week on 361 tons for an extension to a local sewage treatment works. Bridges up for bids in Illinois and Indiana involve 2000 tons. Private building still is limited to small individual lots of bars. Prices continue relatively steady.

San Francisco — The reinforcing bar market was the most active one of the week and 1332 tons were placed. Truscon Steel Co. took 400 tons for a plant in Long Beach, Calif., for Spencer-Kellogg & Sons Inc. Pending business calls for more than 18,000 tons.

Seattle — Important awards are lacking this week, but several sizable tonnages are pending. The state of Washington will open bids April 21 for a span in King county, involving 132 tons, and other projects calling for over 100 tons.

Reinforcing Steel Awards

- 1300 tons, sewer, Chicago sanitary district, to Concrete Steel Co., Chicago; E. J. Albrecht Co., Chicago, general contractor.
- 400 tons, small highway projects in Missouri and Illinois, to Laclede Steel Co., St. Louis.
- 400 tons, Spencer-Kellogg & Sons Inc. plant, Long Beach, Calif., to Truscon Steel Co., Los Angeles.
- 300 tons, De Reimer avenue sewer, Bronx, N. Y., to Concrete Steel Co., New York, through S. T. & C. Contracting Co., New York.
- 150 tons, ward building for state hospital, Norwalk, Calif., to Consolidated Steel Corp., Los Angeles.
- 120 tons, men's and women's ward buildings, Cranston, R. I., to Bethlehem Steel Co., Bethlehem, Pa., through Matthew Cummings Co., Boston.
- 108 tons, fair grounds, Phoenix, Ariz., to unnamed interest.
- 100 tons, sewage disposal plant, Barnstable, Mass., to Northern Steel Co., Medford, Mass., through Cenadella Construction Co., Milford, Mass.
- 100 tons, Malletts Bay road bridge, Burlington-Colchester, Vt., to Bethlehem Steel Co., Bethlehem, Pa.
- 100 tons, building for Junior college.

Concrete Awards Compared

	Tons
Week ended April 10	3,078
Week ended April 3	6,443
Week ended March 28	1,738
This week, 1935	3,346
Weekly average, 1935	6,862
Weekly average, 1936	7,642
Weekly average, March	7,980
Total to date, 1935	70,884
Total to date, 1936	114,628



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DETROIT

Glendale, Calif., to Blue Diamond Corp., Los Angeles.

Reinforcing Steel Pending

1000 tons, state bridges, Indiana.
 760 tons, crossing, Portland, Oreg.; bids April 16.
 750 tons, sewer, Chicago sanitary district.
 750 tons, boardwalk and comfort station, Long Beach, N. Y.; new bids to be taken.
 602 tons, Treasury department, schedule 8035, Los Angeles; Truscon Steel Co., Los Angeles, low.
 500 tons, office building, Philco Radio Television Co., Philadelphia; project indefinitely withdrawn.
 361 tons, north side sewage treatment works extension, Chicago; bids April 23.
 310 tons, shop for Marina high school, San Francisco; new bids April 22.
 250 tons, Panama Canal requirements; bids April 13.
 200 tons, building for St. Louis Dairy Co., St. Louis; Fruin-Colnon Contracting Co., St. Louis, general contractor.
 200 tons, sewer, contract No. 4, Queens, N. Y.; general contract to Tomasetti Contracting Co., Brooklyn, N. Y.
 165 tons, state grade crossing elimination, Towaco, N. J.; general contract to Franklin Contracting Co., Newark, N. J.
 148 tons, Hudson river parkway, Port Chester, N. Y.; joint contract to Garafano Construction Co., Mt. Vernon, and Russiano & Sons, Bronx, N. Y.
 137 tons, highway work in five counties, Washington; bids April 21.
 132 tons, crossing at Black River Junction, King county, Washington; bids April 21.
 110 tons, four bridges, scattered locations, state of Wisconsin; bids April 17.
 100 tons, regional market building, Newburg, N. Y.
 100 tons or more, various state projects; bids at Olympia, Wash., April 21.
 100 tons, viaduct near Green Station, Douglas county, Oregon; bids April 16.
 100 tons, Oak Hill school, Newton, Mass.
 Unstated, two college buildings, Pullman, Wash.; bids at Spokane, April 25.
 Unstated, viaducts and approaches in four Oregon counties; bids at Portland, Oreg., April 16 and 17.
 Unstated, state bridge, Silver Bow county, Montana; Lawlor Construction Co., Butte, Mont., low.

Metallurgical Coke

Coke Prices, Page 69

Sellers of foundry coke in the Pittsburgh district are making shipments to replace consumers' stocks, which in many cases disappeared during the recent floods. This was especially true of foundry coke not in bins and was washed away. Prices are steady for common beehive foundry coke at \$4.25 to \$4.75 per ton, f.o.b. Connellsville, Pa., ovens, and in premium grades at \$5.35 to \$5.50, the same basis. Sales continue to test the market at \$3.50 to \$3.65 per ton for standard furnace coke, which is without change.

Indicative of sustained foundry operations, shipments of by-product foundry coke at Chicago are practically on a par with those during the

corresponding March period. Consumers' stocks, while heavier than a short time ago, are in keeping with the better rate of consumption. Prices continue \$9, ovens, for outside delivery and \$9.75, delivered Chicago.

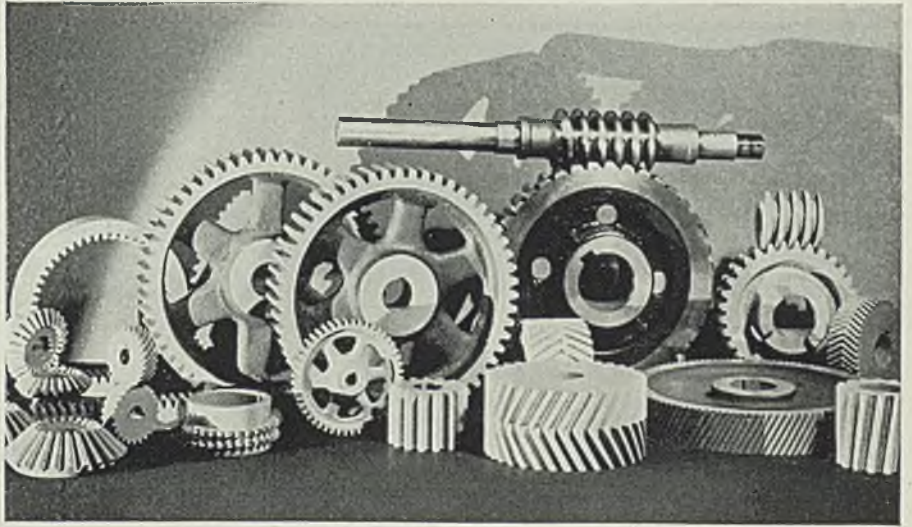
Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 69

Demand for bolts, nuts and rivets in the Chicago district holds to the slightly improved rate noted recently. Contracting for second quarter prac-

tically is complete and some specifications are being received at current prices. Prices are fairly steady, though they have not been tested by large individual orders. In general the rate of specifying in bolts and nuts is exceedingly good in the Pittsburgh district.

Carriage and machine bolts are quoted 70-10-5 off for small sizes and 70-10 off on large sizes, with small rivets quoted 70-5 off list. The market on large structural rivets holds at 2.90c, Pittsburgh or Cleveland, 3.00c, Chicago.



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Pig Iron

Pig Iron Prices, Page 70

Pittsburgh — Shipments remain handicapped by rehabilitation work still going on in many foundries. Davison Coke & Iron Co.'s Neville Island, Pa., merchant furnace remains in active blast, and Shenango Furnace Co. will resume blast in its Sharpville, Pa., stack about April 20. Shipments are still proceeding against old fourth-quarter contracts. All new

business is quoted \$19.50, Pittsburgh district furnace, on foundry and malleable grades; \$19 on basic, and \$20 on bessemer.

Cleveland — The whole market background appears better; foundry and furnace stocks are low; consumption and production increasing. Prices are stronger than at any time than in five or six years. Shipments last week continued to rise, with automotive tonnage leading.

Chicago—Shipments show only a slight increase, compared with the rate a month ago, though new busi-

ness is relatively heavy, and foundry operations are well sustained. Consumers are ordering in small lots, few contracting for as much as three months ahead. Automotive foundries continue busy, while production of railroad castings is increasing.

Boston—Current consumption has been affected to a greater degree by the recent floods than first expected. Buying on the whole is slack, due to accumulation of stocks before the \$1 advance. Domestic market continues to be based on \$20.50, Everett furnace, for foundry grades. Reports are current that foreign iron is being offered \$1 to \$3 a ton below domestic, and one large consumer was reported to have placed an order with an importer the past week.

New York—Following the recent distribution of 1100 tons of iron by the General Electric Co. for its plants at Schenectady, N. Y., Elmira, N. Y., and Lynn, Mass., orders have been confined to relatively small lots. The General Electric tonnage was distributed among several sellers and called principally for foundry and some malleable. The Troy, N. Y., furnace will blow in about May 1.

Philadelphia—Most sellers are disappointed over the volume now coming out, although discounting some of the present dullness as being due, directly or indirectly, to recent flood disturbances. Importations of foreign steel also are an important factor in the restriction of tonnage being booked by domestic sellers.

Cincinnati—Inventories will counteract a slowly expanding melt, so that shipments this month will show considerably less tonnage than in March, when many melters were able to specify against old contracts. Some moderate inquiries are before the market, and in a few cases contracts represent full quarter requirements.

St. Louis—Melt continues to be outstanding. Demand for machinery from agricultural sections is exceedingly heavy and the outlook is for steady consumption. Shipments are ahead of the same period a month ago. Buying for second quarter has been on a conservative scale.

Birmingham, Ala.—Demand is active, and melters report orders in hand and in sight which will warrant steady buying for an indefinite period. Twelve blast furnaces are melting.

Toronto, Ont.—Sales are expanding, awards for last week exceeding 1200 tons. A few melters have placed contracts for second quarter delivery, but most business is spot. Inquiries are increasing and general improvement in sales is looked for this quarter. Dominion Steel & Coal Corp., Sydney, N. S., has rebuilt its No. 1 blast furnace, and will blow it in soon.

Behind the Scenes with STEEL

Research Rampant

NOT so many weeks ago we received from Ludlum Steel Co. two samples of steel wire, one plain carbon steel and the other 18-8 stainless steel, with instructions to mount them on the outside of a window or in some other place where they would be face-to-face with Ole Man Weather, and then to observe the comparative corrosion resistance.

Of course, these samples were sent out to thousands of others and we almost suspect the move as possibly some form of subtle propaganda for stainless steel, but nevertheless we always try to be obliging so we stuck the wires up where they could get the full brunt of a stiff northwest gale and then sat back and waited for them to start rusting.

Each day now we keep an eye on these hardy wire samples, silently cheering them on in their battle with the elements. It's great sport and completely mystifies most office callers. We usually tell them it's a special type of antenna system by means of which we hope to receive signals from Mars.

In a moment of frenzy we even wrote a slight poem about the project. We call it:

MAN AGAINST THE ELEMENTS
Stuck up on our window pane,
Prey to daily soot and rain,
Two small wires await their fate—
Carbon steel and 18-8!

One is red with spreading rust,
Typifying dust-to-dust;
But its pal's in no such state—
Vive la, vive la 18-8!

On the Nose Again

HOW accurately our editors kept track of what was happening to steelworks operating rates during the recent floods is revealed by percentage statistics for March: STEEL set the national rate at 58.33 per cent. Rate compiled by the American Iron and Steel Institute from figures supplied at the end of the month by producers was 58.57 per cent—so close that it isn't even worthwhile to figure the percentage variation.

Pig Stickers

SOME unusually striking advertisements are being used by the Edison Storage Battery people in their current campaign in STEEL. Perhaps you recall

that illustration in their ad a few weeks ago of a panting prima donna straining at high C-sharp or something. It was an A-1 eye-stopper.

Last week, page 65, under the terse heading "Exit the Guinea Pig" was an arresting illustration of a couple of sawbones harpooning a small g.p. Funny thing about the picture was that the artist had given the doc on the left a very fancy Monjouish moustache and shaggy eyebrows, while the partially hidden assistant at the right also had a new moustache, improved eyebrows and a rebuilt nose. They can't fool us though—we recognized both of them through their disguises. Col. Stoopnagle and Bud, that's who!

Lexicographer

FROM Shreveport, La., comes the following letter from J. D. Pace of the Shreveport Cabinet Shop:

Gentlemen:

I just hapened to run across a copy of the reveiew of Ja. 1927 in which I saw some very interesting addresses that is the cause of my writing you this letter with the view of getting a late nubur showing later concerns of manufacturers of machinery that I might buy to used in a plant for making oilfield tools of which I am the inventor of some 20 diferent kinds of a worthwhile kind. Anyway, I will ask that you send me one of a late issue so I may see for myself.

Hoping to get this right off and whatever is its results will be all right I am.

Yours truly,

We sent Mr. Pace a copy of a "late nubur" of STEEL, but he'll probably have a lot of trouble with it. Maybe he will write again, along about 1945. These inventors!

Book Review

YOU might be interested in a little 16-page booklet, recently off the press, entitled "You Hire 20 Men for \$0.008 per Day—Do You Know Them?" You can carry it around in your vest pocket if your vest needs reinforcement.

We won't bother telling you what it's all about; if the title intrigues you address our Readers' Service Department and they will gladly whisk a copy to you.

—SHIRDLU

some prices temporarily. Increasing consumers' demands from this district, Youngstown and Pittsburgh are steadily absorbing supplies. No change has occurred in any prices here the past week.

Birmingham, Ala.—Quotations are unchanged and dealers find activity in some items, heavy melting steel and No. 1 cast in particular.

Seattle—The market continues firm and demand is strong. Japanese buyers are interested and some new business has been closed. Exporters still find space scarce and rates high. Stocks at tidewater are low and material from the interior is not being shipped in volume. Italian interests are said to be making of-

fers in this area but they are handicapped by lack of space to Naples where discharge is specified. Local mills are still buying in fair volume for current use.

Toronto, Ont.—Little change in demand is shown in iron and steel scrap. Deliveries of steel scrap to mills in the Hamilton district have improved and there is a steady call for heavy melting steel and turnings. Montreal dealers also report better demand for steel grades.

William G. Harvey Co., 2222 South Geddes street, Syracuse, N. Y., has been appointed by Ingersoll Milling Co., Rockford, Ill., to handle the

sale of its small tools and Ingersoll cutters in the upper New York state area.

Warehouse

Warehouse Prices, Page 72

Pittsburgh—Shipments of reinforcing steel bars, galvanized sheets and steel channels and angles, as well as heavier structural sections, are a highlight in the local market. Prices are holding steady.

Cleveland—The market is fairly active, but so far this month only a slight gain is noted over the comparable period in March. Prices are steady.

Chicago—Business the early part of April was the best in volume for the first week of any month since last fall. Sales continue well diversified, aided by a rising demand for building materials. Warehouses defer price revisions on sheets, in keeping with changes incorporated in new mill differentials.

Boston—Volume during March was on a parity with February. April, however, reflects improvement in the daily average. Prices are unchanged, although some shading is reflected in merchant pipe and galvanized sheets. Foreign steel bars and plain shapes continue to be sold at about 25 to 65 cents per 100 pounds below domestic prices.

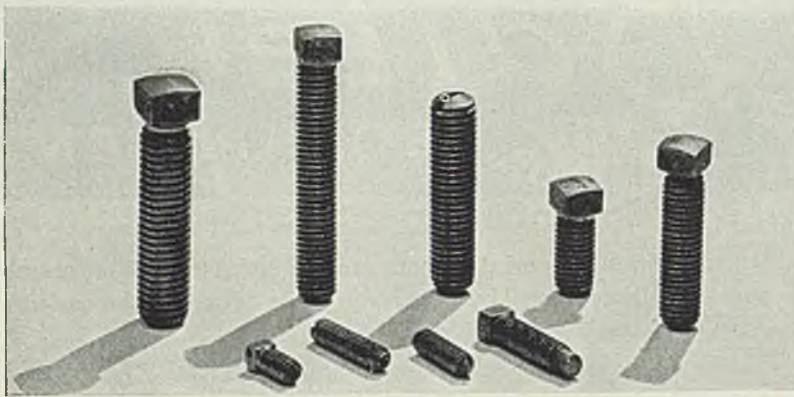
New York—Demand was sharply reduced last week, due to usual widespread observance of Easter religious holidays. On the whole, current volume does not show any tendency to exceed that of March. Prices are unchanged.

Philadelphia—Demand is being sustained at the improved rate of last month. Flood rehabilitation has scarcely been felt by local warehouses to date, but substantial tonnage is expected to develop later. Prices are unchanged.

Detroit—Jobbers are encouraged over late spring prospects, and currently are finding April's specifications and shipments ahead of March.

Cincinnati—Increase in demand from warehouses is holding, purchases being from widely diversified industrial sources. Inquiries lend hope for an improvement in tonnage for building projects, chiefly in small lots.

Seattle—Demand is increasing. Public works projects and the Puget Sound navy yard are calling for various items, adding to the total of jobbers' turnover. Portland houses continue to give concessions in their territory on sheets, bars, plates and shapes, but are keeping out of Washington where list prices are being maintained.



UNITED BOLTS AND HEVI DUTY FURNACES



Removing a basket of Carburized Bolts, United Screw & Bolt Co., Cleveland, Ohio

In the plant of the United Screw & Bolt Co., basket after basket of bolts pass in and out of a Hevi-Duty Vertical Retort Furnace as part of their daily production schedule. The use of this furnace provides them with a carburized product, high in quality, at costs lower than with other methods.

SEND FOR BULLETIN NO. 931A

HEVI DUTY ELECTRIC CO.

MILWAUKEE **HEVI DUTY** WISCONSIN

HEAT TREATING FURNACES

« ELECTRIC EXCLUSIVELY »

Iron Ore

Iron Ore Prices, Page 71

Cleveland — Long-term contract arrangements for Lake Superior iron ore are being closed on the basis of last year's prices, but little demand is appearing in the open market. The Ford Motor Co. may close this week on its inquiry for 490,000 tons. None of the upper lake ports is open for navigation, and the opening date for shipping ore still is indefinite. The Lake Superior Iron Ore association reports the following receipts at lower lake ports and shipments therefrom for the season, and dock balance April 1:

	Receipts	Shipments	Dock Balance April 1 1936
Buffalo	2,127,812	4,281	2,915
Erie	1,035,642	1,087,533	52,558
Conneaut	3,437,360	3,582,344	1,565,803
Ashtabula	2,936,836	2,576,112	1,651,891
Fairport	772,260	778,813	387,085
Cleveland	5,455,295	4,086,074	706,409
Lorain	2,097,114	1,097,679	12,527
Huron	748,178	735,062	333,461
Toledo	1,296,231	667,554	21,497
TOTAL	19,907,228	14,615,452	4,734,146
Comparative total 1 year previous	15,572,523	11,783,677	4,569,298

Steel in Europe

Foreign Steel Prices, Page 72

London—(By Cable) — Steelmakers in Great Britain established an all-time record in March, producing 980,100 gross tons of ingots and castings, passing by a comfortable margin the prior high record of 949,600 tons, in March, 1927. The March tonnage compares with 938,500 tons in February, a gain of 41,600 tons. The daily rate in March was 37,696 tons; in February, 37,540 tons. Production is close to practical capacity.

Pig iron output in March was 633,600 gross tons, at a daily rate of 20,439 tons, compared with 584,700 tons, and a daily rate of 20,162 tons in February. Active stacks numbered 109 each month. This is the largest pig iron output for any month since March, 1930, when 665,800 tons were made.

Shortage of foundry pig iron is increasing because of heavy demand for steelmaking iron. One hematite stack has been put in blast, although the coke shortage limits relighting of more units. Steel mills are booked to capacity on semifinished steel and imports from the Continent are increasing. Demand for shipbuilding steel is heavy. Domestic trade in galvanized sheets is good but exports are dull. Tin plate trade is fair.

The Continent reports export trade

is quiet, apart from active business for shipment to Great Britain.

Cold Finished

Cold Finished Prices, Page 69

Pittsburgh—Based on continuation of the cold-finished bar market's showing of the first half of April, the month will be the heaviest in specifications and shipments of any month in six years, except the month just before adoption of the former steel code. The improvement is traceable to heavy automobile assemblies, specifications of

jobbers, farm implement manufacturers and miscellaneous users. Most specifications are requested for prompt shipment. The market is firm at 2.10c, base, Pittsburgh.

Tin Plate

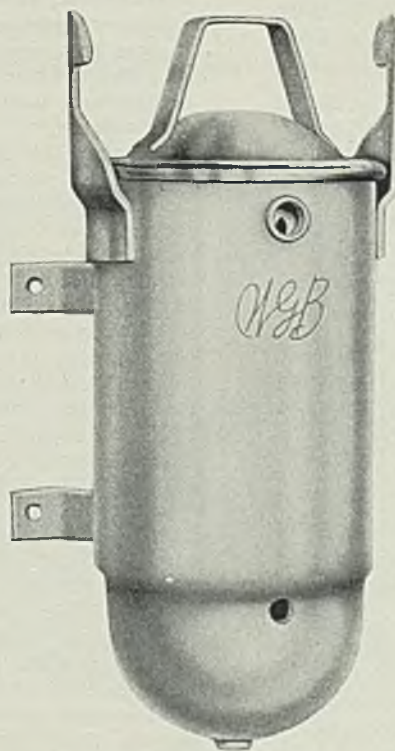
Tin Plate Prices, Page 68

Pittsburgh—Canmakers' requirements for tin plate continue to be placed in steady volume and shipments so far in April to these accounts have been slightly ahead of the first half of

SPECIAL SEAMLESS SHELLS SHAPES **A N D** **DEEP DRAWN TANKS, BOTTLES, ETC.**

Is Our Specialty

This Seamless Drawn Tank is
A Crosby Accomplishment



Stamping Specialists Since 1896

An Experience You Should Not Overlook
Send Us Your Next Specification

THE CROSBY COMPANY

BUFFALO, N. Y.

NEW YORK — CHICAGO — PHILADELPHIA — DETROIT — CLEVELAND

CASE HISTORIES in the WELLMAN PLANT

The DOYLE Case

"I tell you, we've tried everything." The speaker, Hardy, was a tall, studious man whose earnestness testified to the serious problem that faced him. "Can you help me?" he implored.

The Doyle Company had been using bronze valve bodies for years. Sometimes they would have no waste from leakage, but often the loss would run as high as fifty percent of the castings machined. This meant a loss in time and labor.

The question in the mind of Hardy was, "Could the trouble be corrected?" We made several suggestions and followed them with successful tests and good castings, which not only answered Hardy's question but cut out loss, regained old business and satisfied new customers.

Wellman has been solving problems similar to this for a great many years, reducing cost and increasing profit. Write, or call ENdicott 2240 for help in working out your difficulties.

- Castings
- Machined Parts
- Plated Parts
- Bent Tubes

WELLMAN BRONZE AND ALUMINUM CO. 6100 SUPERIOR AVENUE CLEVELAND, OHIO

March. With assurances of a good spring and summer canmaking season, tin plate mills continued last week at 75 to 80 per cent. A number of hot mills in the Pittsburgh district are resuming which had been down for the past two to three weeks due to the fact that tinning pots were being used to rehabilitate finished tin plate damaged by the floods. The market holds at \$5.25 per base box, Pittsburgh.

Coke By-Products

Coke By-Product Prices, Page 69

New York—Demand for toluol and industrial xylol has been increased considerably by reason of the greater consumption of lacquers by automobile industry. Demand for sulphate of ammonia, naphthalene and phenol continues heavy. All prices are firm.

Nonferrous Metals

Nonferrous Metal Prices, Page 70

New York—A buying wave in copper which made an advance to 9.50c Connecticut, imminent was the outstanding development in nonferrous metals last week. Demand for tin was also heavier but prices continued to decline. Lead, zinc and antimony held steady.

Copper—All copper sellers are expected to advance electrolytic to 9.50c, Connecticut, by Tuesday morning. Copper wire and cable, and most copper and brass rolled products will advance ¼-cent, effective at the close of business Monday. The pending rise came as no surprise to the industry as the market has been firm to strong ever since several sellers advanced their asking levels to 9.50c on Feb. 15.

Lead—Moderate business was done in lead and all sellers were firm at 4.45c, East St. Louis. A buying pickup is expected to develop late this month.

Zinc—Prime western held steady last week at 4.90c, East St. Louis, in a generally quiet market. Demand is expected to improve materially after the Easter weekend.

Tin—Fair business was done in tin almost daily but prices declined. Easiness was attributed to reports that heavier supplies are due from Bolivia. Domestic supplies for prompt delivery continued limited. Spot Straits tin closed around 47.00c.

Antimony—Prices held unchanged on the basis of 13.50c, duty paid New York, for Chinese spot. Trading was generally quiet.

Noland Co. Inc., Washington, has been appointed Toncan iron sheet

distributor by the Republic Steel Corp., Cleveland.

Activities of Steel Users and Makers

CM. KEMP MFG. CO., maker of industrial gas apparatus, Baltimore, has appointed W. C. Holmes and Co. Ltd., Huddersfield, England, to manufacture and market the industrial carburetor, immersion heating, atmos-gas producer and other Kemp products in Great Britain. It also has appointed A. T. Katliner-P. Damiron, Paris, France, to arrange for the manufacture and sale of the same products in continental Europe.

♦ ♦ ♦

Peterson Bros. Corp., 85 Walker street, New York, has been appointed representative by Lamson & Sessions Co., Cleveland, manufacturer of bolts, nuts, cap screws, etc., covering the sale of its products in metropolitan New York, the Hudson river valley territory, and New Jersey.

♦ ♦ ♦

Harnischfeger Corp., Milwaukee, has sold 11 arc welding units to the Chicago, Milwaukee, St. Paul & Pacific railroad, out of a total lot of 21 units recently purchased for use in the shops at Milwaukee in fabricating new freight and passenger cars and in the repair program. With railroads again entering the market, Harnischfeger officials said welder sales are showing substantial increases, other lines of industry being more active as well.

Equipment

See also Pages 16 and 17.

Chicago—While further improvement in machine tool sales is lacking, orders and inquiries hold previous gains. Small individual lots predominate, and lists of more than a few items are exceptional. One of the largest lists pending is for the Santa Fe railroad, closing on which is looked for shortly. New inquiries from railroads are light. Machine tool builders now are able to give reasonably prompt delivery on most types of products. Business in foundry and miscellaneous equipment generally is steady.

Seattle—Demand for mining equipment and machinery used in logging and lumbering is well maintained, while miscellaneous items are also moving in larger volume.

Construction and Enterprise

Ohio

AKRON, O.—B. F. Goodrich Rubber Co., James F. Tew president, plans construction of new tire and tube factory and of a new mechanical goods factory, both to be outside of Ohio. Engineering department is preparing plans.

ASHLEY, O.—Village, Ray Whipple mayor, is contemplating construction of \$49,000 waterworks system. Jennings & Lawrence, 12 North Third street, Columbus, O., engineers.

BUCKEYE LAKE, O.—Department of agriculture, division of conservation, Columbus, O., is considering sewage disposal system to cost \$125,000. Jennings & Lawrence, 12 North Third street, Columbus, O., engineers.

CLEVELAND—Fairport Machine Shop Inc. has been organized by Fred R. White Jr., R. H. Weir, and A. J. Fink. Weir & Reynolds, 1208 Hanna building, correspondent.

CLEVELAND—Angell Nail & Chapel Co., 4580 East Seventy-first street, is enlarging its plant and installing new wire-drawing equipment.

CLEVELAND—Plating & Galvanizing Co. has been incorporated by Louis D. and Raymond L. Round, and Louis D. Cull, to do commercial electroplating and galvanizing, with offices in the Cleveland Chain & Mfg. Co. building on Henry street. Correspondent is Thornton E. Round, same address.

COLUMBUS, O.—City plans large improvements in new sewage disposal plant to cost \$475,000. bids due noon April 28. Llewellyn Lewis is service director, City hall, and Paul Maetzel is city engineer.

DAYTON, O.—Contracting officer, United States air corps, materiel division, Wright field, will receive bids until April 16 on cylindrical tanks, circular 36-725, with 25,000-gallon capacity each.

DAYTON, O.—Dayton Power & Light Co., 20 South Jefferson avenue, will award contracts in near future for miscellaneous equipment to be used in construction of new addition to electric generating station. General Electric Co., Schenectady, N. Y., is furnishing 42,000-horsepower turbogenerator. Entire project is to cost over \$3,000,000. Engineer is Columbia Engineering Corp., Fourth and Plum streets, Cincinnati.

FOSTORIA, O.—Atlas Mfg. Co. Fostoria, O., has purchased the Fostoria plant and equipment of the Hupp Motor Car Co.

HAMILTON, O.—City has retained Froelich & Emery, engineers, Second National Bank building, Toledo, O., to design and estimate cost of addition to power plant, including installation of 10,000-kilowatt steam turbogenerator, with accessory equipment.

HOLLOWAY, O.—Village, F. G. McGrath mayor, is considering installing flat bottom steel storage tank in connection with water system improvement. Engineer is Jennings-Lawrence Co., 12 North Third street, Columbus, O.

PAINESVILLE, O.—City council will purchase new 550-horsepower boiler for the municipal electric light plant, costing \$100,000.

TOLEDO, O.—Board of education,

50%
LESS
COST



50%
LESS
WEIGHT

THIS is the striking result of composite design as affected by Parish engineering service on a pressure fitting of cast steel that constantly failed under high pressures in service.

Produced of a stamped-and-welded design, this fitting not only split the cost and weight of its former style but successfully tested at 100 lbs. air pressure . . . Similar savings and betterments are likewise possible on *your* manufactured parts. Your blue-prints and specifications will permit this study.

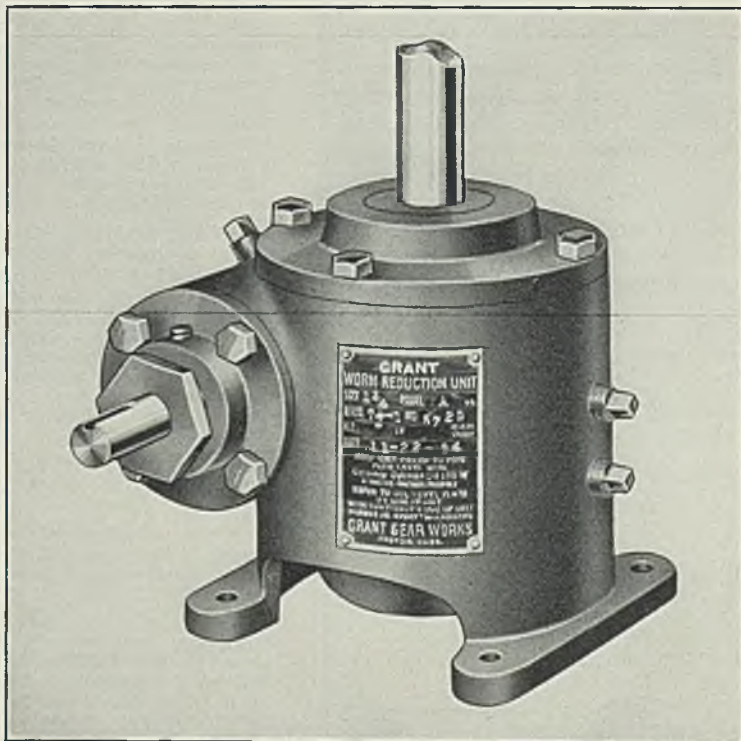
PARISH PRESSED STEEL CO.

Specialists in difficult stamping design

Robeson & Weiser Sts. READING, PA.

Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Calif.

GRANT SPEED REDUCERS



A complete line of Vertical Worm Gear Shaft type of Worm Reducers. Ratios 5-1 to 100-1 and Horse Powers 1/50 to 15. Excellent agitator drives. Write for catalog No. 58.

GRANT GEAR WORKS — BOSTON

Southard and Linwood avenues, has set aside \$800,000 for a new vocational high school to accommodate 1600 pupils.

SPRINGFIELD, O.—Crowell Publishing Co. will spend \$1,000,000 on a plant improvement program. Lee W. Maxwell, chairman.

TOLEDO, O.—Di Salle Plating Co. has been incorporated by Assunda, Anthony and L. Di Salle, to do metal plating. Correspondent is Michael Di Salle, 1028 Edison building.

TOLEDO, O.—George N. Schoonmaker, city service director, has rejected bids received March 31 for power plant improvements and will re-advertise soon. Included in proposed work are two gasoline engines and accessory equipment, to cost approximately \$35,000, and relocation and re-

connection of existing synchronous motor to act as generator. H. P. Jones & Co., Second National Bank building, is consulting engineer. (Noted STEEL, March 23).

URBANA, O.—Champaign Rural Electric Co-operative Inc., Carl Frye engineer, 620 Broad street, Columbus, O., is taking bids due noon April 18 for rural electrification to service approximately 1900 farms in Champaign county at an estimated cost of \$435,000. (Noted STEEL March 30.)

WELLSVILLE, O.—Sterling China Co. is planning addition and alterations to plant, for which plans are being drawn by Prack & Prack, architects, 119 Federal street, Pittsburgh.

Illinois

ALTON, ILL. — Castalia Co., 200 West Third street, has been incorporated to engage in general manufacturing business, by Emil P. Verlie. C. Dane Eastman and Nellie C. Coulter. Correspondent is Green, Verlie & Hoagland, First National Bank building, Alton.

BELLEVILLE, ILL.—City will take bids in April or May for construction of sewage disposal plant costing \$434,545, for which PWA has allocated \$195,545. J. G. Cooney, 3303 Rowland street, is engineer. (Noted STEEL, March 30.)

CHICAGO—Avon Packing Co., 188 West Randolph street, has been incorporated by Roy R. Smith, Rudolph Lipkowski and T. Hutter, to do a general meat packing business. Correspondent is Misner & Cohn, 188 West Randolph street.

CHICAGO—Commander Mfg. Co., 4225 West Kinzie street, has been incorporated by Sol E. and Bernard T. Sweet and Herman Jaffe, to manufacture storage batteries. Max H. Marine, 139 North Clark street, is correspondent.

CLEARING, ILL. — Clearing Machine Corp., R. W. Glasner president, manufacturer of steel power presses for metal stamping, is building an addition to its plant at 6499 West Sixty-fifth street, for which the general contract has been given to the Clearing Industrial district, Merchandise Mart, Chicago. The addition will be 69 x 141 feet and will contain a new 50-ton traveling crane.

MARENGO, ILL.—City, V. H. Kesser engineer, rejected bids for sewage disposal plant construction received March 12 and will probably advertise again soon.

PEORIA, ILL.—Continental Chemical Corp., 610 Lehmann building, has been organized to manufacture chemical compounds by M. L. Carlson, E. A. Anderson and Earl B. Williamson. Correspondent is E. A. Anderson, 610 Lehmann building, Peoria.

New York

COLD SPRING, N. Y. — Remington Screw & Bolt Co. will alter and recondition its plant and foundry at cost of over \$40,000.

COLONIE, N. Y.—City has plans near completion for new sewage disposal plant to cost \$245,000, with PWA aid. Bids will probably be opened in late April. Engineers are Solomon & Keis, 267 Broadway, Albany, N. Y.

ENDICOTT, N. Y.—Endicott Johnson Co. is planning construction of addition to plant at cost of over \$37,000. M. A. Boigel is engineer at plant.

JAMESTOWN, N. Y.—Socony-Vacuum Oil Co., 1103 Elk street, Buffalo, plans construction of a super-service

station, including installation of 550-gallon steel tanks, electric pumps, and air compressors at total cost over \$37,000.

LOCKPORT, N. Y.—City plans construction of incinerator plant buildings costing \$51,800, with PWA aid. Engineers are Nussbaumer & Clarke Inc., 321 Franklin street, Buffalo.

NEW YORK—Empire Metal Creations Inc., 21 East Twenty-first street, manufacturer of metal products and novelties, has leased floor space for a new plant at 4 West Sixteenth street.

PERRY, N. Y.—City, W. J. Prescott mayor, plans municipal power plant costing \$200,000. An election will be held soon to vote on the project. L. C. Reynolds, Geneva, N. Y., is engineer.

ROCHESTER, N. Y.—Department of public works, City hall, plans construction of two incinerator plants, costing \$75,000 and \$350,000, on the east and west banks of the Genesee river. Metcalf & Eddy, 1300 Statler building, Boston, engineers.

ROCHESTER, N. Y.—Rochester Gas & Electric Co., H. Russel president, Gas & Electric building, will take bids soon on steam generating plant, to include bent tube boilers, turbines, tanks, air compressors and filters, costing \$1,000,000. E. M. Gilbert, 512 Washington street, Reading, Pa., is engineer.

SYRACUSE, N. Y.—Greenway Brewery Inc., 1925 Park street, plans construction of bottling plant in brewery addition. Engineer is W. Markham, Everett building.

WEST POINT, N. Y.—Construction quartermaster, United States Military academy, will receive bids April 21 for installation of filter plant additions, including steel storage tanks, electrically-driven centrifugal pumps and connections.

Pennsylvania

AMBRIDGE, PA.—Borough of Ambridge, S. L. Card secretary, is taking bids April 16 for study of possibilities of municipal electric power system.

FLEETWOOD, PA.—Borough council is planning new municipal power plant to cost \$166,000. J. W. Maskell, 947 East Rittenhouse street, Philadelphia, is engineer.

MORRISVILLE, PA.—Council has rejected bids received March 24 for waterworks improvements and will receive new bids soon. H. H. Lee, 333 North Pennsylvania avenue, is engineer.

PITTSBURGH—Mayer Body Corp will build a plant extension at 6465 Frankstown avenue, to cost \$10,000

Indiana

ANDERSON, IND.—City plans several improvements to light and power plant, including installation of \$10,000 modern plant heater, 1200-horsepower boiler and stokers to cost \$65,000, and addition to evaporator, to cost \$8000. H. Gwinnup is city engineer.

INDIANAPOLIS—Victor Piston Pin Co., 115 North Noble avenue, was damaged by fire recently.

INDIANAPOLIS—Indiana Oil Equipment Co. Inc., 621 Massachusetts avenue, has been organized to manufacture oil-using equipment and appliances. Incorporators are R. M. Hofheinz, also resident agent, James E. Nicely and M. F. Hoffheinz.

NEWCASTLE, IND. — Five 1000-kilowatt transformers at the Chrysler Motor Corp. plant here were burned



Two new, proven products, to meet today's needs . . .

HOUGHTON'S SOLUBLE GRINDING OIL

Moisture-free, highly concentrated; may be added directly to tank. Readily and completely soluble; wets out work and wheel quickly; produces higher finish. Non-foaming, non-gumming, sterile, uniform.

HOUGHTON'S GRINDING PASTE

The premier grinding material wherever a paste-type material is desired. Washes away chips quickly, wets out rapidly, prevents rust, gumming or sludging. Sterile and uniform.

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240 W. Somerset St., Philadelphia, Pa.



Manufacturers of
Carburizers
Quenching Oils
Rust Preventives
Cutting Oils
Lubricants

—Construction and Enterprise—

March 30, and a boiler room was also damaged.

Michigan

DETROIT—Barkley-Grow Aircraft Corp. has been organized to manufacture airplanes, airplane parts and accessories, with offices at 2017 Penobscot building. Harold B. Grow is president.

DETROIT—Packard Motor Car Co., 1580 East Grand boulevard, is building a foundry and crane extension and some large bins for storing coal and coke. (Noted STEEL March 23.)

DETROIT—Crown Tool & Die Inc., has been organized at 4155 St. Aubin avenue, to manufacture dies and tools. Fred Plateau, 6352 Kercheval avenue, correspondent.

DETROIT—Co-operative Die & Machine Co., 4196 Bellevue avenue, has been incorporated to manufacture tools and dies. Correspondent is Harold B. Mumm, 5066 Coplin avenue.

DETROIT—Wayne Screw Products Co., 521 St. Jean avenue, is enlarging its plant and will install 40 new screw machines. Albert C. Germer is president.

GRAND RAPIDS, MICH.—Kindel Furniture Co., 100 Garden street, Southeast, is constructing an addition to its factory, for which the general contract has been awarded the Owen-Ames-Kimball Co., 38 Pearl street, Northwest.

GRAND RAPIDS, MICH.—Bulman Mfg. Co., 1719 Elizabeth street, Northwest, is erecting a \$15,000 factory addition, for which Owen-Ames-Kimball Co., 38 Pearl street, Northwest, has the general contract for the building.

HOWELL, MICH.—City will construct \$60,000 sewage disposal plant, for which plans are being prepared by Francis Engineering Co., 204 Eddy building, Saginaw, Mich.

LANSING, MICH.—Council plans sewage disposal system to cost \$900,000, and has engaged Schoolcraft, Drury & MacNamee, 103 East Washington street, Ann Arbor, Mich., to prepare plans.

LANSING, MICH.—Wheeling Corrugating Co., Wheeling, W. Va., plans construction of one-story, 50 x 100-foot, plant here. H. G. Christman Co., Kalamazoo Plaza, Lansing, Mich., has been awarded general contract for building.

MIDLAND, MICH.—Council plans installation of 1,000,000-gallon storage tank at water filtration plant. Schoolcraft, Drury & MacNamee, 103 East Washington street, Ann Arbor, Mich., are preparing plans.

MUSKEGON, MICH.—City is taking bids due April 21 on construction of a sewage treatment plant. Consoer, Townsend & Quinlan, 205 West Wacker drive, Chicago, are engineers.

PONTIAC, MICH.—Baldwin Rubber Co. will build an addition to its plant, for which L. J. Heenan, architect, Pontiac, is preparing plans.

ST. CLAIR, MICH.—Standard Products Co., 1011 Power avenue, Cleveland, plans to remodel a recently-purchased 90 x 150-foot hangar on the Buhl airport near St. Clair, for the manufacture of thermo-plastic products.

TECUMSEH, MICH.—Ega Carburetor Co., 144 East Chicago street, has been incorporated to manufacture metal specialties. Correspondent is Ida Atkins, 302 East Biddle street, Jackson, Mich.

WYANDOTTE, MICH.—All Metal Products Co. plans construction of an

addition to its factory, for which the general contract has been given to Barton-Malow Co., 1900 East Jefferson avenue, Detroit.

Connecticut

BRIDGEPORT, CONN.—United Illuminating Co., 128 Temple street, New Haven, Conn., plans extensions and improvements in steam-electric generating plant at Steele Point, Bridgeport, including installation of new equipment. This work will be part of the 1936 expansion program, which will cost \$2,000,000.

Rhode Island

WESTERLY, R. I.—City plans erection of 200,000-gallon steel standpipe, pumping station, electric pumps and distribution system, total cost to be \$150,000. A. Koy is superintendent of water department. City hall.

New Jersey

NEWARK, N. J.—William Steinen Mfg. Co., 164 Pennington street, is building an addition to manufacture metal stampings, tools, dies and screw machine products.

Massachusetts

CANTON, MASS.—Draper Bros. Co., manufacturer of leather specialties, plans addition to power house, including improvements to present plant and installation of new equipment, at total cost of \$50,000. Engineer is Arthur L. Nelson, 31 St. James street, Boston.

COTUIT, MASS.—Water department, City hall, will take bids soon for waterworks improvements, including pumping equipment and steel tank, to cost \$150,000. Engineers are Whitman & Howard, 89 Broad street, Boston.

Alabama

THOMAS, ALA.—Superock Co., Empire building, Birmingham, Ala., C. S. Robinson president, recently-organized affiliate of Republic Steel Corp., Cleveland, plans installing motors, controls, electric hoists, conveyors, loaders and other equipment in new slag cement mill near Republic blast furnaces here, at a cost near \$250,000.

Maryland

BALTIMORE—Reid-Avery Co., 1145 Broad street, Philadelphia, plans addition to welding rod plant here at 2324 Chesapeake avenue, to be one story, 100 x 120 feet.

HAGERSTOWN, MD.—J. S. Johnson Corp., recently organized to manufacture pharmaceutical products, is installing bottling machinery, labelers, belt conveyors, cartoning devices, etc.

District of Columbia

WASHINGTON—General purchasing officer for Panama Canal will take bids until April 20 for overhead traveling electric crane.

WASHINGTON—United States engineering office, 1068 Navy building, will receive bids until April 23 for installation of motor-driven pumping and electrical equipment in McMillan pumping station, Washington aqueduct.

Missouri

MOUNTAIN GROVE, MO.—Council has plans under way for new municipal

power plant, and a bond issue will be arranged soon. C. N. Garrison, Springfield, Mo., is engineer.

Oklahoma

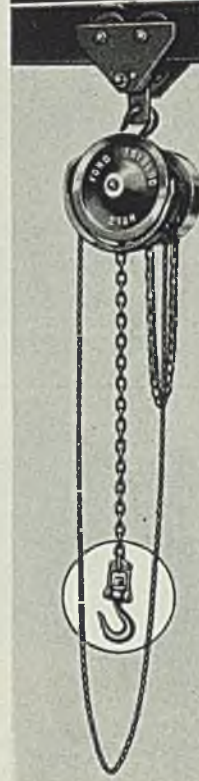
ENID, OKLA.—Enid Ice & Fuel Co., N. E. Crumpacker president, is building a \$100,000 plant with capacity of 50 tons of ice daily. R. W. Shaw is architect, and the McMillan Construction Co. is contractor.

Wisconsin

BEAVER DAM, WIS.—Reliable Welding & Cutting Co., 114 Rowell street, has been incorporated, with Anton Heleniak president.

CRANDON, WIS.—Gambill Distilling

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FORD CHAIN BLOCKS

Co., Green Bay, Wis., care of Poeller, Schrober & Berners, 310 Pine street, Green Bay, plans installation of electric power equipment in new \$80,000 distillery in vicinity of Crandon.

KAUKUNA, WIS. — City rejected March 26 bids for sewage disposal plant construction and will receive new ones April 16. Greeley & Hansen, 6 North Michigan avenue, Chicago, engineers.

MILWAUKEE—Dorfalloy Co., 1825 South Kinnickinnic avenue, has been incorporated to manufacture a new copper alloy called "Dorfalloy." W. S. Smulski is president.

MILWAUKEE — Automatic Screw Machine Products Co., 2223 South Austin street, has purchased a four-story shop at 524 South Second street

and will equip it. T. M. Leisle is principal owner.

MILWAUKEE—Magnetic Mfg. Co., 625 South Twenty-eighth street, is building a shop extension, 60 x 90 feet, to cost \$30,000, equipped. Transmission and brake equipment, separators and concentrators will be manufactured. Roswell N. Stearns is secretary.

MILWAUKEE — Froedtert Grain & Malting Co., South Thirty-eighth and West Grant streets, plans installation of power and conveying equipment in new addition to grain elevator. Work is to begin late in April, at a total estimated cost of \$350,000. K. R. Froedtert, president, is in charge.

NEILLSVILLE, WIS.—Earl Bruhn

and Martin Feuerstein have formed a partnership to build and operate a general machine and repair shop, to be 50 x 60 feet. G. A. Krasin, Marshfield, Wis., is architect.

Texas

HOUSTON, TEX. — Continental Can Co., Pershing square, New York, will build a \$250,000 addition to its plant here, to be three-story with 60,180 square feet of floor space.

Minnesota

MINNEAPOLIS — Minneapolis-Honeywell Regulator Co., 2700 Fourth avenue, South, is adding 60 per cent new floor space, and will install new machinery. G. A. Dutoit is vice president in charge of production.

North Dakota

FARGO, N. DAK.—Northern States Power Co., 15 South Fifth street, Minneapolis, will install a number of new mechanical stokers and auxiliary equipment in power plant here. Improvements will also be made at Minot, N. Dak., including new boilers, stokers, and accessories. This work is part of the 1936 expansion program.

South Dakota

RAPID CITY, S. DAK.—City will hold election April 26 to vote on \$90,000 waterworks bonds to help finance water system improvements costing \$100,000. H. W. Zolpher is city engineer. (Noted STEEL, April 6.)

Nebraska

OMAHA, NEBR. — Nebraska Power Co., Seventeenth and Harney streets, plans to construct and equip new power substation to cost \$60,000, and to install a new boiler unit costing \$70,000, capable of evaporating 30,000 gallons of water per hour into steam at 1200 pounds pressure per square inch.

Colorado

DENVER — Omaha Flour Mills Co., W. O. W. building, Omaha, Nebr., plans installation of electric power equipment in new flour mill and grain elevator here to cost \$450,000. Herner & Wyatt, Board of Trade building, Kansas City, Mo., engineers.

Montana

BILLINGS, MONT. — Montana-Dakota Distillery Co., Charles Merry manager, has purchased building at Second avenue and Twenty-second street, and plans to install machinery and convert it into a distillery.

HELENA, MONT.—Northern Pacific Railway Co., St. Paul, plans installation of motors and controls, transformers and accessories, conveyors, electric hoists and other equipment in connection with extensions and improvements in shops at Helena, Missoula and Livingston, Mont. Estimated cost about \$200,000.

Pacific Coast

CARMEL, CALIF. — Carmel sanitary district is now surveying possibilities for sewage disposal plant to cost \$25,000. Engineers are C. C. Kennedy, 74 New Montgomery street, San Francisco, and H. N. Jenks, 2701 Benevue avenue, Berkeley, Calif.

LONG BEACH, CALIF. — Spencer Kellogg & Sons, Niagara square, Buffalo,

(Please turn to Page 96)



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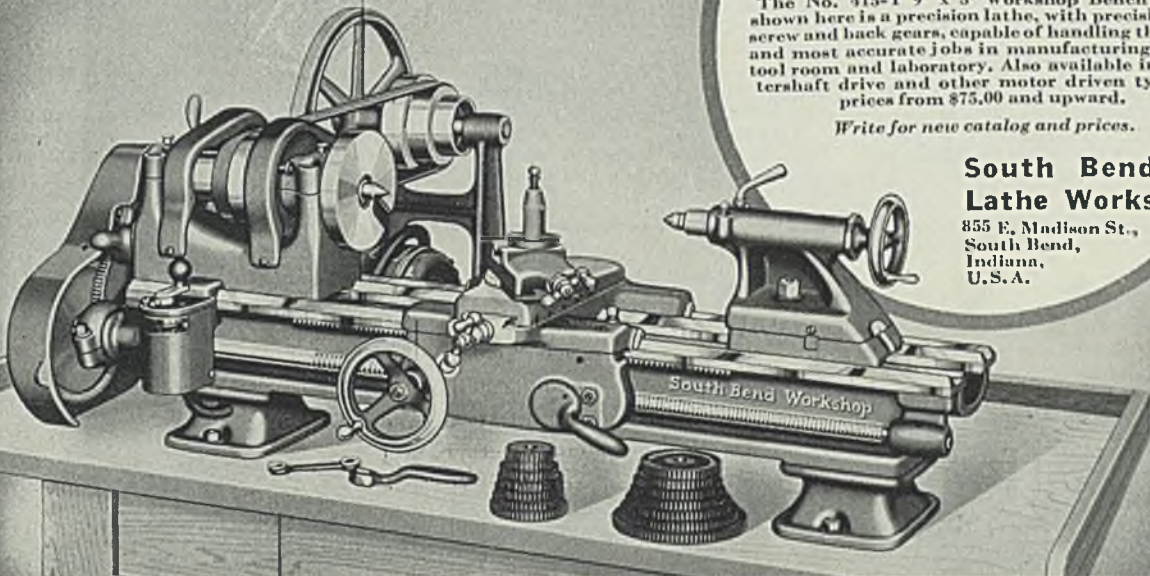
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(Concluded from Page 94)

plan one-story steam power house in connection with new \$150,000 branch plant here. William J. Moran, 1011 South Fremont street, Alhambra, Calif., is engineer.

LOS ANGELES—Norton & Norton Electric Co., 1375 North Broadway, is building a \$25,000 addition to its plant and will install special machinery.

LOS ANGELES—Federated Metals Corp. will build a \$1,000,000 plant at Twenty-sixth street and Indiana avenue, to manufacture nonferrous metals.

SACRAMENTO, CALIF.—United States engineer, Post Office building, is taking bids for 40 steel pontoons, com-

pletely assembled and finished.

SACRAMENTO, CALIF.—Council, H. G. Denton clerk, will take bids soon, following pending PWA approval, for \$40,000 improvement to water filtration plant.

FREEWATER, OREG.—Utah Canning Co., Ogden, Utah, plans installation of power equipment in new branch plant here on which work will start soon and which will cost \$10,000.

PORTLAND, OREG.—State supreme court has authorized Portland to issue \$6,000,000 self-liquidating bonds to finance construction of sewage disposal system.

ABERDEEN, WASH.—West Coast Plywood Co., 316 Becker building, has given Grays Harbor Construction Co.,

Grays Harbor, Wash., the contract for new buildings, in which will be included boiler equipment and power plant. Clarence W. George, Becker building, Aberdeen, Wash., is architect. (Noted STEEL, April 6.)

BELLINGHAM, WASH.—F. A. Naramore, architect, Central building, Seattle, has completed plans for \$675,000 high school, to include machine, automotive and woodworking shops. Work will begin in May.

ELLENSBURG, WASH.—City plans construction of sewage disposal plant, costing \$132,000.

SEATTLE—Western Can Co., 409 Vance building, has been incorporated by F. C. Stuart and associates.

SEATTLE—University of Washington is constructing \$980,000 chemistry building, for which building permit has been issued.

SELAH, WASH.—City council will open bids April 20 for construction of sewage disposal system.

SPOKANE—Brown Metal Works, 3404 Sprague street, plans construction of plant for manufacturing all-aluminum bus bodies.

Canada

BAIECOMEAU, QUE.—Ontario Paper Co. will build a hydroelectric power plant and paper mill here to cost several million dollars, for which the general contract has been let to the Foundation Co. of Canada.

BEAUHARNOIS, QUE.—St. Laurence Alloys Ltd., R. Turnbull president, care of Buckley & Harries, 36 Toronto street, Toronto, Ont., plans new plant construction costing \$100,000.

MONTREAL, QUE.—Metal Industries Corp., A. E. Laverty secretary, 414 St. James street, plans construction of a new plant.

Expands Facilities for Building Special Machinery

(Concluded from Page 38)

place is facilitated by the arrangement of heavy machining equipment alongside of the central aisle. Over this aisle is located a traveling crane, also illustrated, capable of handling the heaviest equipment produced at the plant.

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