

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW



Contents March 9, 1936

Volume 98 - No. 10



Published by
PENTON PUBLISHING CO.

PENTON BUILDING
CLEVELAND, O.

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Member Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association.

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year \$4 two years \$6; European and foreign countries, one year £2.

Entered as second class matter at postoffice at Cleveland, under the Act of March 3, 1879, Copyright 1936 by Penton Publishing Co.



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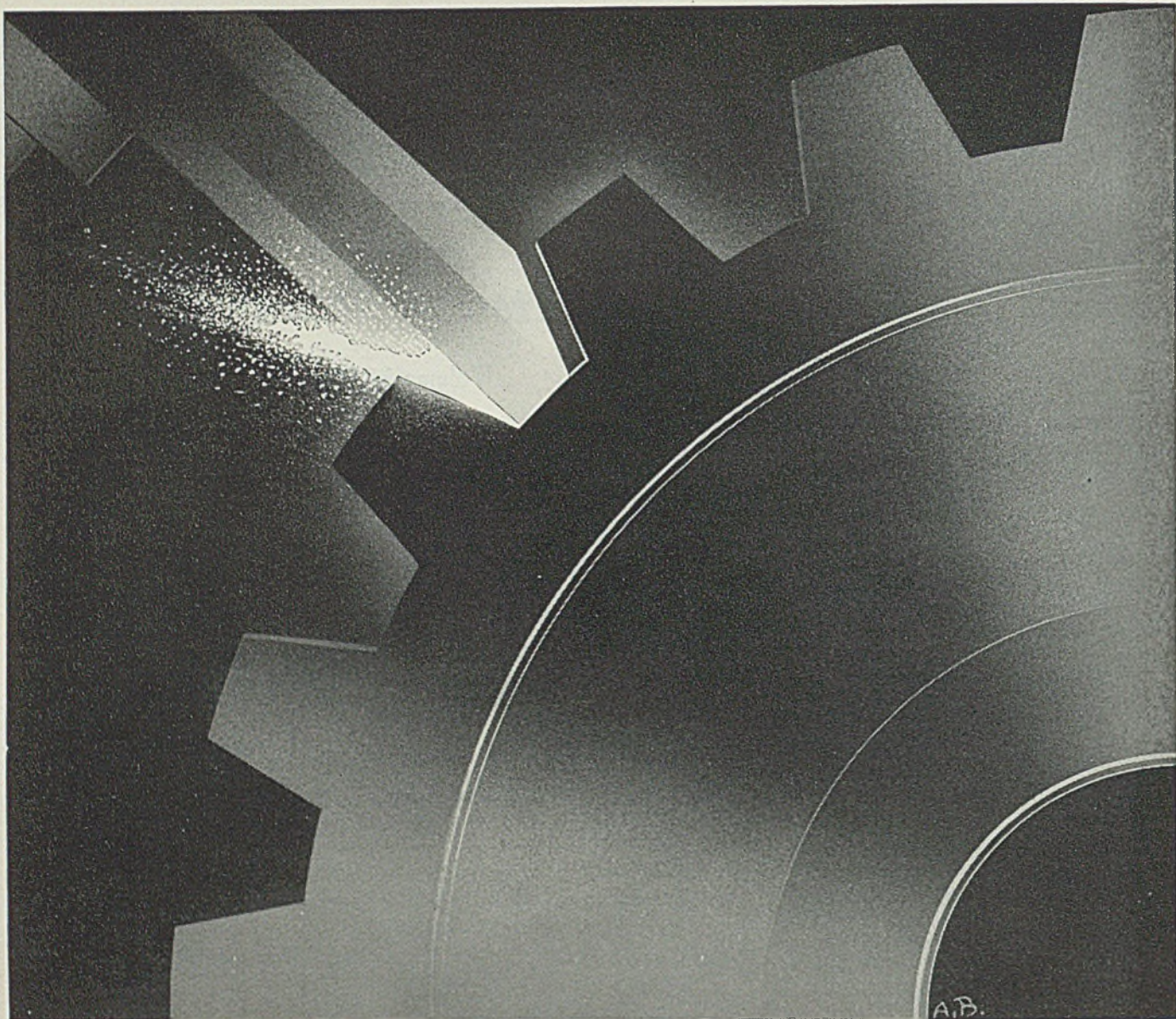
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treating, carburizing, machining—Moly steels have made it possible to cut costs substantially.

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STEEL

As the Editor Views the News

THIS week the attention of thousands of consumers of iron and steel products will be focused upon price problems. Schedules for second quarter will be announced. In Washington hearings will be held in connection with the Wheeler anti-basing point bill. Successful price systems must be flexible enough to meet changing conditions in industry. In quoting for the second quarter, producers will try to modify the existing price structure to meet difficult postcode requirements. In the basing point hearings an old controversy over methods will be debated anew. It is possible that both events will contribute something to the evolution of pricing technique.

• • •

Price changes for the second quarter thus far announced and in prospect seem to have been motivated by a desire to stabilize, equalize or refine quotations (p. 79) rather than by a determination to increase or decrease the general level of base prices. The prospect of a quantity differential system for sheets, strip, and probably plates, shapes and bars is a logical outcome of the successful trial of a similar plan in connection with cold finished bars. If the present price move should succeed in clarifying, even partially, the numerous problems related to quantity preference, important progress will have been made.

• • •

From the beginning of time man has adopted almost instinctively the precept that it is both prudent and wise to conserve part of one's gains as a backlog against the traditional "rainy day." This rule, which has worked so well for individuals, has been followed religiously by the managements of most successful businesses. Every industrial executive recognizes the basic advantages of a corporate reserve or surplus. Therefore, when the federal government, through

Why Legalize Shiftlessness?

its President, proposes a tax plan which penalizes the accumulation of reserve funds for emergency use (p. 29), it virtually challenges a fundamental trait of human nature. We do not believe that this or any other congress will concur in a proposal which is so diametrically opposed to the ingrained habit of thrift which governs the action of such an overwhelming majority of our people.

• • •

One of the marvels of modern manufacturing is the high degree of mechanical perfection in automobiles, refrigerators and other machines which are turned out on a mass production basis. Many of these units are subjected to severe service and sometimes to abuse, yet the number of mechanical failures due to faulty materials or practice is surprisingly low. This is a great tribute to the care with which metallurgical operations are controlled. The method by which this fine record is achieved—the secret of uniform reliability—in the automotive industry, is explained in unusual detail (p. 32) by the chief metallurgist of one of the leading motor car companies. This is a noteworthy contribution to the literature of metallurgical practice.

• • •

Another symposium on high-strength constructional metals—the second in two weeks—again has carried some of the new alloy steels into the spotlight of technical discussion. Last week in Pittsburgh (p. 43) 600 experts interested in the improvement of materials listened to a number of instructive papers dealing with high-elastic type steels, corrosion-resisting steels and certain nonferrous metals. Some of the speakers ventured to peer into the future of these materials. They saw improved production methods and attendant lower prices, fewer misapplications and expensive failures, greater facility in fabrication, and a host of yet undeveloped alloys. The more one contemplates the possibilities in these newer materials, the more he realizes that the entire metalworking industry is entering upon a new era in the application of metals.

A Future of Super Steels

E. L. Phaner

Republic, Modern Phoenix, Spends First Profits in Six Years on Improvements

REPUBLIC STEEL CORP.'S decision announced last week to spend \$3,000,000 for plant improvements, in addition to \$1,600,000 authorized earlier this year, means that it will plow back immediately all the profit it has made in the six years of its existence, plus nearly \$200,000.

This bold stroke, after a total loss of \$31,326,000, is the latest incident of more-than-passing interest in the story of Republic, a corporation which now appears to be rising Phoenix-like from the ashes of the depression.

In 1928, Republic Iron & Steel Co., the foundation on which the Republic corporation was built through numerous mergers promoted by Cyrus S. Eaton, had a net profit of \$4,642,450. That was about equal to the corporation's profit in 1935.

In 1929, the Republic company scored a profit of \$9,780,043. It was not until late in December, 1929, that the steel industry was officially let in on the secret of the mergers which placed the Republic corporation on the map, and the organization was not consummated until April 8, 1930.

Followed five years of steady losses for the corporation which seemed to have been born under an evil star.

One of Eaton's pet projects—merger of Youngstown Sheet & Tube Co. with Republic; "we have other plans for Sheet & Tube"—went by the boards in the financial storm.

The new corporation lost \$3,522,000 in its first year (1930); \$9,034,153 in its second; \$11,261,195 in the third year; \$4,049,253 in the fourth year; and \$3,459,428 in 1934. Last year, therefore, was the first year in which Republic, as a corporation, made a profit. Its net sales for the year amounted to \$137,117,708, compared with \$97,432,562 in 1934. Net working capital rose from \$29,506,900 Dec. 31, 1934, to \$62,300,612 Dec. 31, 1935. The ratio of current assets to current liabilities stood at 6.68 on Dec. 31, 1935, against 3.15 one year preceding.

Earnings of the Corrigan, McKin-

PANORAMA of Republic Steel Corp.'s Corrigan-McKinney plant, Cleveland. At the left, across the river, are the ore docks and the four blast furnaces. Republic's improvement program calls for spending \$1,300,000 to enlarge one of the stacks and to extend the dock, this to require 1200 tons of sheet piling which, incidentally, Republic does not make. The blast furnace capacity is 1,000,000 tons annually. Three are now in operation, with the open-hearth department working at 78 per cent

ney Steel Co. and Truscon Steel Co., two valuable properties acquired by Republic, did not begin to be reflected until the fourth quarter of 1935. As part of this program, the funded debt was increased from \$44,943,200 to \$72,218,248.

The corporation had outstanding Dec. 1 last \$26,862,150 of 6 per cent cumulative convertible prior preference stock series A, \$14,427,600 of 6 per cent cumulative convertible preferred stock, and 4,046,767 shares of common stock of no par value.

Dividends on the 6 per cent cumulative convertible preferred stock have been paid to Oct. 1, 1930, and dividends on the 6 per cent cumulative convertible prior preference series A stock accrue from Jan. 1, 1935. Against the latter accrual a dividend of \$1.50 per share was paid Jan. 1, 1936.

Such are the details of the corporation's latest financial statement.

Expanding into Wire

Simultaneously it issued another announcement, concerning its program for improvements. This contemplates the expenditure of \$3,000,000 at 11 plants. The heaviest will be approximately \$1,300,000 for enlarging a blast furnace and ore dock facilities at the Corrigan, McKinney plant. The dock improvements will enable the company to concentrate the transfer from boat to rail of its ore shipments for plants in Youngstown, Warren, Canton and Massillon.

Of more general interest, however, is the corporation's intention to spend \$1,000,000 for a wire mill at its South Chicago plant. Taken in connection with the report (STEEL, March 2, page 28) that it has bid for a 9 to 10 per cent interest in the Wickwire Spencer Steel Co., of New York, an important producer of wire and wire products with three eastern plants and one at Buffalo, this was interpreted to mean that Republic is preparing to enter the wire market in a big way. Of Class B Wickwire notes, \$3,040,000 were



purchased by a Buffalo brokerage firm, and these, after exchange into proposed new stock, will be turned over to Republic. This, however, has never been confirmed by Republic.

Improvements in Valley

Other improvements in Republic's plans include \$200,000 for the tube mill, coke plant, open-hearth furnaces and transportation facilities at Youngstown, and \$200,000 for improving its tin mills and open-hearth furnaces at Warren. Most of the \$1,600,000 set aside earlier this year will be spent at the Warren and Youngstown divisions.

All the work Republic is contemplating fits into its general scheme of "building for the needs of modern times." All during the depression it has been co-ordinating facilities for manufacturing the lighter forms of finished steel, keeping down costs, striving for prestige, laying the ground work for good will to assert itself.

Many observers in the industry believe Republic, as now constituted, with its concentration on the lighter finishes, could not have lived long in the formative period of American industry, when rail and structural capacity dominated, much less weathered a financial gale of such severity as in the past few years.

From the first, Republic seems to have been pieced together with an eye to new trends. For example, it steered clear of rail and structural mills, and therefore it did not have to carry the burden of millions of capital in idle rail and structural plant. It did, however, go heavily into products used in buildings, such as sheets and pipe, and especially the materials used for automobiles, and the new alloy steels.

Of Republic's sales, 30 to 40 per cent is designated as miscellaneous; that is, it cannot be classified in any of the leading consuming groups. It extends into practically all manufactured goods. Another 25 per cent is classified as "automotive."

The results of this diversity are

Nails Down, Wire Up as Republic Prepares To Build

HARDLY was the ink dry on Republic's statement last week concerning its purpose to increase its capacity for making wire than leading producers announced a reduction of \$6 a ton in wire nails for the second quarter, one of the big items in the wire-products market.

For months nails have been a storm center of competition. Two reductions were made in rapid succession last August and September, first \$1 a ton, then \$3 a ton, since which time there has been no advance.

The latest cut brings the price down to \$42 a ton compared with \$52 last July. For a time recently nails were selling in some instances at \$40 a ton, Pittsburgh.

On the other hand, plain wire for the manufacturing trade last week was advanced \$2 a ton; spring wire \$3; and fence wire \$4.

discerned in the corporation's operations and earnings.

The first year of its existence it operated at 47 per cent of capacity, and, it will be recalled, its loss was \$3,522,000. The year 1935 brought a remarkable demonstration of its improved organization and facilities, when with operations averaging only 8 points higher, or 55 per cent, its net profit was \$4,455,735. The steel industry as a whole operated only at 48.5 per cent last year.

Third largest corporation in ingot capacity, Republic's practical annual capacity for producing finished steel is 4,746,000, while it has a theoretical capacity of 5,772,000, the figure used in the American Iron and Steel institute's *Directory*. The breakdown of products shows that

40 per cent of this theoretical capacity is composed of sheets, strips, tin plate, bolts, nuts, wire and wire products, of which it has a small amount. Include steel bars, and reinforcing bars, and the proportion jumps to 75 per cent.

For making sheets it has a theoretical, or potential, capacity of about 959,000 tons; pipe and tubes, 777,000 tons; hot strip, 104,500 tons; cold strip, 150,700 tons; tin plate, 102,700 tons; bolts and nuts, 143,600 tons; wire and wire products, 44,400 tons—a total of 2,281,900 tons. Its capacity for bars, including reinforcing, is 2,032,000 tons, raising total to 4,313,900 tons.

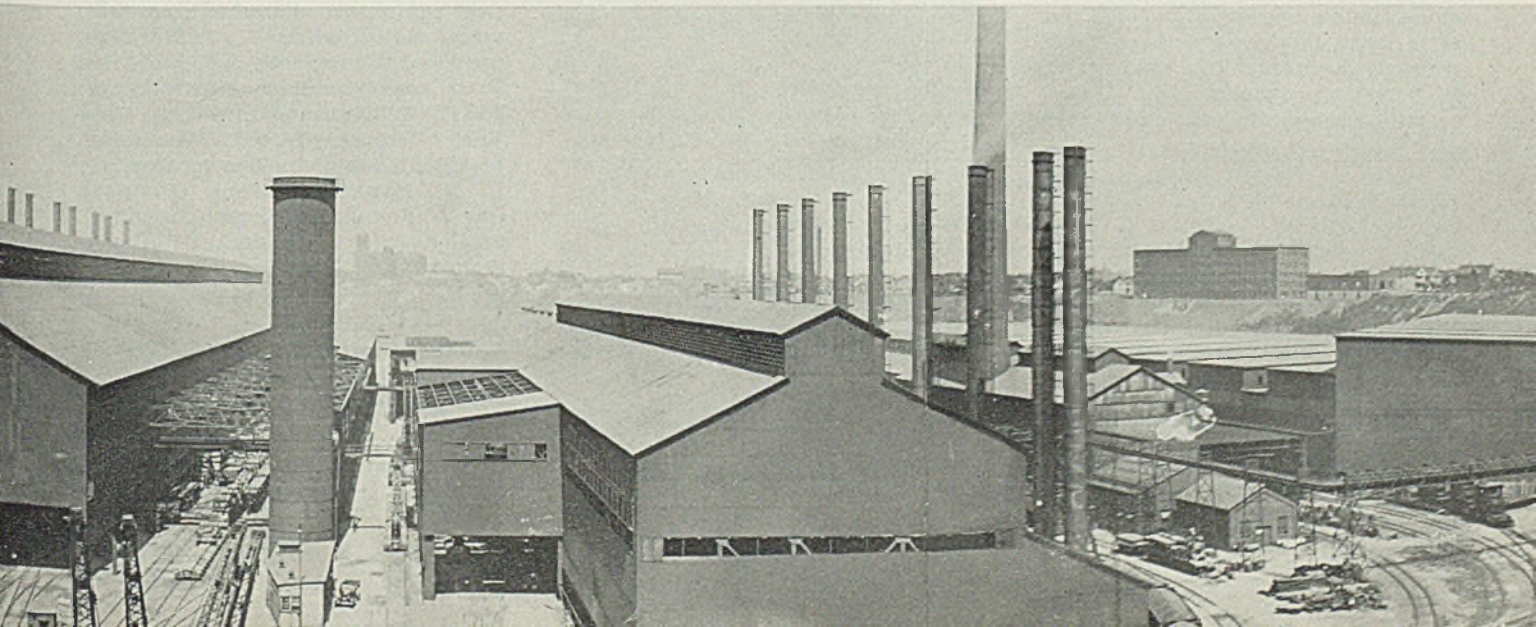
Out of Balance on Wire

It has remained out of the market for rails, but has capacity for 75,000 tons of splice bars and tie plates. For heavy plates, the figure is only 64,000 tons. Capacity for wire rods totals 104,000 tons, yet, as indicated, it could produce only 44,000 tons of wire and wire products. Probably with a view to balancing up this side it took steps to acquire an interest in Wickwire, whose capacity for wire and wire products is approximately 187,625 tons.

In this it is pursuing its traditional policy, such as also exemplified when it took over Truscon, one of the leading fabricators of light building steels; and the Berger Mfg. Co., also specializing in the lighter products, and which recently developed a steel-frame house.

Valuable electric welding patents were held by the old Republic Iron & Steel Co. Still other valuable patents were acquired in the Witherow die rolling process, for making automobile axles.

Republic's plant at Warren, O., is one of the most modern in the industry. Central Alloy contributed heavily in the field of alloy steels. It acquired a large portion of its bolt and nut capacity from the Bourne-Fuller plant at Cleveland. The Donner plants at Buffalo were notable for



low costs, and easy access to the eastern markets.

Republic has built on the firm conviction that steel demand in the United States has permanently shifted away from the railroads and heavy building construction to automobiles, household equipment, and millions of other light forms.

Not only does it hold to this in respect to its own manufacturing facilities, but apparently it also has carefully avoided taking on an excess amount of reserves in raw materials. It is no secret that the largest iron and steel companies today do not want to buy iron ore and coal mines, but have them to sell. In the list of the ten leading holders of Lake Superior iron ore, Republic—while third as a steel producer—is eighth.

To Sell Foreign Iron, Steel

The Base Products Co., Somerset

Steel Ingot Capacity Shrinks in 1935; Bessemer Decline Offsets Other Gains

CAPACITY for making steel ingots and castings as of Dec. 31, 1935, was 69,789,554 gross tons, states the American Iron and Steel institute, New York. Abandonment of 700,000 tons of bessemer converter capacity was not offset by the increase of open-hearth and electric

and Trenton avenue, Philadelphia, has been reported formed to import pig iron, steel and other merchandise from abroad. This company, it is said, has recently sold some charcoal pig iron in this country and also a sizable amount of steel pipe. Further details concerning the organization of this company are expected to be announced shortly.

Address Bethlehem Staffs

Bethlehem Steel Co. officials addressed the annual conference dinner of employe representatives of the Rankin, Pa., and Leetsdale, Pa., works of the company, March 5, in the main office building at Leetsdale, Pittsburgh district.

J. M. Larkin, vice president; E. J. Paulus, general manager of the fabricated steel construction division, and others were among the speakers.

capacity is part of the gradual decline in progress over many years. In 1875 about 86 per cent of steel ingot output was bessemer and only two per cent was made in open-hearth furnaces. In 1935 about 90 per cent was made in open-hearth furnaces and only 8 per cent was bessemer.

Open-hearth capacity was increased 360,000 gross tons in 1935 without construction of a new furnace, the increase representing effects of improvements in equipment and operating methods. New electric melting furnaces were installed with annual capacity of about 84,000 tons of steel ingots and castings, an increase of 9 per cent. No change is recorded for 1935 in capacity for producing steel by the crucible process.

Blast furnace capacity for producing pig iron declined about 1,110,000 gross tons during 1935, from 50,980,241 gross tons at the end of 1934 to 49,869,983 gross tons at the end of 1935.

ANNUAL BLAST FURNACE CAPACITY

As of Dec. 31	Gross Tons			Total
	Pig Iron	Ferro-Alloys	Charcoal Pig Iron	
1935	48,931,893	846,000	92,000	49,869,893
1934	49,999,741	846,000	134,500	50,980,241

steel capacity, although the latter reduced the shrinkage to 256,812 tons.

Capacity for production of ingots alone made a net loss of 305,712 tons after gains in open-hearth and electric furnace were offset against loss in bessemer capacity.

This change in bessemer steel

ANNUAL STEEL CAPACITY

As of Dec. 31	Gross Tons					
	(Ingots and Steel for Castings)			(Ingots Only)		
	Basic	Open Hearth Acid	Total	Bessemer	Crucible Electric	Total
*1935.....	60,410,669	1,149,000	61,559,669	7,195,000	15,620	7,210,620
*1934.....	60,085,832	1,114,445	61,200,277	7,895,000	15,620	7,910,620
1935.....	60,335,709	944,800	61,280,509	7,195,000	15,620	7,210,620
1934.....	60,010,097	944,620	60,954,717	7,895,000	15,620	7,910,620

*Includes only that portion of the capacity of steel for castings of foundries operated by companies producing steel ingots.

Pittsburgh Traffic Club Dinner Draws

ABOUT 1500 nationally prominent railroad and industrial executives attended the Traffic Club of Pittsburgh's thirty-fifth annual dinner, which was held in the William Penn hotel, Pittsburgh, March 5. A luncheon for members and guests of the club was given Thursday by A. R. Kennedy, chairman of the house committee and also traffic manager of Pittsburgh Steel Co. The Koppers Co. also gave a luncheon on the same date. About 200 executives were entertained by Jones & Laughlin Steel Corp. at a dinner in the Duquesne club, March 4, arrangements for the latter were in charge of H. E. Graham, assistant to the president and general traffic manager of Jones & Laughlin.

Among those who attended the Traffic club banquet were: B. F. Fairless, president, Carnegie-Illinois Steel Corp.; E. T. Weir, chairman, National Steel Corp.; C. W. Bennett, president, American Sheet & Tin Plate Co.; S. E. Hackett, president, Jones & Laughlin Steel Corp.; J. T. Tierney, president, Koppers Co.; B. F. Harris, president, National Tube Co.; L. A. Paddock, president, American Bridge Co.; Richard K. Mellon, president, Mellon National bank; Col. Frank Drake, president, Gulf Refining Co.; F. A. Merrick, president, Westinghouse Electric & Mfg. Co.; Thomas Moses, president, H. C. Frick Coke Co.; Alan M. Scaife, chairman, Pittsburgh Coal Co.; L. F. Rains, president, A. M. Byers Co.; Frank B. Bell, president, Edgewater Steel Co.; I. Lamont Hughes, executive vice president, Carnegie-Illinois Steel Corp.; T. M. Girdler, president, Republic Steel Co.; G. M. Humphrey, president, M. A. Hanna Co.; H. A. Roemer, president, Pittsburgh Steel Co. and Sharon Steel Corp.; and W. A. Bonitz, trustee, Pressed Steel Car Co.

A number of railroad executives and equipment manufacturers also attended, including W. J. Harahan, president, Chesapeake & Ohio, Nickel Plate and Pere Marquette railways; F. E. Williamson, president, New York Central; W. C. Dickerman, president, American Locomotive Co.; C. H. Hardy, president, American Car & Foundry Co., and Joseph C. Snyder, vice president, Pullman-Standard Car Mfg. Co.

Carnegie-Illinois Employe Magazine Makes Bow

Steel Columns, a magazine dedicated to industrial relations among the Chicago district employes of Carnegie-

Illinois Steel Corp., Pittsburgh, made its bow last week when an attractive 25-page initial issue came off the press.

The magazine, reported and edited by Carnegie employes in the Chicago district, deals with local happenings, among which is a newsy column entitled, "Ink and Iron."

Latest reports last week credited the belief that the United States Steel Corp.'s monthly magazine, *United States Steel News* might not appear before the May issue. Original plans had been to commence the publication with the April issue.

Cold Metal Co. Carries On

Cold Metal Process Co., Youngstown, O., whose plant was razed by fire March 4, has arranged to have all orders for cold-rolled strip on hand executed and shipped to customers without any delay.

Arrangements also have been made, it is stated by the company, for the completion on schedule of all mills of the Steckel type, either on order or in process of construction.

Burden To Make Light Weight Alloy

BURDEN IRON CO., Troy, N. Y., has been reorganized, and as soon as improvements are made to its plant will engage in light weight alloy and stainless steel lines as well as its regular products. Approximately \$250,000 will be expended in making the necessary plant improvements.

With the recent reorganization, control of the 124-year old concern has passed from the Burden family, which is left in possession, it is said, of 20 per cent of the common stock, whereas it formerly owned all of the common stock.

Alfred Nusso, East Orange, N. J., metallurgist, has been elected president to succeed George M. Godley, New York. Robert Kemp, Jackson Heights, Long Island, N. Y., consulting engineer, will be vice president, succeeding O. A. Van Denburgh, Troy. Mr. Van Denburgh will serve as secretary.

Arthur E. Swan, formerly chief engineer of the Crucible Steel Co. of America at its Harrison, N. J. plant; James D. Fleming, Troy industrial commissioner, and Andrew P. McKean, Troy have been elected to the board of trustees, together with Messrs. Nusso, Kemp and Van Denburgh. Others on the board are I. Townsend Burden and William P. Burden, Troy, representing the Burden family; N. V. W. Franchot, Olean, N. Y.; and Mr. Godley, New York, former president.

Stock Sale Reports Reveal Sharon's Pittsburgh Holdings

THE story back of the Sharon Steel Corp.'s acquisition of the largest individual stockholding in Pittsburgh Steel Co., Pittsburgh, came to light late last week.

The Securities and Exchange commission, Washington, in its January report of security transactions by officers, directors and principal stockholders reported that the large blocks of Pittsburgh Steel Co. stock in the hands of Dwight Winter and Emil Winter had been disposed of during the month, the purchaser, of course, having been Sharon Steel Corp., former Sharon Steel Hoop Co.

Dwight Winter, former director of Pittsburgh Steel Co., sold all of his holdings of 9638 common shares and 122 preferred shares of Pittsburgh Steel Co., and Emil Winter, former vice president and director, sold 21,516 shares of common and 3447 shares of preferred. Whereas Dwight Winter disposed of all his holdings, Emil Winter retains 600 common shares and 17 preferred shares out of his original stockholdings.

Other minor transactions included

Hommer D. Williams' disposal of his 10 common shares and Henry J. Miller's increase of 10 common shares to 1741 and unchanged holdings of 297 preferred shares. Mr. Williams formerly was president of Pittsburgh Steel and retired Feb. 1; Henry J. Miller continues as vice president and secretary.

Details of the stock transactions show that Dwight Winter disposed of all his 9638 common shares on Jan. 15, sold 15 preferred shares on Jan. 14, and 107 preferred shares on Jan. 31.

Emil Winter sold 3716 common Jan. 15, 4000 common Jan. 17, 14,400 common Jan. 25, 1100 preferred Jan. 14, 75 preferred Jan. 17, 1100 preferred Jan. 29, and 1338 preferred Jan. 31.

Some idea of the extent of the Sharon Steel Corp.'s holdings may be obtained from the fact that Pittsburgh Steel Co. lists 104,750 preferred shares and 253,500 common shares outstanding.

Pennsylvania Industries Inc., a Hillman company, through which latter interest it is reported the Sharon Steel-Pittsburgh Steel Co. tie-up originated, also reported to the Securities and Exchange commission that it had disposed of 797 shares of A. M. Byers Co. preferred in January, leaving it with a holding of 9500 shares. It also disposed of 3370 shares of National Supply Co. preferred, leaving it with a holding of 5808 shares.

New Name, Management

STEEL, Jan. 13, page 13, and Jan. 20, page 10, reported the news story on the Pittsburgh-Sharon merger and the election of Henry A. Roemer, president of Sharon Steel Corp., to the presidency and directorship of Pittsburgh Steel Co.

On Feb. 27 a special stockholders' meeting of the Sharon Steel Hoop Co. approved of the change in name of the concern to Sharon Steel Corp. and notification to the New York stock exchange that it proposed to reduce its capital represented by outstanding shares from \$9,875,000 to \$3,750,090 (STEEL, March 2, page 29).

Stockholders at the same time ratified a proposal to issue 70,000 shares of no-par preferred and to increase the authorized number of common shares to 1,000,000. In financial circles it was credited that this meeting was to prepare the way for the eventual and complete merger with Pittsburgh Steel Co.

New Record Set in Race for Stainless Steel Plate Size

A RACE appears to be under way among producers for turning out the largest stainless steel plate. At present, the situation is as follows:

American Rolling Mill Co., Middletown, O., has announced a 70 by 208-inch plate of 19-9 chrome nickel steel, 3/16-inch thick and weighing, theoretically, 785 pounds. It was machine polished successfully.

Allegheny Steel Co., Brackenridge, Pa., has completed shipment of 15 stainless plates 72 by 208 inches in size, 3/16-inch thick, and reported to weigh about 810 pounds each. These sheets, to be used in die kettles for the textile industry, were furnished with a bright, smooth finish.

Last September STEEL reported what was then thought to be the largest sheet of this material ever made. A product of American Rolling Mill, it was a mere 84 by 90 inches in size, 12-gauge, with a No. 7 finish.

Any other entrants in this stainless steel plate derby are requested to send data on their "platers" to the editors of STEEL, to be duly recorded in the event.

Steel Ingot Rate Makes Good Gain

DAILY ingot production averaged 118,712 gross tons in February, compared with 112,942 gross tons in January, an increase of 5 per cent. In February last year production was 115,740 tons. Only November and December, 1935, had a higher daily rate of production.

In February this year 54.09 per cent of steelmaking capacity was engaged, compared with 51.49 per cent in January and 52.28 per cent in February last year, according to monthly statistics of the American Iron and Steel institute.

On account of the shorter month total production is below that of January, although the daily rate is higher and the proportion of capacity engaged is larger, as the accompanying table shows.

Production

INCREASES in operating schedules at Youngstown and eastern Pennsylvania were sufficient to boost the steelmaking rate 1 point last week to 55½ per cent, highest level since the first week of December last year. Cleveland and New England were the only districts to lose operating ground, while all other producing centers held unchanged. Further details follow:

Detroit—Unchanged at 94 per cent last week, as there continue to be 16 out of 17 open-hearth furnaces on production schedules.

Pittsburgh—Held through last week at 38 per cent. A leading pro-

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended	Change	Same week	1935	1934
	Mar. 7				
Pittsburgh	38	None	38	34	
Chicago	62	None	55	50	
Eastern Pa.	39	+ 1½	28½	31	
Youngstown	68	+ 5	55	56	
Wheeling	78	None	92	70	
Cleveland	64	- 2½	74	82	
Buffalo	42	None	38	52	
Birmingham	66	None	55½	52	
New England	68	- 4	61	66	
Detroit	94	None	94	93	
Cincinnati	76	None	†	†	
Average	55½	+ 1	50	51	

†Not reported.

ducer operated at 37-39 per cent, whereas the average of independents' ingot operations was steady at about 45 per cent. Among finishing mills, tin plate is at 75 per cent, strip at 45 per cent, sheets at 50 per cent, and pipe mills at 50 per cent. Twenty-seven out of 60 steelworks blast furnaces are still producing. These include 14 for the three United States Steel Corp. subsidiaries, and 13 for four independents.

Birmingham—Held at 66 per cent last week, with 15 open hearths melting, and no immediate change in prospect.

Youngstown—Up sharply to 68 per cent, a gain of 5 points, and tentative schedules of producers indicate an even higher rate, in anticipation of increased demand from the automotive industry.

Central Eastern Seaboard—Advanced 1½ points to 39 per cent, the highest district level this year. Prospects are good for further improve-

ment before the end of this month. Steelmaking for plate production is better, and improved demand for pipe and tubular goods is also reflected in the minor increase at this time.

Cleveland-Lorain—Down 2½ points to 64 per cent, National Tube Co., Lorain, taking off one open hearth to operate 10; Republic Steel Corp. continuing with 11, and Otis Steel Co., 4.

Chicago—Unchanged at 62 per cent, the peak for the year to date. Blast furnace operations are steady, with 20 of 41 stacks active.

Cincinnati—Unchanged at 76 per cent, with 18 of 24 open hearths in operation, and tentative schedules call for no slackening in the present rate.

Wheeling—Remained at 78 per cent last week, with 29 open hearths active out of 37. Several of the inactive furnaces are down for needed repairs.

CANADIAN INGOT OUTPUT UP

Canadian production of steel ingots and direct steel castings in January totaled 100,225 tons, a slight increase over the 98,888 tons reported in December, and almost double the 59,525 tons produced in January, 1935.

Output of pig iron amounted to 61,336 tons, a decline of 13 per cent from the December total of 70,547 tons, but an increase of 38 per cent over the January, 1935, figure of 44,416 tons.

Output of ferroalloys was also lower, at 4324 tons, compared with 4688 tons in December.

Lafayette Marks Half Century of Engineering

Lafayette college, Easton, Pa., is celebrating the seventieth anniversary of engineering, with an engineering and industrial exhibition March 18-21.

Engineering was offered for the first time during the 1865-66 college term when the Pardee scientific department was established, following receipt of a \$100,000 endowment from Ario Pardee, of Hazelton, Pa.

On March 20 important engineers and members of the Lafayette faculty will speak at morning, afternoon and evening programs. Important steel producers and consumers will have exhibits of processes and products on display for the duration of the exhibition.

TAYLOR NEARS EARNINGS

Taylor-Wharton Iron & Steel Co., High Bridge, N. J., reports net loss of \$31,072 in 1935, against loss of \$515,730 in 1934.

Steel Ingot Production

	Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 97.91 per cent						Calculated daily production, all of companies working (gross tons)	Number of 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
2 mo.	5,618,408	55.06	398,834	33.32	6,017,242	52.77	115,716	52
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.	2,838,382	58.23	228,425	35.99	3,061,807	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.

Two Stacks In, but February Iron Production Declines

PRODUCTION of coke pig iron in the United States dropped slightly in February and thereby extended the current recession to three consecutive months. The drop in daily rate was 3.1 per cent, as against 4.1 per cent in January. While production was declining, active blast furnaces increased from 118 on Jan. 31 to 120 on Feb. 29. Iron production and operating stacks in February were at the highest levels for any February since 1930.

Total output for February was 1,838,932 gross tons, which, compared with the 2,029,304 tons of January, was a loss of 190,372 tons, or 9.4 per cent. Part of this loss is attributed to the fact that February was a two-day shorter month than January. The February total was the largest since

or nonmerchant stacks resumed, while 5 stacks were blown out or banked. One merchant stack resumed and none was blown out.

Blast furnaces resuming in February were: In Ohio: River No. 3,

AVERAGE DAILY PRODUCTION

	Gross Tons			
	1936	1935	1934	1933
Jan.	65,461	47,692	39,537	18,348
Feb.	63,411	57,675	45,385	19,752
Mar. ....	.....	57,120	52,438	17,484
Apr. ....	.....	55,719	57,873	20,786
May ....	.....	55,986	66,370	28,784
June ....	.....	51,949	64,563	42,165
July ....	.....	49,043	39,630	58,108
Aug. ....	.....	56,767	34,199	59,137
Sept. ....	.....	59,009	29,969	50,264
Oct. ....	.....	63,818	30,689	43,824
Nov. ....	.....	68,876	31,930	36,124
Dec. ....	.....	68,242	33,161	38,456
Ave.	64,470	57,694	43,774	36,223

MONTHLY IRON PRODUCTION

	Gross Tons		
	1936	1935	1934
Jan.	2,029,304	1,478,443	1,225,643
Feb.	1,838,932	1,614,905	1,270,792
Tot. 2 mo.	3,868,236	3,093,348	2,496,435
Mar. ....	.....	1,770,990	1,625,588
Apr. ....	.....	1,671,556	1,736,217
May ....	.....	1,735,577	2,057,471
June ....	.....	1,558,463	1,936,897
July ....	.....	1,520,340	1,228,544
Aug. ....	.....	1,759,782	1,060,187
Sept. ....	.....	1,770,259	899,075
Oct. ....	.....	1,978,379	951,353
Nov. ....	.....	2,066,293	957,908
Dec. ....	.....	2,115,496	1,028,006
Total ....	.....	21,040,483	15,977,679

last September with 1,770,259 tons; in February one year ago, production was 1,614,905 tons. Although the February output was the best for that month in six years, it was still far below that of the 1930 figure of 2,845,937 tons.

Average daily production in February was 63,411 tons, a loss of 2050 tons from the 65,461 tons of the preceding month. This was the lowest daily rate since September, 1935, with 59,009 tons; in February of last year the rate was 57,675 tons. In February, 1930, the best preceding February, iron was being made at the rate of 101,640 tons per day.

The 120 blast furnaces operating on the last day of February swung back to the equal of last December, and was the best February on record since 1930 with 180 stacks operating. In February, one year ago, the total was 96.

During the month, 6 steelworks

and Youngstown No. 3, Republic Steel Corp.; Lorain No. 4 National Tube Co.; Central B, Carnegie-Illinois Steel Corp. In Pennsylvania: Clairton No. 1, Carnegie-Illinois Steel Corp. In Indiana: Gary No. 8, Carnegie-Illinois Steel Corp. In Colorado: Minnequa E, Colorado Fuel & Iron Co.

Stacks blowing out or banking were: In Ohio: River No. 1 Republic Steel Corp. In Pennsylvania: Duquesne No. 5, Carnegie-Illinois Steel Corp.; one Swede, Alan Wood Steel Co. In Maryland: Maryland C, Bethlehem Steel Co. In West Virginia: Riverside, Wheeling Steel Corp.

As noted in STEEL for Feb. 10, the

February Iron Production

	No. in blast last day of Feb. Jan.		Total tonnage Mer- chant Nonmer- chant	
	Feb.	Jan.	Mer- chant	Nonmer- chant
Ohio	31	28	75,576	376,356
Penna.	34	35	56,686*	443,295*
Alabama	12	12	80,557*	81,250*
Illinois	10	10	49,004	141,156
New York....	8	8	60,675	50,154
Colorado	2	1		
Indiana	10	9	7,592*	270,740
Maryland	3	4		
Virginia	1	1		
Kentucky	1	1		
Mass.	0	0		
Tenn.	0	0		
Utah	1	1	7,690	138,201
West Va.	2	3		
Michigan	4	4		
Minnesota	1	1		
Missouri	0	0		
Total.....	120	118	337,780*	1,501,152*

*Includes ferro and spiegeleisen.

Punxsutawney furnace of the Punxsutawney Furnace Co., DuBois, Pa., is being dismantled. This furnace, built in 1896-97, rebuilt in 1919 and last operated in 1926, had an annual capacity of 70,000 tons of foundry pig iron. With the dismantling of this unit, the total number of potential furnaces in the country is down from 267 to 266.

Meetings

AN INSPECTION trip through the new hot strip mill of the Carnegie-Illinois Steel Corp. at McDonald, O., will be part of the program of the annual spring engineering conference of the association of Iron and Steel Engineers, Pittsburgh, to be held in Youngstown, O., April 22-23. Preceding this inspection trip will be an evening and morning technical session.

FORM BIRMINGHAM SECTION OF FOUNDRYMEN'S ASSOCIATION

The fourth joint foundry practice meeting held in Birmingham, Ala.,

RATE OF OPERATION

(Relation of Production to Capacity)

	1936 ¹	1935 ¹	1934 ²	1933 ³
Jan.	46.9	34.2	28.3	13.3
Feb.	45.5	41.4	32.5	14.3
Mar.	41.0	37.5	12.7
Apr.	40.0	41.4	15.1
May	40.2	47.5	20.9
June	37.2	46.3	30.6
July	35.2	28.4	42.4
Aug.	40.7	24.5	42.8
Sept.	42.5	21.5	36.4
Oct.	45.8	22.1	31.8
Nov.	49.5	22.8	28.2
Dec.	49.0	23.7	27.9

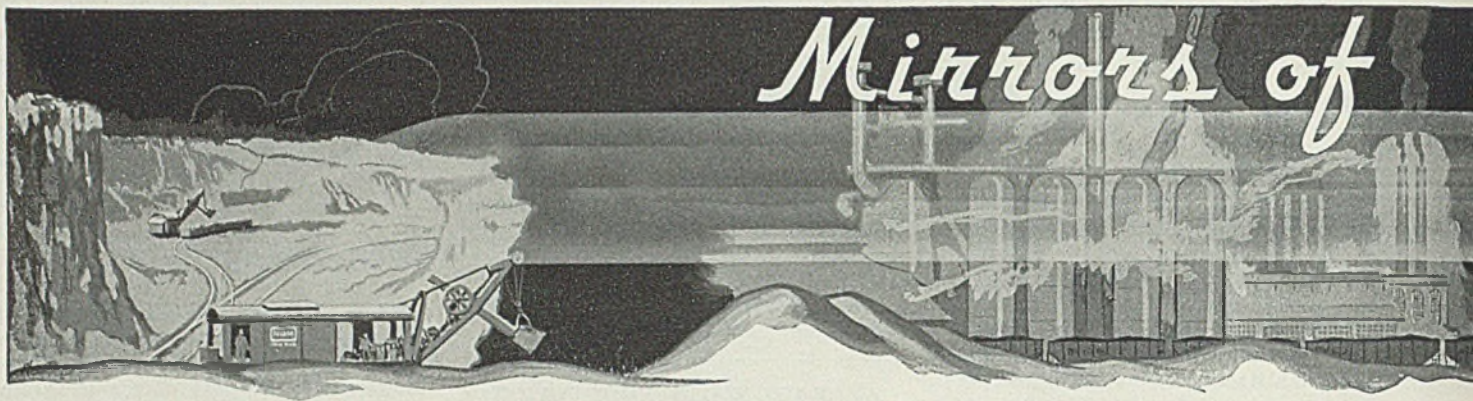
¹Based on capacity of 50,845,741 gross tons, Dec. 31, 1934; ²capacity of 50,975,561 tons, Dec. 31, 1933; ³capacity of 50,313,975 tons, Dec. 31, 1932. Capacities by American Iron and Steel Institute.

Feb. 27-28, under joint sponsorship of the Birmingham section of the American Society of Mechanical Engineers and the American Foundrymen's association, was made the occasion for the formation of a chapter of the latter organization. The new chapter, to be known as the Birmingham district chapter, starts off with some 80 members, the largest chapter roll of any A.F.A. chapter.

Officers for the new chapter were elected as follows: Chairman L. N. Shannon, Stockham Pipe Fittings Co., Birmingham.; vice chairman, W. Lee Roueche, McWane Cast Iron Pipe Co., Birmingham.; and secretary-treasurer, R. R. Deas, American Cast Iron Pipe Co., Birmingham.

LACLEDE DOUBLES EARNINGS

Laclede Steel Co., St. Louis, experienced net earnings of \$227,350 in 1935, after charges and taxes, against \$104,012 in 1934.



DETROIT
OUT on East Grand boulevard the Packard people have been stealing the automobile industry's show. The spotlight is on them full for the reason that through February's doldrums Packard was proportionately busier than any other motor maker in Detroit.

Their stir and bustle is due, first, to a remarkably steady demand for the 120 series; second, to the preparations now in an advanced stage on the small Packard six that will be out before the public, probably in September. Packard stock, though more than doubled in market value this year, is touted by Detroiters as a good buy.

On the 120, not yet a year old, the number of models for this series has been considerably broadened to 12 from the original coupe and sedan jobs. Packard has thereby put a definite clinch hold on the experiment it took in descending from the lofty price heights.

Plan 1500 Weekly This Month

In the first flush of novelty on the 120, as high as 7000 were assembled in one month since inception last April. Even today it is clear the novelty was no flash in the pan; March assemblies now have been scaled upward from 4500 units to 6000.

In registrations, Packard a year ago was sixth in its price field but since October it has held second position for the 120. So much for that venture; the longer Detroit considers it, the more orchids it passes to Packard management for courage to part with tradition of making high-priced cars only.

Of the second division into which Packard's manufacturing policies now divide themselves, Detroit is speculating on what the little six will look like. The six obviously will be lower in price than the present \$814-\$1256 range of the 120, and usually keen observers will wager

it will come out with a base price tag on it of \$600 to \$650. On good authority, Packard decided on a small six only if it could lop off about \$200 from the lowest 120 base. Incidentally, the six will complement and not replace the 120.

If tradition means anything—and it does at Packard—styling on the small car will follow its predecessors, just as the 120 borrowed its characteristic Packard radiator and other outward design appearance from the parent eight and twelve.

Spreading Parts Contracts

By odd lots, die work for the six has been largely spread around by Packard among suppliers by now. The fenders have been contracted for from an outside shop. Orders have been placed outside for the six's cylinder-lining contract. Many of the body lines will follow the 120. The frame will be 5 inches shorter than the 120.

By and large, the six motor that Packard has been testing on its proving ground will be a conventional design that will come forth stressing economy as well as power. In the latter connection, it should be recalled that Packard has hit "a horsepower per inch of wheelbase" strong on the 120.

Most of the machine tools necessary for production of the six have been bought, but only following a long delay. Last October most of the machinery inquiries came out, suppliers figured and submitted lists that in a pile were as high as a couple of office desks.

For several months, since no orders were placed against these inquiries, it began to look like Packard was motivated by curiosity on equipment prices. But it developed that the used machinery market was being scoured; some of the machine tools at the old Packard aircraft division where Liberty engines were once made were to be requisitioned. Finally, months later, some of the

new machinery orders came through.

So the matter stands as of last check. When suppliers first got wind of the six—which now is four months ago—Packard let the word out that the new car might be on the streets in April.

Of course, that is an impossibility now. But, according to the stage preparations are in now, it will be another five months at least before all details can be correlated. Too, with usual Packard policy of making certain of the ground, it would rather lose a few months than rush the new program to a hasty announcement. Observers remember that the 120 was some 15 months in preparation.

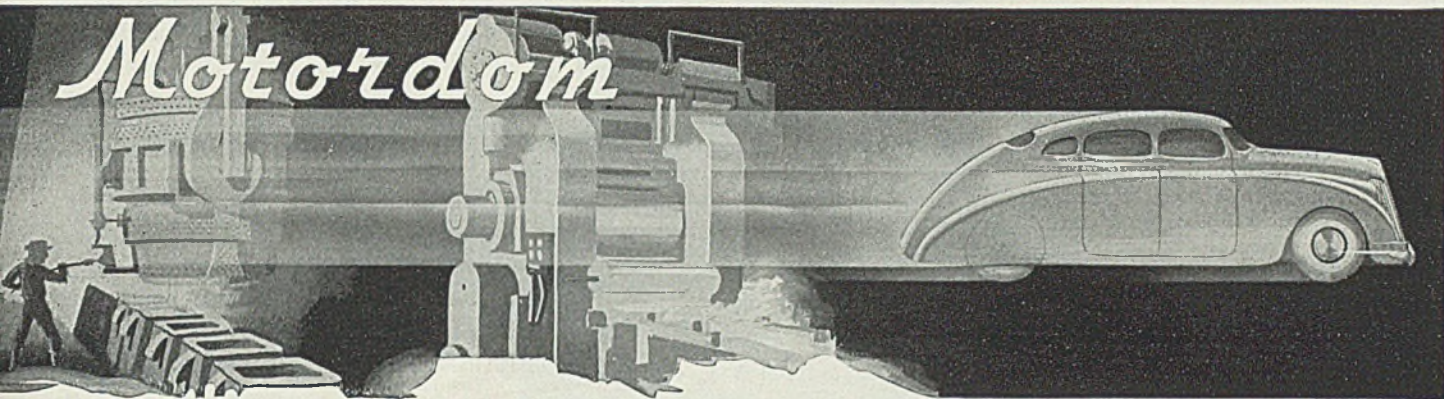
In order to closely guard some of the minor details, suppliers and estimators are having a hard time getting into the Packard plants to work out manufacturing problems. Monthly passes are strictly "out," and estimators on a single part are not permitted to view other, and often adjoining, parts, for the six. Much contract work is being wider spread to outside shops.

Zephyr Eyes Competition

Lincoln and its Zephyr are probably more interested in the Packard six than any other competitor, though there are no major changes to counter in store for the Zephyr. Due to the limitations of the bridge-deck frame, the Zephyr is necessarily confined to the two closed body types with which it made its bow last October.

Lincoln has been turning out about 600 Zephyrs a week, on a four and five-day basis, and still is using the expensive Briggs LeBaron body that as a welding job is a novelty—there are over 5000 separate welds in one of these bodies.

They say that the reputation of Lincoln's inspection has had its throwbacks at Ford. Because the Zephyr uses some V-8 parts interchangeably, such as the wheel, axle,



etc., the manufacture of the Zephyr has boomeranged to tighten up certain Ford specifications.

As this department forecast a week ago, assemblies here began to turn for the better last week from the 62,000-unit-per-week total, which was the 1936 low.

The rates of Motor Products, Ainsworth Manufacturing, Ternstedt, Bundy Tubing and others were stretching out—in some of these cases work five days a week was reeled off. And, a canvass of the important motor parts' makers shows none is carrying more than 30 days' supply of finished parts in stock.

The same is true of automobile manufacturers themselves, and fewer than 300,000 finished cars are now on hand in the plants and scattered through all the country's retail sales rooms.

Some Detroit plants have stocked local warehouse space and thereby have not embarrassed their outlying dealers but, by and large, the situation is healthy. The spring buying movement of new cars will be translated almost instantly into higher assemblies here.

Cold Freezes Used Jobs

Furthermore, with the break in the weather, used car demand will pick up. One crippling factor in used cars, overlooked by many commentators, is that in this winter there was no "hot spot" to which used cars could be shipped. By this is meant that the usual sunny climes of the South and West Coast were frigid, too, and could not take their usual midwinter share of the East's oversupply of used models.

That March assemblies are headed to equal or pass the 367,252 of January seems assured in a cross section of present motordom comment. The improvement should be progressive in April and May.

For early June there's a cloud on the horizon — the motor industry will have the competitive effect of

lower passenger rates on the railroads to cope with. While none here believes it will seriously affect new car sales, there is little doubt but the change eventually will cut into gasoline, tire and other accessory business.

Few people will forego ownership of a car because they can ride in a coach for 2 cents a mile, but they may let their car stand in the garage more. Furthermore, 2 cents a mile may make some companies think twice about allowing 5 and 6 cents a mile to salesmen. Though motor car operation can scarcely be done for less, it may mean more salesman-traveling shunted to the railroads.

Last week Ford and Chevrolet were neck-and-neck at 18,500 and 19,000 assemblies each, three to four days being the working week at each plant. Plymouth was third with

6000, assemblies in three days.

Fourth honors went to Dodge, accounting for 4000, but a fourth assembly day per week is being added there this week. In line, Olds was next at 3300 cars in four days; then Pontiac's 2600 also spread over four days. Buick and Hudson each made 2200 to 2300 models last week, and the Chrysler-DeSoto's aggregate came to 2000.

Assembly Speeds Unslackened

In each case it is interesting to note that the car maker has not pared down noticeably on his individual day's assembly. As slack times came in early in February each kept to their daily figure, but solved the temporary dearth of orders by clipping off days per week.

Thereby, no major orders for a plant scale-down were ever issued, and each factory, straining at the leash over spring prospects, can quickly inform workmen that a day, and more, will be added instantly.

Speaking of the normal-size stocks of new cars in the field, automobile makers may be playing on a little human psychology. Calculating that something not readily available incites a greater demand, their inability to make deliveries of any model or color at once may soon whet the appetite of the buying public.

Meanwhile, the push is on in automobile general sales departments. Buick and Olds began new sales campaigns March 1. Hudson, Packard and others have all had regional managers' meetings the past few weeks. Chevrolet is turning from concentration on its junking program to new car sales effort.

Graham is taking estimates from interested parts suppliers on its new business coupe. The design has been changed to include a rumble seat . . . Studebaker says its total export business in February was the heaviest since November, 1928, and that its truck exports taken alone were the heaviest in history . . . Chevro-

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	*275,000
Mar.	338,434	429,793	.....
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	.....

Year2,753,111 4,009,496

*Estimated.

Estimated by Cram's Reports

Week ended:	
Feb. 15	75,170
Feb. 22	62,813
Feb. 29	64,956
March 7	84,705

let brought out a new color March 1—"frosty green"—that supplements six other standard hues. But they say at Chevrolet that so far they have made 44 per cent of their 1936 jobs in standard black . . . Hudson bookkeepers changed from red to black ink Dec. 31, 1935, when in reporting a \$584,749 profit an earning resulted for the first time since 1930 . . . Bohn Aluminum is experimenting exhaustively on an all-aluminum engine block that looks like it might be adapted for a rear-engine car . . . Almost three years to the day, Willys-Overland's receivership was terminated. David R. Wilson, receiver since Feb. 15, 1933, has now been named president of the company and will operate Willys under section 77-B of the bankruptcy act.

New Capacity

MOVES are reliably reported on foot in headquarters of United States Steel Corp. for an important enlargement at the Clairton, Pa., works of Carnegie-Illinois Steel Corp., Pittsburgh, and last week it was reported that American Sheet & Tin Plate Co. might soon send out definite inquiries for a continuous wide strip sheet mill to be built at Clairton.

In connection with this development it is likely that most existing facilities at Clairton, with the exception of the large modern by-product coker ovens there, would be scrapped. An inquiry for cost purposes has been before the steel mill equipment building trade for some time concerning a proposed mill similar to that now mentioned for Clairton.

Costs in the past several years have been re-estimated periodically to conform to up-to-date estimates, although up to recently no definite site had been agreed upon, and in addition to the Clairton site there has been some possibility that the mill would be built at the Braddock, Pa., division where Carnegie-Illinois Steel Corp.'s Edgar Thomson works is now located. Such an expansion as is now being mentioned would involve the expenditure of some \$30,000,000 to \$40,000,000.

Meanwhile, steps are progressing by Jones & Laughlin Steel Corp., Pittsburgh, for the early placing of contracts to build its wide strip sheet mill adjoining the company's present Soho works, Pittsburgh. An early announcement as to the successful bidder will be made.

TURN OVER GARY MILL

American Sheet & Tin Plate Co. has completed the test run on its new wide hot strip mill at Gary, Ind. Regular operations are expected to commence in April.

Steel Exports Gain Over January, 1935

SINCE scrap has assumed a dominating position among exports of iron and steel commodities, ranging from 50 to 65 per cent of the total in recent months, statistics by the metals and minerals division of the department of commerce have been expanded to include a table of scrap exports by countries of destination.

This shows scrap exports for January were somewhat larger than in December but considerably smaller than in January, 1935. Japan, Italy, and the United Kingdom take most.

Details of steel and iron exports for January, totals for which were reported last week (STEEL, March 2, p. 29), are found in the accompanying table. Several refinements in classification have been made, as will be seen by reference to the footnotes.

Segregation of scrap items, giving a separate total for manufactured exports and for scrap, aids in seeing the actual picture of foreign trade from the United States. Under the new presentation it is seen at a glance that while the grand total of exports fell from 262,740 gross tons in January, 1935, to 241,564 tons in January, 1936, exports other than scrap rose from 76,628 gross tons in January,

1935 to 82,602 tons in January, 1936.

January imports were 50,489 tons, compared with 53,678 tons in December. Details will appear in STEEL, next week.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Articles	Gross Tons		
	Jan., 1936	Dec., 1935	Jan., 1935
Pig iron	186	1,066	261
Ferromanganese and spiegeleisen	7	.....	3
*Other ferroalloys	274	.....	.....
Ingots, blooms, etc.	95	732	3,221
Bars, iron	118	150	233
†Bars, concrete reinfor. ..	250	.....	.....
‡Bars, other steel	3,153	3,652	4,899
Wire rods	3,939	2,943	3,279
Boiler plate	215	108	44
Other plate, not fab.	3,190	5,557	1,933
Skelp, iron and steel	812	3,290	373
Iron sheets, galv.	130	154	99
Steel sheets, galv.	6,295	7,791	5,324
Steel sheets, black	8,816	7,671	12,166
Iron sheets, black	616	94	401
Strip steel, cold-rolled ..	2,461	1,880	1,297
Strip steel, hot-rolled ..	2,493	1,521	1,475
Tin plate, taggers' tin. ...	18,025	18,923	14,954
Terne plate	433	102	282
Tanks, except lined, etc. ...	2,080	2,025	774
Shapes, not fab.	3,348	4,079	1,663
Shapes, fabricated	1,051	684	1,152
Plates, fabricated	129	36	42
Metal lath	73	99	15
Frames and sashes	111	.....	.....
§Sheet piling	285	325	559
¶Rails, 60 lbs. and over ..	3,966	7,110	897
‡Rails, under 60 lbs.	364	10	103
Rail fastenings	417	883	303
Switches, frogs, crsgs. ...	184	233	138
Railroad spikes	221	162	232
Railroad bolts, nuts	70	76	42
Boiler tubes, seamless. ...	421	492	792
Boiler tubes, welded	38	38	40
Casing and oil-line pipe, seamless	1,817	1,310	2,460
Do welded	326	358	1,387
Seamless black pipe, other than casing.	341	189	211
Malleable iron screwed pipe fittings	227	283	269
Cast iron—do	91	164	178
Cast iron pressure pipe, and fittings for	513	167	360
Cast iron soil pipe—do ..	181	180	280
Welded black steel pipe ..	2,231	1,209	1,788
Welded black wrought iron pipe	210	55	119
Welded galv. steel pipe ..	1,059	1,349	2,407
Welded galv. wrought iron pipe	177	319	25
Riveted iron or steel pipe and fittings	139	35	56
Plain iron or steel wire ..	2,491	1,754	1,819
Galvanized wire	2,536	1,423	1,401
Barbed wire	1,513	3,205	2,562
Woven wire fencing	231	206	162
Woven wire screen cloth ..	74	103	100
Wire rope	409	259	231
Other wire and mfrs.	365	1,117	365
Wire nails	675	1,055	783
Horseshoe nails	55	97	74
Tacks	34	16	36
Other nails, staples	153	183	239
Ordinary bolts, machine screws, rivets, washers ..	461	481	438
Iron castings	846	675	849
Steel castings	210	132	116
Car wheels, axles	285	2,143	489
Horseshoes, calks	1	37	1
Iron and steel forgings, n. e. s.	682	489	427
Total	82,602	90,889	76,628
Iron and steel scrap	153,906	142,135	179,630
Tin plate scrap	2,461	2,673	4,209
Waste-waste tin plate ..	2,595	3,572	2,273
Total	158,962	148,380	186,112

GRAND TOTAL..... 241,564 239,269 262,740

*New class. No comparable figures for previous periods.

†New class. Previously included under former classification "Steel bars."

‡New class. Includes alloy, non-alloy and stainless steel bars (excepting concrete reinforcement bars).

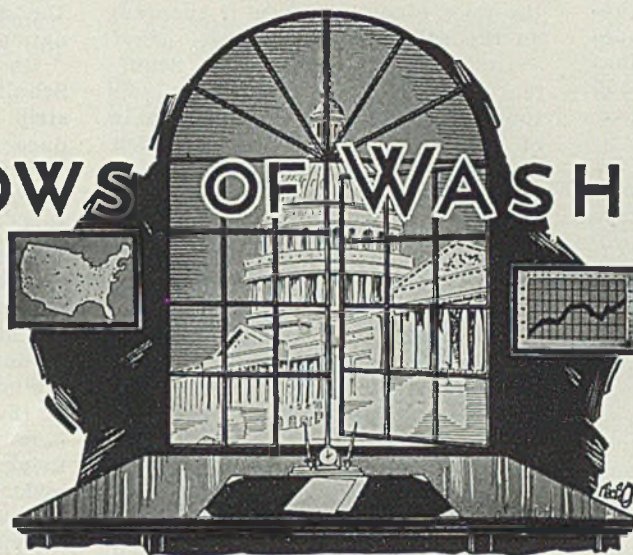
§New class. Previously included with "Frames and sashes."

¶Previously shown as "50 pounds."

UNITED STATES EXPORTS OF IRON AND STEEL SCRAP, TIN PLATE SCRAP AND WASTE-WASTE TIN PLATE

Countries	Gross Tons		
	Jan., 1936	Dec., 1935	Jan., 1935
Belgium	85	.....	24
France	102	.....	.....
Germany	75	710	117
Greece .....	.....	.....	13
Italy	56,785	35,158	20,425
Netherlands	2,416	621	707
Poland and Danzig	2,192	.....	9,663
Spain .....	.....	3,497	82
Sweden .....	.....	21	.....
United Kingdom	30,909	39,835	21,555
Yugoslavia	6,055	1,003	.....
Total Europe	98,619	80,846	52,585
Canada	3,212	7,788	4,155
Mexico	607	1,757	2,975
Jamaica .....	.....	.....	1
Total No. and Cent. America, W. Indies	3,819	9,545	7,131
Argentina .....	.....	.....	2,328
Venezuela .....	.....	2,187	.....
Total South America .....	.....	2,187	2,328
British India	1,058	809	.....
China	711	8,596	3,672
Netherland India	363	.....	.....
Hong Kong .....	.....	333	759
Iraq	11	.....	10
Japan	53,733	42,342	113,225
Kwantang	584	.....	4,566
Philippine Islands .....	.....	9	45
Turkey	15	19	.....
New Zealand .....	.....	3,568	.....
Total Asia and Oceania	56,475	55,676	122,277
Union of South Africa	49	103	.....
Egypt .....	.....	.....	1,790
Mozambique .....	.....	.....	.....
Total Africa	49	127	1,790
GRAND TOTAL	158,962	148,380	186,112

WINDOWS OF WASHINGTON



BUSINESS representatives here generally regard the suggestion of President Roosevelt, in his message to congress, for a graduated tax on corporate income not distributed when earned, as another gesture against "bigness" in business. An apparent further chapter in the campaign to "soak the rich."

Apparently Washington has an idea that the surplus account of a corporation consists of a large hoard of cash sequestered in some convenient place, bank or in the company's strong box. As such, it seems ripe for picking and an impost of 20 to 40 per cent is the simplest thing in the world.

As a matter of fact, probably few corporations, large or small, have sufficient cash to pay a 40 per cent tax on surplus, and had they enough they would be left without working capital, in spite of the millions in financial statements under the heading of surplus. In this classification is included inventories, part of the cost of plant built from undivided profits, and many other items which are far from being liquid cash.

Heavy Industries Need Reserves

As an example the United States Steel Corp. shows for the close of 1934 (the pamphlet report for 1935 is not yet out) an earned surplus of \$528,575,627.88 and cash of \$71,304,704.73. Republic Steel Corp., an important independent steelmaker, as of the close of the year 1934 reported total surplus of \$35,951,522.01 and cash balance of \$6,505,057.61. Other steel companies have a similar situation. Losses of the past few years have worn down their cash holdings as well as their surplus and had they not possessed a substantial backlog of funds not distributed in dividends during the fat years they would have gone on the rocks in the depression.

Present surpluses would not be disturbed, but after the new law be-

comes effective—and it is better than a fair chance that the President will have his way—the upbuilding of further surplus would be at the expense of a heavy assessment, probably averaging one third of the accumulation.

It is being pointed out that producers of food products and other staple commodities, where the flow of business is fairly steady, could operate with a smaller surplus than manufacturers of machine tools and other capital goods, where reserves must be stored up in good years as a cushion against lean years.

Gnaws at Internal Structures

There is talk of exempting surplus earnings up to \$500,000, which would blanket and protect the majority of small and moderate-size fabricators of iron and steel, but would be a pittance for the large steel producers. As a columnist has aptly put it, what is fat for a Hottentot is merely reserve for an Eskimo. Wall Street's first reaction to the proposal was that it would increase dividends, but its second thought was that this increased distribution would be more than offset by a weakening of the internal structure of the larger corporations.

It is stated that since 1929 corporations in the United States have paid out about 27 billion dollars more than they have earned, to stockholders and to employees. Without surpluses these payments would have been impossible and the relief problem would have been the greater.

It increasingly appears that this newest program of the President is a reform and not a recovery measure, and shows the President still is far to the left of the center. Application of such a measure would prevent building up such business fortunes as those of Henry Ford or Harvey Firestone.

Practically all recent and current expansion of steel companies in strip mills and other betterments has been

financed out of surplus, only one major company issuing securities to pay for new mills. This exception is the Jones & Laughlin Steel Corp. With surpluses taxed out of existence, new capital would be needed for every forward move, taken either from operating profit or from the sale of securities.

The surpluses reported as of the end of 1934 (few complete 1935 reports have yet been issued) by leading corporations were as follows, it being understood that these are not to be taxed but that additions would be:

Ford Motor Co.	\$580,276,000
U. S. Steel Corp.	528,576,000
Southern Pacific	469,143,000
Standard Oil (N. J.).....	449,062,000
Pennsylvania	401,646,000
American Telephone	401,270,000
Santa Fe	391,093,000
Electric Bond & Share.....	371,108,000
Union Pacific	285,308,000
General Motors	270,109,000
Kennecott Copper	253,598,000
Consolidated Gas of N. Y....	220,099,000
New York Central	199,899,000
Chesapeake & Ohio.....	196,413,000
Du Pont	178,729,000
Allied Chemical	160,190,000
Socony-Vacuum	138,589,000
General Electric	111,334,000
American Tobacco	105,251,000
Cities Service	101,350,000
Great Atlantic & Pacific.....	98,431,000
Baltimore & Ohio	80,258,000
Woolworth, F. W.	78,809,000
Bethlehem	76,370,000
American Can	75,029,000
Swift & Co.	68,994,000
Atlantic Refining	66,792,000
Chrysler Corp.	64,094,000
Sears Roebuck	60,776,000
Texas Corp.	56,402,000
Pullman	50,893,000
Union Carbide	49,458,000
International Harvester	40,622,000
National Dairy Products.....	40,517,000
Anaconda Copper	37,252,000

Sun Through Clouds

However, in spite of the belief that this form of tax is adverse to business development, there is the feeling that the third quarter of this year will see active business. This is based on three factors: Distribution of about two billions in soldier bonus, expected to be paid out in

August; distribution of several hundred millions due farmers in bounties during third quarter; and that much of the WPA fund of \$4,800,000 will be pushed out as rapidly as possible.

The President's "suggestions" for raising the money needed, in his message to congress, were divided into "temporary" and "permanent" programs and proposed levies would be imposed in the following manner:

A graduated tax on corporate income, including dividends from other corporations, which is not distributed as earned. This would be accompanied by repeal of the present corporate income tax, the capital stock tax, and the related excess profits tax.

Although the President mentioned no rates in his message, a scale ranging from 20 to 40 per cent and averaging 33-1/3 per cent is said to have been discussed at recent conferences on the subject. Mr. Roosevelt has estimated that such a tax would yield some \$620,000,000 annually additional.

Will Now Tax Dividends

Removal of the present exemption from dividends of the normal tax on individual incomes also is in the cards. In this way the government would reach corporate earnings either if they were held by the corporations or if they were forced out by heavy taxes as dividends to stockholders.

The President not only surprised members of congress but the Washington newsmen who attended a press conference a few days prior to the tax message when they were told that the President had nothing further in mind than trying to get some of the "windfall" taxes back from the AAA decision beneficiaries.

A press conference lasting about an hour was held at the White House the day the tax message went to congress, at which time the President made every effort to play down the corporate surplus tax, but it just couldn't be done. Financial experts present asked the President the pertinent question as to what would become of industry during periods of depression if they did not have large surpluses, how they could pay either wages or dividends. He simply replied that a sufficient reserve could be held but he did not elaborate upon the word "sufficient" and has left everything up in the air.

WHEN A CONGRESSMAN TALKS ON STEEL—WELL, JUST READ

There has been a wave of hysteria in government departments and congress the past few weeks in connection with the increased use of machinery by industry, with the subsequent unemployment of additional numbers of men. Many harangues have been delivered on

the floor of both houses of congress on the subject.

Last week Rep. William E. Schulte, Democrat, of Hammond, Ind., took occasion to make considerable of a talk on the subject in which he condemned the increased use of machinery in the steel industry.

"There is hardly a day passes", he said, "but what we do not receive several score letters from men back in my district, men who are employed in the steel industry, who are now being displaced by the so-called four-high mills.

"I am reliably informed that each and every one of these mills that is placed in operation takes the place of approximately 241 men. Just imagine a piece of cold steel 1/8-inch thick, cold rolled, going through a piece of machinery, being pressed and flattened out and made into tin—going through that machine at a speed of between 10 and 12 miles an hour and rolled into big, heavy spools, and all of this done by power-driven machinery. Is it any wonder that the men are complaining in

Bethlehem's Position "Never More Promising"—Grace

EUGENE G. Grace, president, Bethlehem Steel Corp., writes under the heading "A Better Outlook" in the Bethlehem Review for March. Mr. Grace says:

"The present situation of our company gives reason for a fuller degree of encouragement than has existed for several years.

"Our company is steadily emerging from the hard times of the last five years and the stockholders, management and employes will emerge along with it.

"We are now employing virtually our normal force, having a payroll of about 70,000 persons, with hourly wage rates at the level of our most prosperous years.

"Aside from forces over which we have no control, the surest way for us to improve our position is through initiative and enterprise.

"Bethlehem through the darkest days of the depression prepared for the future. It developed new products, maintained its properties at a high degree of efficiency, constructed important new plant facilities, kept the organization intact, preserved its morale and is today prepared to meet all competition and lead the way toward greater uses of steel by the buying public.

"Our situation, therefore, was never more promising and when business gets fully under way we are confident that our efforts will be rewarded by bringing increasing tonnage demand to our mills."

the steel industry throughout the nation?"

On the same subject, again, Mr. Schulte, after stating that 12 broad strip mills with 1600 workmen produce as much tonnage as 32,000 workmen produced on the old 636 sheet and jobbing mills combined, said:

"My friends, that is the particular picture that confronts us in the steel industry. More labor-displacing machinery is still being brought in and placed in operation in spite of the protests of the men; in spite of their demanding a right to work—in spite of their demands for a living, with the old saying that 'we must progress—we cannot stand still or go back'.

"The duplication, multiplication, and perfecting of the machine or mechanical devices has increased faster during the past 20 years than at any time in the history of our country. This is a serious question and a very serious one indeed if the saturation point has not been reached at which machinery is displacing the hand worker faster than industry can absorb the slack of unemployment, or can supply new occupation for men who are displaced, especially under the old system of distributing the profits of the machine."

BERRY, GOING INTO POLITICS, TOYS WITH REVIVING NRA

Maj. George L. Berry, co-ordinator for industrial co-operation, figured doubly in the news last week when he announced he might run for governor of Tennessee, and it developed that his industrial recovery council has been secretly maturing a program for compulsory government control of wages, hours, and fair trade practices, which in a measure would be a revival of NRA.

Before the President, Secretary of Commerce Roper, and Secretary of Labor Perkins, Major Berry on Tuesday discussed a digest of reports of committees which will report back to the council next Thursday. The Berry committees are proposing, among other things, that congress set up a commission with power to determine a minimum wage rate in the basic industries, to fix the maximum number of working hours per week, regulate minimum wages for child labor, create boards on which management and labor would have equal representation, amend antitrust laws to allow affirmative co-operative action, and to transfer the equivalent of the judicial functions of NRA to the federal trade commission.

It will be recalled that Major Berry's much-heralded town meeting of industry and labor here Dec. 9 and 10 virtually blew up when such basic industries as steel and automobiles refused to send representatives. The few industries which were represent-

ed were herded into small groups in order to set up committees which are now about to report. NRA expires automatically April 1.

Labor

A MALGAMATED Association of Iron, Steel and Tin Workers in its weekly publication, *The Amalgamated Journal*, states that it will be the machinery through which labor in the iron and steel industry will be organized.

A week ago it developed (STEEL, March 2, p. 22) that the committee on industrial organization formed by John L. Lewis, president of the United Mine Workers, had offered \$500,000 to the American Federation of Labor for organizing the steel industry, contingent upon the Federation raising \$1,000,000 additional.

William Green, president of the A. F. of L., spurned this \$500,000 and declared the federation would shape up its own program. *The Amalgamated Journal* states: "From its inception the Amalgamated has organized on industrial lines, is an industrial organization, and will organize the steel workers industrially."

This indicates that the method of organization will not differ any from that proposed by Mr. Lewis.

STEEL & WIRE EMPLOYEES-MANAGEMENT TO MEET

A joint convention of representatives of employes and the management of the American Steel & Wire Co. will be held shortly in Cleveland.

District councils of the employe representation plan to correspond to district divisions of the company. The employes' council of each plant of the district elects two delegates to meet periodically with the district management.

Two employe representatives have been delegated by the local council at each plant to attend this convention, at which some sessions will be for employe representatives only and the remainder will be joint sessions between the management and employe representatives.

BAR IRON WAGE RATE HOLDS FOR MARCH AND APRIL

Wage rates in bar iron mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will remain unchanged for March and April, no change having occurred in average sales prices during January and February. The card rate for the next bimonthly period is 2 cents on boiling, or puddling, bar and 12-inch mills, and 2.10c on guide and 10-inch mills.

Open Hearing on Basing Point Bill

SENATE committee on interstate commerce, of which Senator Burton K. Wheeler, Democrat of Montana, is chairman, set the stage last week for beginning hearings Monday, March 9, on the Wheeler-Utterback anti-basing point bill. (STEEL, Feb. 24, page 14)

Experts of the federal trade commission who participated in drafting the bill probably will be heard first. These will be W. B. Wooden and Eugene W. Burr, attorneys.

Secretary of Commerce Roper, Secretary of Agriculture Wallace, Attorney-General Cummings, and Secretary of the Interior and PWA Director Ickes have been invited to testify. Chances are they will send representatives from their departments.

Iron and steel executives met in New York Thursday to discuss the basing point situation, but no announcement was made concerning representation at the hearings.

Sen. James J. Davis, Republican of Pennsylvania, on Thursday read letters of protest against the bill from B. E. Kibbee, executive vice president, Sharon Steel Corp., Sharon, Pa., and E. R. Crawford, president, McKeesport Tin Plate Co., McKeesport, Pa.

Senator Wheeler rejoined with a request to Senator Davis that Messrs. Kibbee and Crawford testify, and added: "I am exceedingly anxious to have the highly-paid secretary of the American Iron and Steel institute come before the committee and state what his opposition to the bill is."

Representatives of the lumber, cement, and sugar interests also are expected to oppose the bill.

Transportation

JONES & LAUGHLIN STEEL CORP., Pittsburgh, last week was the first Pittsburgh concern to send a tow of steel products out after the ice blockade that had lasted in the Ohio river for the preceding six weeks.

Late on Feb. 28 the ice went out of the three rivers in the Pittsburgh district after reaching a flood stage of 29½ feet. Several steel and other industrial plants in the Pittsburgh district were forced temporarily to suspend operations owing to the high water.

The J. & L. steamer which left last week was the HENRY A. LAUGHLIN, downbound for Memphis, Tenn., with a tow of 14 barges.

Other Pittsburgh shippers followed

in the Jones & Laughlin wake last week. Union Barge Line sent out the motorship PEACE with a tow of steel products for Memphis delivery, and the American Barge Line dispatched the INLAND with steel products also from the Pittsburgh district for the south. Carnegie-Illinois Steel Corp. recalled the steamer ALLEGHENY, which was out under charter.

Several Ohio river steamers with barge loads of scrap iron are again moving from southern points of origin to consuming plants in the Pittsburgh district. This week the steamers FAIR PLAY and D. W. WISHERD, both of the Campbell Transportation Co., Pittsburgh, left Memphis, Tenn., with tows of scrap for Pittsburgh mills.

ENGINEERS OPPOSE CANAL, BUT WILL HOLD HEARING

Army board of engineers for rivers and harbors announced March 3 that it is not convinced of the advisability of the Lake Erie-Ohio river canal, estimated in preliminary reports to cost in excess of \$140,000,000.

Decision was announced subsequent to favorable reports submitted by district and divisional engineers of the United States army.

However, date for public hearing has been set March 30 for further appeal on the subject. This will be held in the army munitions building, Washington.

Pays \$35,360 For Ideas

Employees of the General Electric Co., Schenectady, N. Y., were paid \$35,360 in 1935 for new ideas submitted under the company's suggestion system. A total of 15,945 was suggested and 5514 adopted, compared with 11,438 proposed in 1934 and 3736 adopted.

Died:

WILLIAM J. GILMORE, 54, vice president of the Ohio Steel Foundry Co., Lima, O., in that city, March 1. He was born and spent his youth in Oil City, Pa., where he learned the molders trade. After working in various iron and steel foundries in that district, he went to Chicago and became superintendent of the Indiana Harbor plant of American Steel Foundries. Later he became vice president of the Hubbard Steel Foundry Co., East Chicago, Ind., and was also for a time with the Allied Steel Casting Co., Harvey, Ill. In 1922 Mr. Gilmore became associated with the Ohio Steel Foundry Co. as works manager, and in 1926 was made vice president.

Herman Forg, for almost 50 years president and treasurer of the Forg

Mfg. Co., hardware manufacturer specializing in sheet metal stampings, in Somerville, Mass., Feb. 24.

♦ ♦ ♦
Leroy Kimball, 36, advertising manager, Acme Steel Co., Chicago, in that city Feb. 27.

♦ ♦ ♦
Clyde A. Haefner, vice president, Detroit Harvester Co., Detroit, in Detroit, Feb. 25.

♦ ♦ ♦
J. J. Sweeney, 84, for 30 years superintendent of the International Nickel Co.'s Bayonne, N. J., plant, in New Brighton, S. I., Feb. 26.

♦ ♦ ♦
Albert A. Charles, 84, founder of the Kokomo Steel & Wire Co., subsidiary of the Continental Steel Corp., Kokomo, Ind., in that city, March 2.

♦ ♦ ♦
David Matthews, 84, pioneer employe of the Morgan Engineering Co., Alliance, O., and for the past 16 years foundry superintendent, in that city, Feb. 28.

♦ ♦ ♦
Capt. Henry H. Hinslea, 64, who sailed iron ore boats for the Becker Line and other carriers on the Great Lakes for many years, in Sebring, Fla., March 2. He had been retired for about six years.

♦ ♦ ♦
James F. Campbell, 55, president, Antaciron Inc., Wellsville, N. Y., in Wellsville, Feb. 27. Mr. Campbell perfected a process for the manufacture of acid-resistant iron, which he produced in the plant of which he was head.

♦ ♦ ♦
Benjamin Thomas, 64, for many years superintendent of the hot mill department of the American Sheet & Tin Plate Co., Elwood, Ind., in that city, recently. He was a native of Wales, but came to this country when 21 years old.

♦ ♦ ♦
Edward D. Frohman, 62, vice president and general manager of the S. Obermayer Co., Pittsburgh, aboard the *Franconia* near India, Feb. 28, enroute on a world's cruise. Mr. Frohman was also a director of the Penn-Rillton Co., and the Marine Mfg. & Supply Co.

♦ ♦ ♦
Henry C. Yeiser Jr., 43, former president of the Globe-Wernicke Co., office equipment manufacturer, Cincinnati, while on his yacht at Miami, Fla., March 5.

♦ ♦ ♦
Harrison G. Hudson, 68, machinery superintendent of the Atlas Car & Mfg. Co., Cleveland, in Cleveland, March 5.

♦ ♦ ♦
John M. Nash, 93, founder of the J. M. Nash Co., Milwaukee, one of the oldest makers of woodworking machinery, in Orlando, Fla., Feb.

29, while vacationing. A native of New York state and a Civil war veteran, Mr. Nash established the business in 1880 and had been president ever since.

♦ ♦ ♦
John Holmes Hyde, 45, of Bath, Me., in Boston, Feb. 24. He succeeded his father as the owner of the Bath Iron Works in 1917, and sold the business and entered the war as a second lieutenant. He was president of the Maine Golf association.

♦ ♦ ♦
K. L. Curtis, 57, inventor and consulting engineer, in New York, Feb. 26. He was professor of electrical engineering at Leland Stan-

ford university for a number of years, following which he became associated with the Albert & J. M. Anderson Mfg. Co., Boston. He was also connected with the General Electric Co. at one time.

♦ ♦ ♦
George Buell Alvord, 64, West Hartford, Conn., industrialist, in Nassau, British West Indies, March 1. He was a director of numerous companies, including the Union Hardware Co., Torrington, Conn., the Progressive Mfg. Co., also of that city, and the Magma Copper Co., New York. He was born in Torrington, Conn., and was graduated from Yale in 1895.

Men of Industry

J H. CARTER, formerly works manager of the Lowellville, O., plant of the Sharon Steel Corp., has been named general superintendent of the Monessen, Pa., mills of Pittsburgh Steel Co., a position which had been open for some time. W. C. Sutherland, vice president in charge of operations for Pittsburgh Steel, remains in his present position.

R. C. Butler has been named superintendent of blast furnaces for Pittsburgh Steel, succeeding George W. Hughes. Mr. Hughes had held the latter position since 1915.

K. A. Nygren, formerly with the Globe Seamless Tube Co., Milwaukee, has been made assistant to the superintendent of the Allenport, Pa., plant of Pittsburgh Steel.

♦ ♦ ♦
Gen. Otto H. Falk, chairman, Allis-Chalmers Mfg. Co., Milwaukee, has been elected a director of the Square D Co., Detroit.

♦ ♦ ♦
J. Tedford Bachman, son of the late Morris Bachman, one of the founders and the first president of Sharon Steel Hoop Co., Sharon, Pa., has been named manager of the New York office of the Sharon Steel Corp.

♦ ♦ ♦
Walter Borges has been appointed special sales representative of the Wrought Washer Mfg. Co., Milwaukee. He will be located at the company's Milwaukee office, and will cover special territories from that point.

Mr. Borges was formerly general manager of a manufacturing plant in Milwaukee. He will work under the personal direction of W. F. Disch, general sales manager of the company.

♦ ♦ ♦
Henry F. Anderson has been appointed district sales manager for the

Atlas Fence Co., division of the Manganese Steel Forge Co., Philadelphia, covering the territory of eastern Pennsylvania, southern New Jersey and Delaware. Mr. Anderson will operate from the general offices of the company at Philadelphia.

♦ ♦ ♦
W. V. Peters, district sales manager at Cleveland for Truscon Steel Co., has been transferred to the company's headquarters at Youngstown. L. F. Stormont, heretofore Mr. Peter's assistant, has been appointed his successor.

♦ ♦ ♦
Walter Price has resigned as president, treasurer, and general manager of the Philadelphia Range Boiler & Tank Co., Philadelphia, to form his own company for the manufacture of galvanized range boilers and kindred products. He is disposing of his entire financial interest in the Philadelphia company. The new company, to be known as Walter Price Co., is temporarily located at 2045 North Broad street, Philadelphia.

♦ ♦ ♦
M. Rogers has been named general factory manager of Caterpillar Tractor Co., Peoria, Ill. He entered the business in 1922 as foreman of the turret lathe department of the C. L. Best Tractor Co., a predecessor of the Caterpillar company. In 1927, two years after the formation of the present company, he was named assistant factory manager of the Peoria tractor plant, and in 1929 was appointed factory manager, which position he held until his promotion to general factory manager.

James R. Munro has been appointed factory manager of the tractor division, succeeding Mr. Rogers. Mr. Munro enrolled for the four-year apprentice training course at the C. L. Best Tractor Co. in 1918, and



M. Rogers

upon completion of this work was employed in the tool room. He was made foreman of this department in 1925, and later was put in charge of the heat-treating plant in the San Leandro, Calif., factory. He was transferred to Peoria in 1931 as superintendent of the new diesel engine assembly line and assistant superintendent of tractor erection, a

post he held at the time of his latest advancement.

J. W. Leonard has been made general sales manager of the Cuyahoga Steel & Wire Co., Cleveland. His affiliation with Cuyahoga follows 12 years with the Youngstown Sheet & Tube Co. in the Cleveland area.

Carl W. Bettcher has been elected vice president of the Eastern Machine Screw Corp., New Haven, Conn., manufacturer of the H & G self-opening die heads. Mr. Bettcher has been connected with this company for the past 17 years.

E. E. Griest has been made vice president and general manager of the Fort Pitt Malleable Iron Co., Pittsburgh. Graduating from Purdue university, Lafayette, Ind., in the class of 1907, he was employed for a short time in the engineering department, Park works, Crucible Steel Co. of America, Pittsburgh. He then was machine shop foreman, Erie railroad, Hornell, N. Y. From 1908 to 1918 he served as assistant general foreman, assistant master mechanic and master mechanic of the Pennsylvania railroad shops, Fort Wayne, Ind. He joined the Chicago Railway Equipment Co., Chicago, in 1918 as assistant general superintendent; in 1919 was made general superintendent,

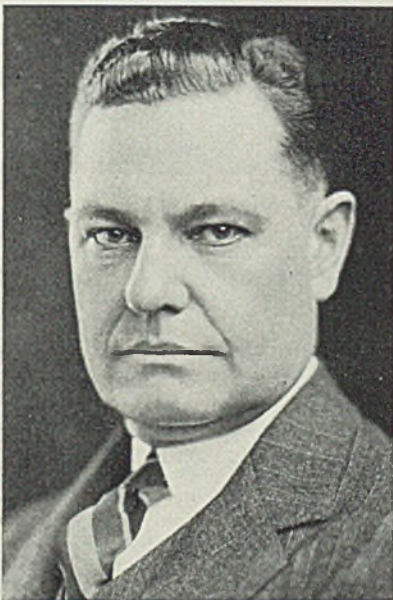


James R. Munro

and in 1931 was elected vice president in charge of manufacture, and served in that capacity until his resignation Feb. 15, 1936.

Mr. Griest is a member of the American Foundrymen's association, American Society of Mechanical Engineers, Western Society of Engineers, American Society for Testing Materials, and Western Railway club.

Will Head Up Industrial Department of General Electric Co., Schenectady, N. Y.



J. E. N. Hume

Who, as manager, will have charge of all apparatus sales, except sales to utilities. A graduate of the University of Virginia, he began his career with General Electric as a switchboard engineer. For a time he worked with the late Col. James M. Andrews, and later succeeded him as manager of the steel mill and mining section. In 1928 he became manager of the motor division, and in 1929 was made assistant manager of the entire department. He assumed his new duties in December, 1935



J. D. Wright

Appointed assistant manager. A graduate of the University of Wisconsin with a bachelor of science degree in engineering. Mr. Wright joined General Electric in 1909, and after completing the test course, was transferred to the industrial-control engineering department. In 1915 he went to the industrial engineering department, becoming head of its steel mill section in 1922, and assistant head of the department in 1930. He assumed his new duties Feb. 24



Karl H. Runkle

Made assistant manager, effective Feb. 24. A graduate in electrical engineering from Iowa State college in 1917, he completed the G-E student engineering course in 1918, and entered the mining section of the industrial department. In 1925 he was sent to Chile and Peru on special industrial work for the International General Electric Co., and on his return resumed work in the industrial department, becoming manager of sales of the mining and steel mill section in 1928

He is president of the Malleable Iron Research Institute, and director and chairman of the western section of the Malleable Founders society.

B. R. Parker, formerly pattern foreman, Ohio Brass Co., Mansfield, O., has joined the Di-Mold Casting Co., Dayton, O., as pattern foreman.

Ryan Sadwith, vice president of Ross Industries Corp., and in charge of manufacturing of the Sadwith-Waldron plant, is also president of the newly-formed Industrial Washing Machine Corp., New Brunswick,

N. J., organized to cover the field of washing, rinsing and drying machines for the metal industry, and for pan washing machines for bakeries.

H. H. Ball, secretary of the new company, has had many years experience as a sales engineer of this type of equipment, and will be in charge of designing and sales.

M. A. Carpenter has been made sales manager for the Falk Corp., Milwaukee, succeeding L. A. Graham, resigned. Mr. Carpenter has been identified with the company for the past 12 years, serving as advertising

manager and recently as sales promotion manager.

E. E. Reagle, superintendent at the Sharon, Pa., plant of Sharon Steel Corp., has been appointed general superintendent of all the company's plants. J. M. May, formerly production manager, has been appointed assistant general superintendent.

Walter S. Jackson, night superintendent, has been named to the superintendency of plant. L. L. Wilson, superintendent of the cold mill, has been named assistant superintendent of the company's strip mills.

Bethlehem Steel Corp. Makes Changes in Sales Personnel

BETHLEHEM STEEL CORP., Bethlehem, Pa., has made the following changes in its sales personnel:

J. V. Honeycutt has been appointed assistant vice president in charge of sales. He formerly had been assistant general manager of sales. John M. Ellis, formerly manager of sales for the New York district, has become general manager of sales for the company, with headquarters at Bethlehem. C. M. Denise continues as general manager of sales for fabricated steel construction. H. G. Walton, formerly general manager of sales, has been made assistant to the vice president.

C. W. Bretland, assistant manager of sales for the New York district, has been appointed manager of sales for that district. Andrew Conneen continues as manager of sales for fabricated steel in New York. H. H. Fuller, of the New York sales force, has been named assistant manager of sales in New York. W. D. Kennedy, formerly manager of sales, has been named special representative in the Philadelphia district, and L. M. Parsons, formerly assistant manager of sales, has been appointed manager of sales. P. D. Burtis, of the

Philadelphia sales staff, has been made assistant manager of sales in that district.



J. V. Honeycutt



John M. Ellis



C. W. Bretland



H. H. Fuller



L. M. Parsons

New Deal Would Legislate Thrift Out of Industry

PRESIDENT ROOSEVELT'S amazing proposal for drastic changes in the method of levying corporate taxes is contradictory to principles which have been considered almost universally to be fundamental to the success and stability of American industry.

The broad outline of his idea is revealed in the following paragraph from his message to congress:

"A proper tax on corporate income (including dividends from other corporations) which is not distributed as earned would correct the serious twofold inequality in our taxes on business profits if accompanied by a repeal of the present corporate income tax, the capital stock tax, the related excess profits tax and the present exemption of dividends from the normal tax on individual incomes. The rate on undistributed corporate income should be graduated and so fixed as to yield approximately the same revenue as would be yielded if corporate profits were distributed and taxed in the hands of stockholders."

Proposal Put Out as Tax Measure but The Element of Reform Appears Heavy

Obviously the proposal is prompted more by a zeal for reform than by a sincere desire for increased revenue. The President and his inexperienced financial advisers clearly have been annoyed by the large surpluses maintained by a few large corporations. They look upon these accumulations as "hoarded" resources which escape taxation. By penalizing such surpluses, they aim to induce corporations to disburse a larger proportion of their earnings in the form of dividends. This, they reason, will increase the purchasing power of stockholders, stimulate business and, incidentally, by applying the normal tax on individual incomes to dividends, provide the government with a higher yield from the earnings of business.

Naturally the first reaction of orthodox industrialists, financial experts and economists to this reasoning is that the sponsors of the tax reform are overlooking completely the useful function of corporation surpluses in easing the shock of depressions. Every president of an industrial company during the recent period of stress either has thanked his stars for having given him the foresight to accumulate a surplus

to tide him through the storm or has cussed his shortsightedness for having failed to lay enough aside to carry him through. If ever the merit of a surplus was demonstrated convincingly, it was during the late lamented depression.

But the resourceful new dealers have an answer for this. They declare that their scheme does not wholly deprive the corporation of protection in hard times. They say that the industrialist does not need a "large" surplus. Instead of accumulating a sizable emergency fund, he should go to his banker more frequently. He should appeal to the public for funds. He should call upon his stockholders for additional money to meet unforeseen emergencies. They want more action in the form of bank loans, flotation of securities, etc. Anything, they argue, is better than the present system of accumulating surpluses, which in their minds constitute "sterilized" or "dangerous" money.

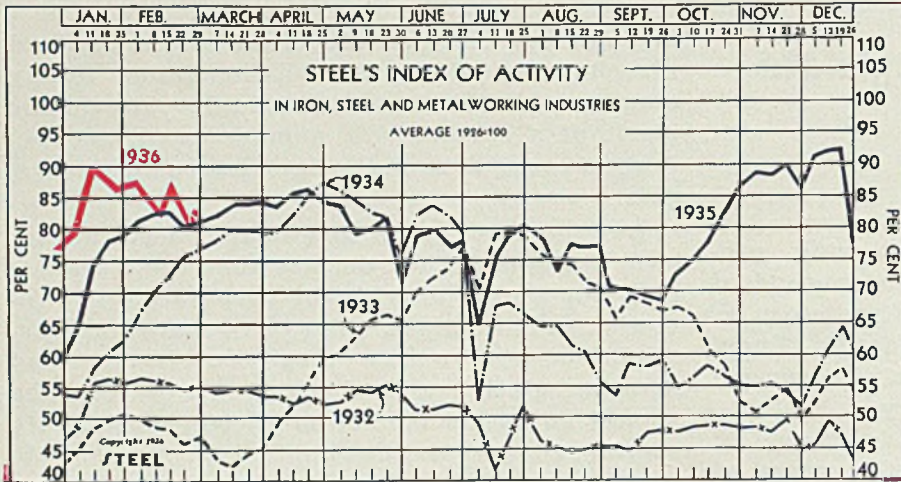
President Draws Line Between Reserves and Surplus, but It Is a Dim One

At this point it should be stated that the President draws a line of distinction between reserves and surpluses. He told press representatives that "reserves" could be accumulated by companies borrowing back from stockholders after dividends had been paid or by raising funds from other sources. The treasury department—co-sponsor of the tax reform—is quoted as stating that the new legislation will be phrased so as to prevent corporations from diverting earnings into excessive plant expansion or improvement. From this one would infer that the other familiar methods of "plowing under" earnings into corporate assets, such as building good will through advertising, promoting efficiency through improved plant equipment, etc., will be frowned upon.

In brief, on the face of the President's not-too-specific message, it appears that the new dealers are determined to outlaw the age-old precept that thrift is a virtue. They are trying to tell industry that the practice of laying aside a reserve for the inevitable rainy day is utter nonsense.

We doubt whether the present or any other congress will enact legislation which contradicts so outrageously the fundamental precepts of human progress. There are not enough hare-brained congressmen in Washington to legislate well managed industrial companies into shiftless corporate panhandlers.

THE BUSINESS TREND



STEEL'S index of activity in the iron, steel and metalworking industries gained 1.4 points to 83.2 in the week ending Feb. 29:

Week ending	1935	1934	1933	1932
Jan. 4	78.2	65.4	53.6	45.3
Jan. 11	90.2	73.8	58.1	48.6
Jan. 18	89.3	78.1	60.9	49.8
Jan. 25	86.0	79.5	62.3	50.8
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	83.2*	81.1	76.8	47.4

†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.

Index of Activity Reflects Slight Gains for Industry

IN VIEW of the many and varied radical experiments which have engaged the attention of the American public during the past few years, it is perhaps significant that today congress is more deeply concerned with practical problems than with fancy theories or panaceas. Right now it is dealing with such stubborn, practical, brass-tack questions as taxes, control of competition, relations with foreign powers, etc. At last congress is struggling with existing conditions—with realities.

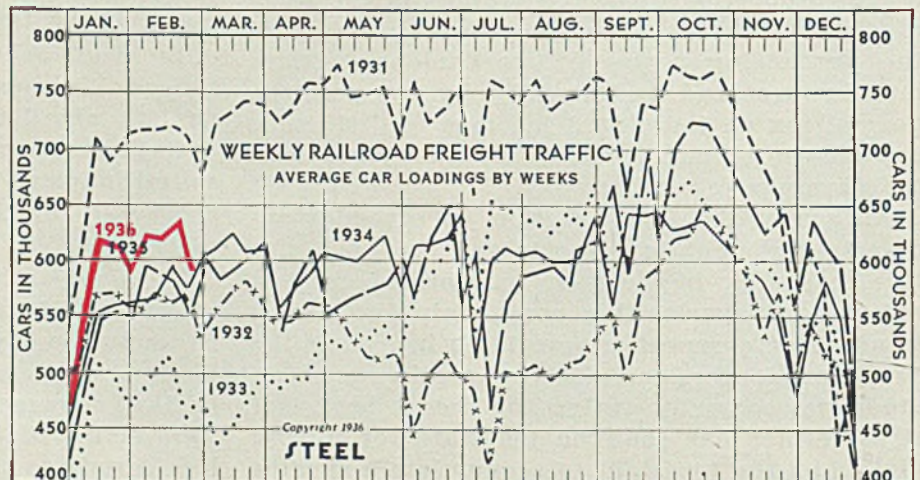
This is an encouraging sign—particularly in an election year, and it has a tangible bearing upon the outlook for business. The fact that

the great determining force at the November polls will be the opinion of the middle-of-the-road public—not that of the extremists of the right or left—is reassuring to business stability. It means that constructive forces such as confidence, abundant credit, expanding demand for goods and services, etc., will exert a greater degree of influence.

Industrial activity seems to be on the verge of an expanding movement. Steelworks operations are remaining steady while a difficult and delicate problem of price policy is being considered. Electric power output is easing slightly in what appears to be the normal trend for this time of the year. Automobile output—probably near the low point of the present cycle—will expand shortly.

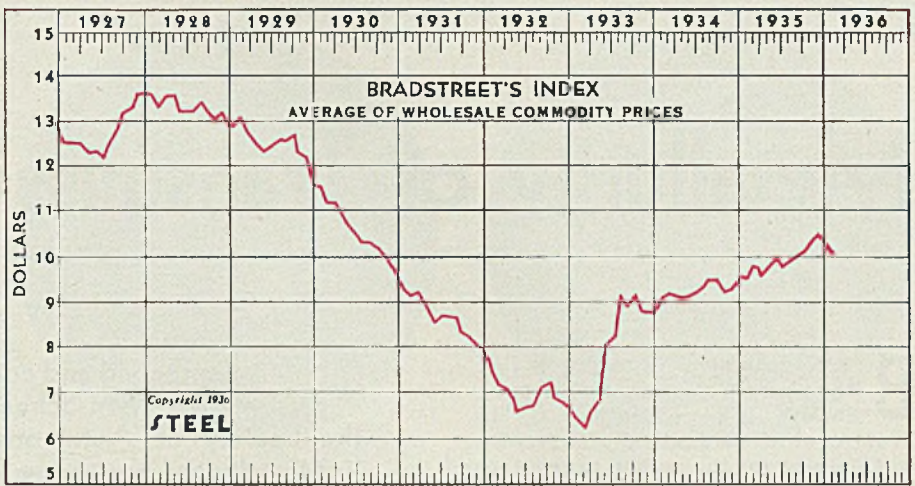
Revenue freight traffic jumped spectacularly in the final February week. The more than seasonal gain was an important factor in lifting STEEL'S index of activity to 83.2.

	1936	1935	1934
Feb. 22	586,712	553,165	574,908
Feb. 15	631,347	581,669	600,268
Feb. 8	622,097	591,327	573,898
Feb. 1	621,839	596,961	565,401
Jan. 25	584,691	555,528	563,100
Jan. 18	611,408	562,900	560,400
Jan. 11	615,028	553,518	557,266
Jan. 4	541,984	497,274	500,813
	1935	1934	1933
Dec. 28	466,679	425,404	454,765
Dec. 21	599,534	548,478	531,464
Dec. 14	615,237	580,202	559,419
Dec. 7	637,133	551,490	541,992



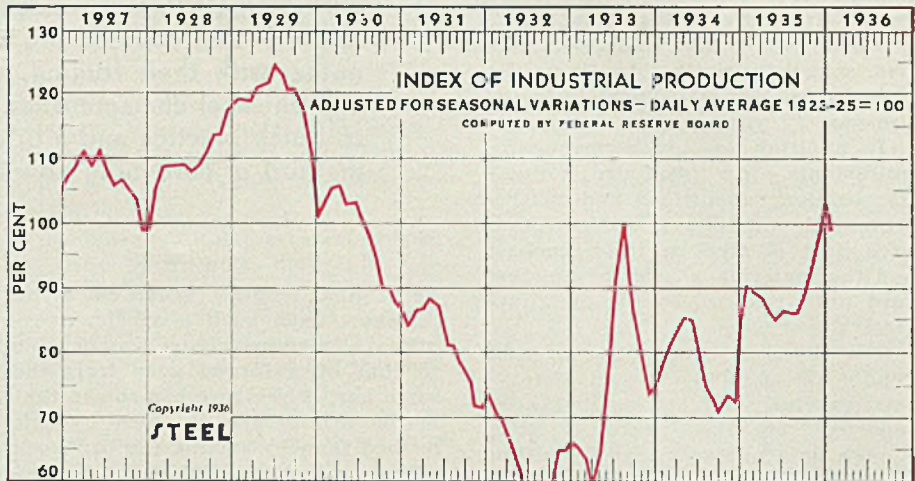
Commodity Index Registers Second Consecutive Decline

	1936	1935	1934	1933
Jan. 1	\$10.36	\$9.49	\$9.01	\$6.53
Feb. 1	10.02	9.78	9.26	6.53
Mar. 1		9.79	9.17	6.54
Apr. 1		9.66	9.16	6.98
May 1		9.79	9.14	8.02
June 1		9.90	9.24	8.34
July 1		9.84	9.32	9.01
Aug. 1		9.91	9.48	8.99
Sept. 1		10.00	9.45	9.05
Oct. 1		10.17	9.27	8.84
Nov. 1		10.28	9.29	8.81
Dec. 1		10.40	9.49	8.83



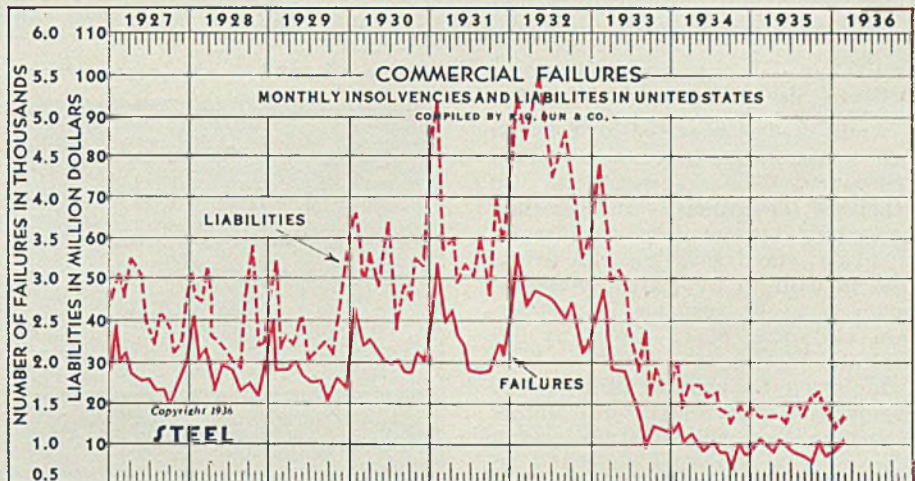
Industrial Production Declines Sharply in January

	1936	1935	1934	1933
January	99	91	78	65
February		89	81	64
March		88	84	60
April		86	85	67
May		85	86	77
June		86	84	91
July		86	75	100
August		87	73	91
September		89	71	84
October		95	73	77
November		98	74	73
December		104	86	75



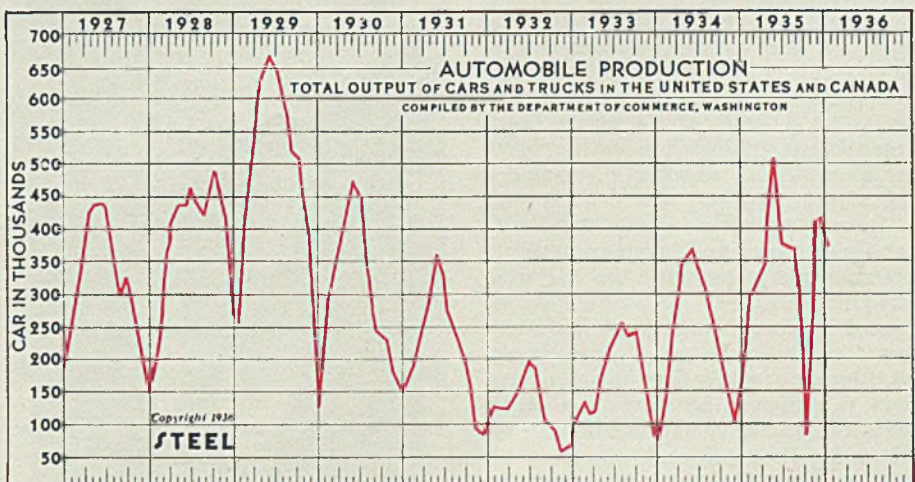
January Commercial Failures Show Sharp Advance

	Failures, Number		Liabilities, Dollars (000 omitted)	
	1936	1935	1936	1935
Jan.	1,077	1,184	\$18,104	\$18,323
Feb.		1,005		18,737
Mar.		976		18,522
Apr.		1,115		18,063
May		1,027		15,669
June		961		20,463
July		931		20,446
Aug.		910		17,845
Sept.		806		21,837
Oct.		1,097		22,243
Nov.		927		20,023
Dec.		940		17,442



January Automobile Output Shows Downward Trend

	1936	1935
January	380,554	303,392
February		353,781
March		451,768
April		501,814
May		385,364
June		376,993
July		350,054
August		247,686
September		95,127
October		283,337
November		411,535
December		421,579



Metallurgy of Transmission Gears

BUICK gear steel is made by the open-hearth process and is purchased to specification G. M. 3145-A, which is identical with S.A.E. 3145 except for the carbon range, the suffix "A" denoting a five point range—in this case 0.43-0.48. This material, with minor changes in carbon range from time to time, has been in use almost continuously for the past 17 years.

In addition to chemistry, the requirements cover grain size, normality, banding, inclusions and macrostructure. Samples are taken from each heat of steel as it is received and the material is held in the steel yard until released by the metallurgical department.

The chemical composition is held rigidly to specification and the results carefully checked against those reported by the source. Even though both analyses may be within the requirements, differences sometimes occur which indicate either laboratory errors or undesirable variations in the steel.

Grain Size, Inclusions Watched

Grain size is specified as 6-8 and determined according to standard procedure. The same sample is also examined for normality and banding, and given ratings based on certain arbitrary standards. Special attention is paid to duplexing, which is believed to be responsible for certain variations of an especially undesirable nature.

Inclusion ratings are obtained by comparison with the General Motors inclusion chart. Numbers are used in place of letters, with a scale of 0, 1, 2, 3 corresponding to D, C, B, A and ranging from bad to good. In this way, a numerical average can be obtained for a number of heats. An average inclusion rating of 2 or better is considered satisfactory. Individual heats showing a rating of 0 on a sufficient number of samples are subject to rejection.

Macrosections are made from upset specimens and compared with macrographs showing the desired structure. Later, when the heat is forged, a gear is sectioned and subjected to the same comparison as an additional check. The upset specimen is prepared by cutting a piece from the end of a bar to a length of twice its diameter and upsetting at 2350 degrees Fahr. to one-fourth of

THIS is the second and concluding installment of a paper presented by Mr. Schenck before a recent meeting of the Society of Automotive Engineers in Detroit. The first installment, appearing in STEEL for Feb. 17, reviewed current metallurgical practice employed throughout the industry and covered the various gear steels in use, together with their forging, annealing, hardening, drawing and physical characteristics. The present article is devoted to Buick practice and a brief description of an improved method of hardening now in development.

its original length. When cut along its short axis, such a specimen exhibits a macrostructure comparable to that of a forged gear from the same bar. Experience has shown that better results are obtained by this method than by etching the bar stock without upsetting. This test is readily standardized and can be performed with equal facility by both source and customer.

Figs. 1 and 2 are macrographs

showing two gears with different etching characteristics. That in Fig. 1 is comparatively "dense," while the one in Fig. 2 is more "open." The most desirable degree of "density" is a matter of some disagreement and probably will continue to be until more is known concerning the true significance of macrostructure.

Close contact is maintained with the sources furnishing the material. Accurate records are kept of all troubles and irregularities which are reported to the steel company's representative who makes a personal call at least once a week. These representatives devote all their time to this one account, an arrangement which has proved mutually beneficial.

BY R. B. SCHENCK
Chief Metallurgist, Buick Motor
Co., Flint, Mich.



Die Problems Important

All the gears are made in forging machines of the latest type. The importance of correct die design and adequate die maintenance is fully recognized. Frequent inspection and macroexamination insure proper control of metal flow, which is so essential from the standpoint of quality. The center holes are all pierced, including that of the counter gear. The forge furnaces are of conventional design and are oil fired. Temperatures are carefully regulated by experienced heaters and the closest possible supervision maintained.

The annealing operation is performed in underfired continuous furnaces with automatic temperature control (see first installment, STEEL, Feb. 17). These furnaces have four separately controlled zones and are extremely flexible. The central cooling zone with the thin removable roof permits accelerated cooling from the second high-temperature zone. This saves annealing time and tends

to decrease banding. Annealing capacity of each furnace is 1250 pounds per hour.

The desired structure is one containing the maximum amount of lamellar pearlite, as shown in Fig. 3. In Fig. 4 we have a partially divorced and spheroidized structure which is detrimental to machining and none too good for hardening.

Structures Check Hardness

In addition to the regular brinell tests, samples are taken periodically for microexamination. An excellent correlation exists between brinell hardness and microstructure. The hardness range which has been found to produce the desired pearlitic structure most consistently is 197-207. The hardness of the gear in Fig. 3 was 207; the one in Fig. 4 was 187.

The cyanide hardening equipment involves a conveyor system of the "jackrabbit" type which carries the gears through the complete cycle, consisting of preheat, four cyanide pots, quench, wash, and rinse (see first installment).

The five furnaces are independent units standing on legs and can be moved by means of an electric truck. When a pot burns out or other repairs are needed, the fuel and air lines are disconnected and a spare unit, always held in readiness, replaces the one to be repaired.

The four cyanide furnaces are gas fired, with automatic temperature control. The preheat furnace is

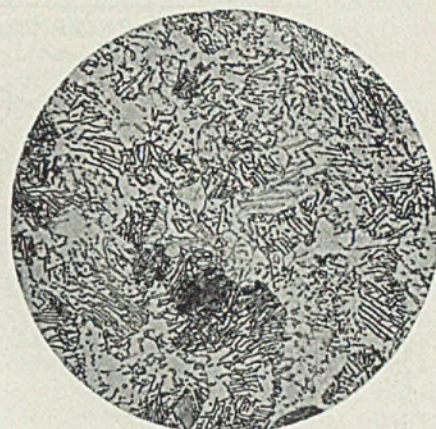
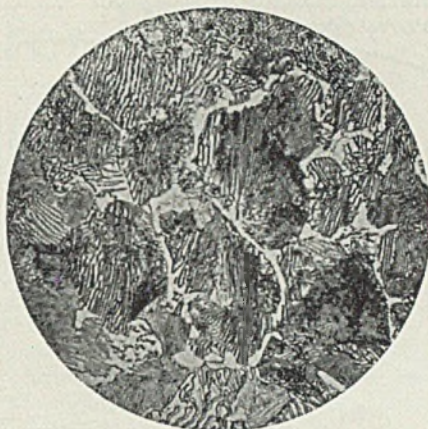


Fig. 3 (left)—Annealed gear steel showing pearlitic structure and good machining qualities. Nital etch; X750. Fig. 4 (right)—Partially divorced and spheroidized structure, with poor machining qualities. Nital etch; X750

heated by the products of combustion from the adjacent furnace by means of a brick flue which is easily broken and repaired when either unit requires moving.

The pots are either cast steel or heat resisting alloy, both materials giving satisfactory service. The best combination is to use alloy for the first two pots, as these receive the hardest firing, and steel for the last two. The pot dimensions are 40 inches long x 25 inches wide x 18 inches deep. An old pot, with the bottom cut out, is used in the preheat furnace, which is the same construction as the other units.

The time cycle is 6 minutes which

makes a total of 24 minutes in the four pots. Temperature of the preheat unit is 500 degrees Fahr.; of the four cyanide pots, in order, 1325, 1500, 1500 and 1325 degrees Fahr. The probable time-temperature cycle for the average gear is given in Fig. 5.

The capacity of this equipment is 800 pounds per hour. The gears are suspended from the conveyor on suitable fixtures spaced so as to provide uniform quenching conditions. The oil flow is automatically shut off for 90 seconds when the gears go into the quench tank, as it was found that distortion could be controlled more effectively with still oil.

The temperature cycle in use is the one finally chosen after trying many different combinations. The temperature of the first pot is set just below the A_c1 point of the steel and that of the last pot, just above the A_r2 point. This combination seems to decrease shock in both heating and quenching.

Thin Case Found Best

The cyanide case obtained averages about 0.002-inch. It is purposely held to this low figure in the belief that the least thickness of cyanide case necessary to provide adequate wear resistance is the best. While no test data are available either to prove or disprove this point, it is believed that a heavier cyanide case is not beneficial and may be detrimental to the fatigue resistance of gear teeth with a core hardness of C-50 or above. There is ample evidence that a cyanide case decreases shock resistance.

The sodium cyanide content of the bath in all four pots is held to a value of 3 to 6 per cent. The baths are replenished with a mixture containing 25 per cent sodium cyanide with the balance equal parts of soda ash and salt. Small quantities of 96-98 sodium cyanide are added as required to maintain the desired composition.

During the past two years, several

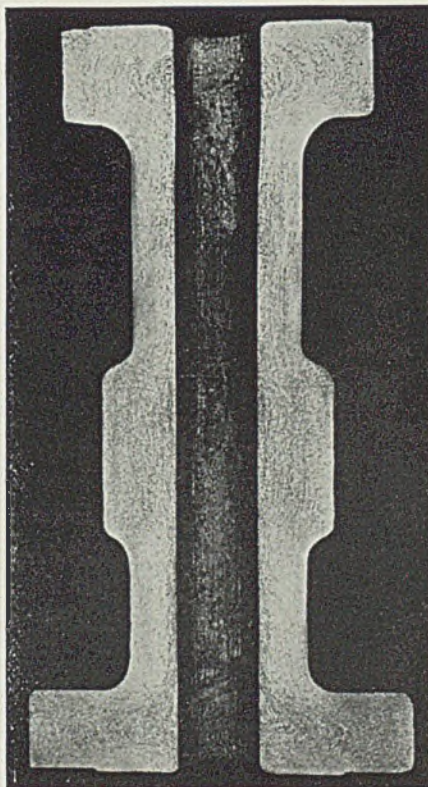
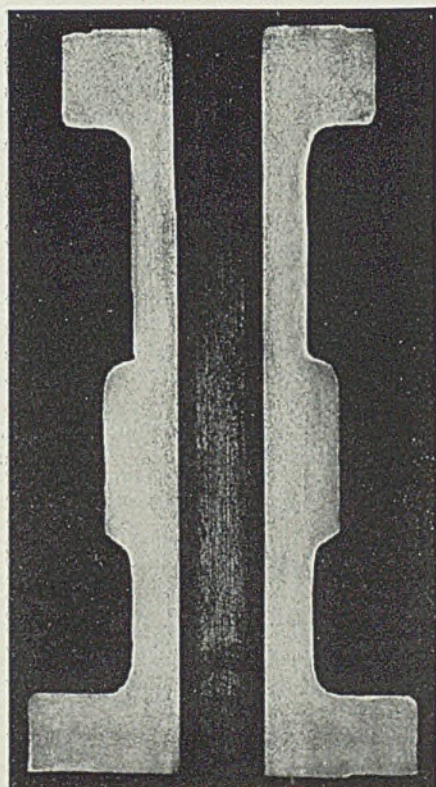


Fig. 1 (left)—Cross section of typical gear showing comparatively "dense" macrostructure. Fig. 2 (right)—Similar cross section showing gear with more "open" macrostructure

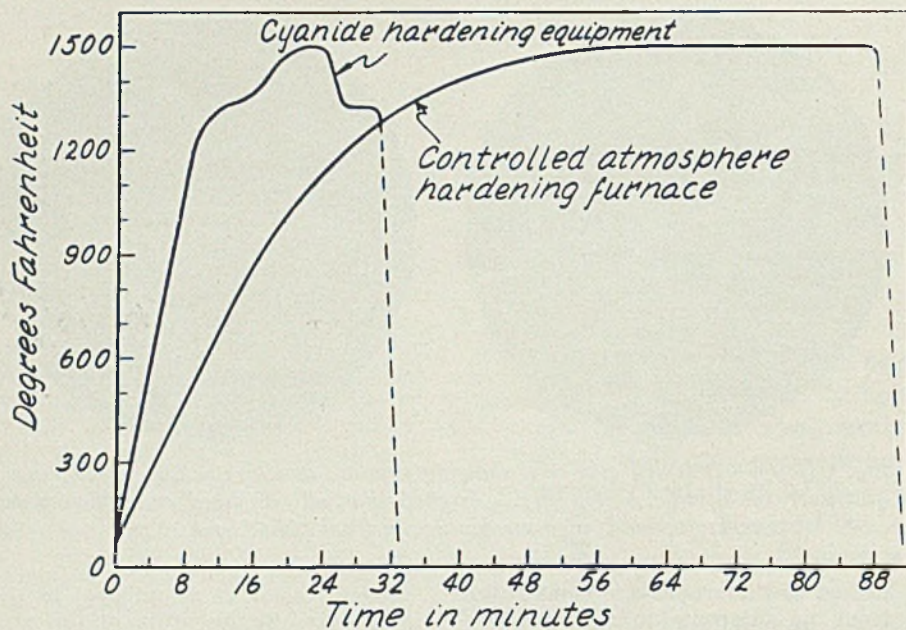


Fig. 5—Comparison of average time-temperature curves for two types of gear hardening equipment

million gears have been hardened by this method. The automatic features, together with the flexibility of the temperature cycle, make possible a degree of control not attainable with the more common designs of cyanide equipment.

The drawing operation is performed in a vertical gas-fired furnace with automatic temperature control. The gears are placed on projecting pins fastened to the conveyor and after passing through the drawing cycle, are cooled in a tank under the furnace, containing soluble oil compound, and returned to the operator for removal. The capacity of this furnace is 1200 pounds per hour. The drawing temperature is 450 degrees Fahr. and the time in the heating chamber is two hours.

Comprehensive Test Program

The finished gears are subjected to a unit inspection for Rockwell hardness and are held to a minimum of C-50. In addition, frequent checks for distortion, toughness, case depth and microstructure are made in order to insure still closer control. Troubles which develop are immediately made the subject of an exhaustive investigation which may cover the complete history of the steel from the melting furnace to the finished gear. Dynamometer and road tests are frequently made on complete transmissions to obtain information relative to changes in design, material and heat treatment.

The case and core characteristics of Buick transmission gears cover the following ranges: Case depth, 0.001 to 0.003-inch; case hardness, C-50 to 55; core hardness, C-50 to 55. The same ranges are given for both case and core, since the extremely light case has almost no effect on the

Rockwell hardness. The tensile strength of the core lies between 275,000 and 300,000 pounds per square inch.

Develop New Hardening Method

An improved method for hardening high carbon gears which offers certain advantages not attainable with the cyanide process is now in use at the Buick plant. Although still in a state of development, the results so far obtained have been promising.

The equipment consists of a continuous gas-fired muffle furnace with automatic temperature regulation and controlled atmosphere. Auxiliary equipment is provided for gas conditioning.

A line drawing of the furnace is shown in Fig. 6. The gears are placed on skeleton trays and pass through the muffle and quenching tank as indicated by the arrows. Conditioned gas is passed through the muffle to produce the desired atmosphere.

The muffle is 22 feet long from the outer door to the chute, 3 feet 2 inches wide and 17 inches high. The capacity is 1200 pounds per hour

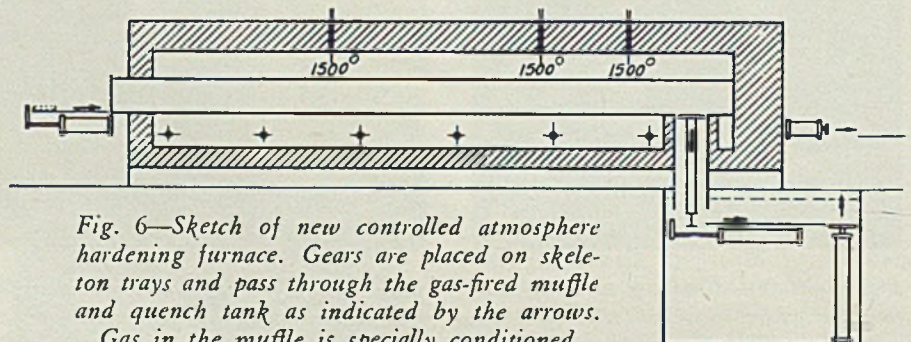


Fig. 6—Sketch of new controlled atmosphere hardening furnace. Gears are placed on skeleton trays and pass through the gas-fired muffle and quench tank as indicated by the arrows. Gas in the muffle is specially conditioned

with a total time of 88 minutes. The temperature setting for the three zones is 1500 degrees Fahr.

With the proper atmosphere, a case averaging 0.006-inch is obtained. This case is of excellent quality and is slightly hypereutectoid with the excess cementite in spheroidal form. By sufficient enrichment of the gas with hydrocarbons, a continuous layer of cementite several ten-thousandths of an inch in thickness can be formed. This is believed to be an undesirable feature and can be avoided readily. It is, however, an interesting phenomenon which might be construed as additional evidence that the carbon in austenite exists in the form of dissolved Fe_3C rather than in the atomic state.

Higher Values Obtained

Gears hardened from this furnace are drawn at the usual temperature of 450 degrees Fahr. and show an increase in Rockwell hardness over the cyanided gears of about two points. The toughness seems to be better than that of the cyanided gears and this toughness is maintained to a remarkable degree as the case depth is increased above the usual 0.006-inch.

With respect to distortion, the new method is a noticeable improvement over the cyanide. It is believed that this is mainly due to the slower heating rate and longer total time of heating, which are natural characteristics of this type of furnace. In Fig. 5 the heating cycles for both methods of hardening are shown on the same chart.

Preliminary dynamometer and road tests indicate a durability at least equal to that of cyanided gears. It is expected that further tests will show an improvement over gears hardened from cyanide.

200-Heat Furnace Lining

Recent experience with a rotary-type, powdered-coal furnace in a malleable foundry indicates that a lining of silica brick is good for an average of 200 heats. Rotation of the furnace during melting subjects the entire lining to the same amount of heat.

Making Molds for Plastics From Cast Beryllium Copper

CAST beryllium copper recently has been found to offer advantages as a mold material for plastics and it is expected to find ready acceptance for certain applications in which present materials are either inadequate or too expensive. Molds made from the new material are said to offer opportunities in extending use of plastics over a wider field to include such items as architectural friezes, plaques, medallions, ornamental packages and displays, irregular-shaped mechanical devices, artistic ash trays, belt buckles, novelties, and other uses where elaborateness of design prevents mold production by ordinary mechanical methods.

Use of beryllium copper as mold material was developed by the Bronze division of the Gorham Co., Providence, R. I., after two years of planned experimental work. Details of the development are outlined in the January issue of the *Bakelite Review* published by the Bakelite Corp., New York.

Is Extremely Hard Alloy

Beryllium copper is an alloy containing approximately 2.5 per cent beryllium and 97.5 per cent electrolytic copper. Percentages of either metal may vary according to properties desired in the alloy. Beryllium is a semiprecious metal worth about \$30 a pound; it has an extremely low specific gravity, being about 0.7 the weight of pure aluminum. Its presence makes it possible to harden the resulting alloy by proper heat treatment. The degree of hardness which can be obtained far surpasses that which can be had with modern bronze alloys. Because of this property, the Gorham Co. selected beryllium copper with the objective of producing cast dies and molds.

Up to the present, most of the work in cast molds has been done with steel, because steel seemed to be the only metal that could be expected to stand up under the necessary molding pressures. In casting steel, a relatively thick coating of scale results. This scale must be removed and the process is not only expensive but it results in lack of detail in the finishing casting. Another serious trouble is the porosity of cast steel.

Beryllium copper has the good casting properties of bronzes, and there is relatively little scale, which makes it possible to obtain rather fine detail. Furthermore, it has been possible to reduce considerably the porosity of beryllium copper cast-

ings, compared with bronze alloy castings. The latter, in turn, are much less porous than steel castings. These good casting properties, combined with hardness and good mechanical strength, make beryllium cast molds well suited to the plastic molding industry.

It is stated that molds of this material can be produced economically (1) for small parts of intricate design where the hob would be too fragile to stand up in the reproduction of cavities in mild machine steel, and (2) for decorative ornamental designs where reproduction is obtainable in steel only by expensive hand engraving. Designs of this kind may not only be reproduced more economically, but it is possible to retain the detail of the original.

Beryllium copper molds cannot be produced more economically than other types of molds in every instance, it is pointed out. For example, on molds for closures where the design can be reproduced by sinking a hob in mild machine steel, and where a number of cavities are desired, the Gorham Co. does not recommend the new process. Also, on simple shapes which can be readily turned on a lathe or cut by regular milling cutters, the economies of beryllium cop-

per molds are not so pronounced. Shrinkage occurs in casting molds of this metal, therefore, the process is not recommended where extreme accuracy is desired unless subsequent machining and finishing are relied upon to obtain the desired accuracy.

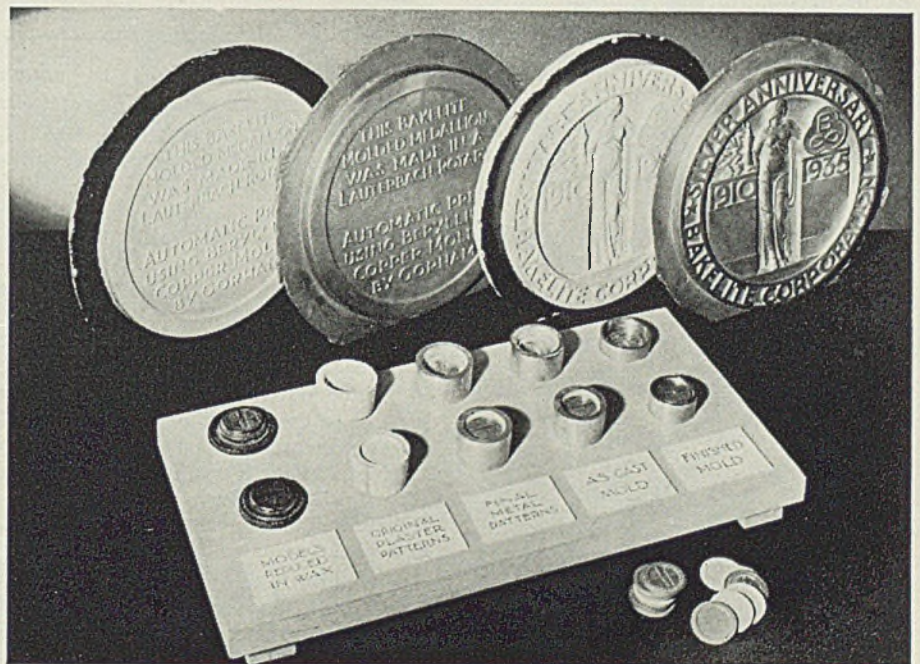
To date, experience has not been sufficient to assume that beryllium copper molds will stand up indefinitely in service as well as steel molds. In one instance, approximately 2500 moldings have been made from each of two cavities with no ill effects on either. A mold for the cover of a large silver chest has produced some 3000 pieces at 500 pounds per square inch pressure without noticeable wear or caving in.

Drawbacks to Molds

From the mechanical properties of the material, it can be assumed that beryllium copper molds will stand up as well as pack hardened machine steel molds, with the exception that abrasive wear on the surface would be expected to be greater. There also is an indication that some difficulty may be encountered in releasing pieces from the molds. In common with all bronze alloys, they take a brownish color, but tests do not reveal that polish of the finished piece is affected. These objectional features might be overcome by chromium plating the mold after it is finished.

For many years, oil-hardened tool steel molds have been considered the most satisfactory for molding plastic materials. Not long ago the service-

(Please turn to Page 38)



Here are shown the various steps in making a beryllium copper mold. In the background are the original patterns for a medallion. Mounted on the board, left to right, are reduced models in wax, original plaster patterns, final metal patterns, as-cast mold, and finished mold. Bakelite parts produced from the mold are shown in the foreground

Industrial Inspection Lighting

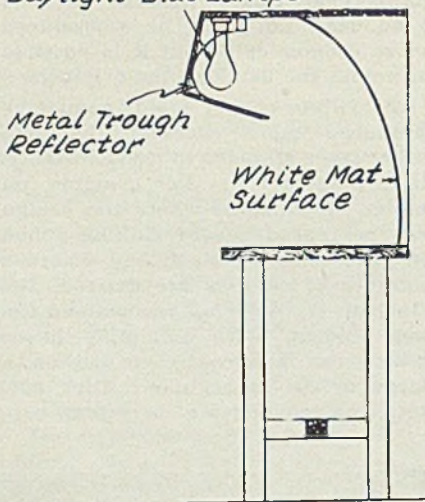
Requires More Than

Adequate Intensity

APPLYING light to inspection operations with care and planning which consider character of the product, specific working facilities, and seeing comfort of the worker, is the trend in modern manufacturing, according to Richard G. Slauer, illuminating engineer, Westinghouse Lamp Co., Bloomfield, N. J., who presented a paper recently before the annual meeting of the Illuminating Engineering society in Cincinnati. In his opinion, visual industrial inspection problems require more varied use of fundamental lighting principles than any other type of industrial application.

We no longer think only of well-diffused, high-intensity illumination, said Mr. Slauer. In fact, unyielding adherence to this usual concept of good lighting often will produce the poorest results. Visibility curves show that under average conditions of seeing, lighting levels of 20 to 30 foot-candles are justified. But in-

Daylight Blue Lamps



One of several methods to obtain equivalent of extremely large light source for inspecting polished surfaces. The background surface may be continued to the floor if large objects are to be inspected

spection work is seldom average work.

Certainly, any inspection job that is preceded by many processing steps, in which labor costs are relatively high, and in which errors may well affect consumer price with possible damaging effects upon the reputation of a quality product, deserves super-lighting, despite the time, trouble, and cost to install, he stated.

The problem of inspection lighting should be viewed from several angles, according to Mr. Slauer. He emphasized six factors which embrace most inspection lighting problems, namely: (1) Composition; (2) finish; (3) form; (4) internal structure; (5) surface contour; and (6) color.

Composition is the identification

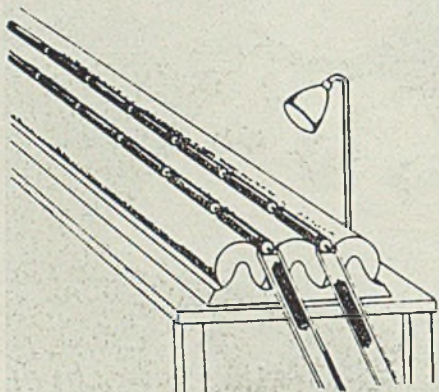
of surface defects by differences in light reflections. Well-diffused illumination usually is best, but the intensity will vary according to the nature of the product. Some 100 foot-candles or more may be required to detect carbon particles on a gray iron casting, while 10 to 20 foot-candles are satisfactory for detecting large black spots on a snow-white background.

Every product today may be classed as having either a dull or shiny finish. The dull finish products are easy to inspect under well-diffused illumination of adequate intensity. Shiny objects, on the other hand, reflect so much light that increasing the strength of the light source usually impairs visibility. To remove this condition, the light source must be kept larger, or apparently larger, than the object inspected. Then, differences in the image of the light source on the object are indications of surface defects. Plating inspection is a common process where the class of finish dictates inspection lighting practice. Images of light sources—daylight or artificial—are so pronounced as to obscure surface variations in an object.

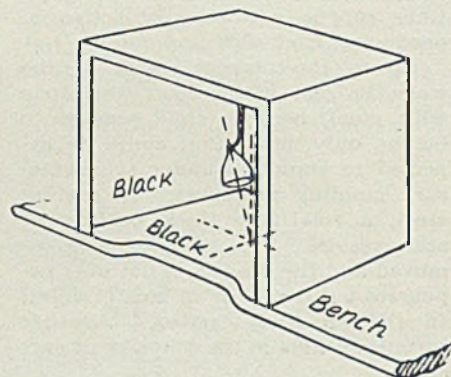
Use of Silhouette Lighting

Inspection for form, or physical outline, usually calls for diffused light, except for small objects which are inspected best with silhouette lighting. Since, in silhouette lighting, the inspector must look directly at the light source, one of low brightness is essential to his eye comfort. Diffusing the light source will help, but too much diffusion will destroy the sharp outline. Containers and many other products are inspected efficiently under different forms of silhouette lighting.

Internal inspection with light is applicable only when the object is translucent. As for surface contour, slight variations are easier to see



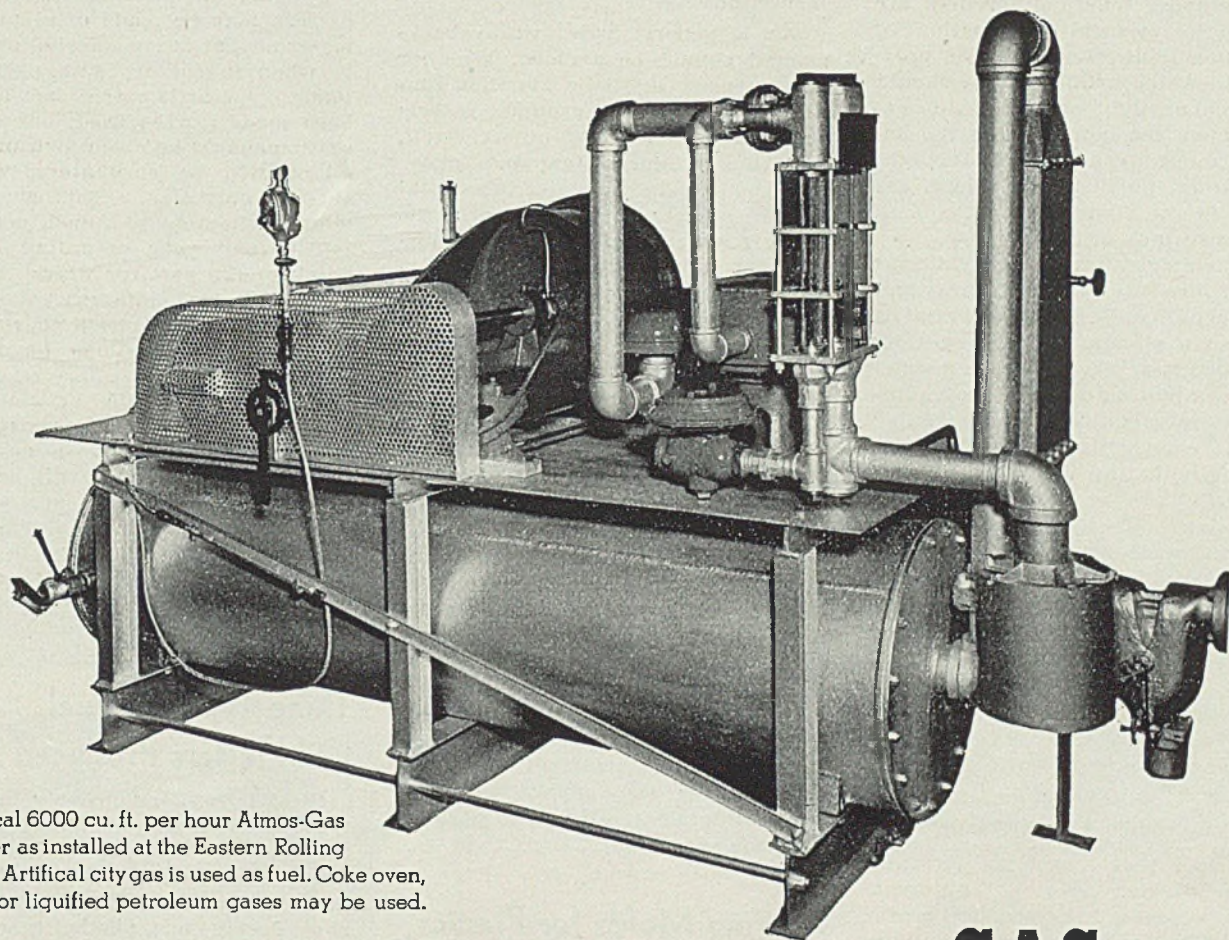
Inspection of highly polished parts such as roller bearings may be carried on as shown here. The objects are rotated and moved axially. Changes in highlight indicate the presence of flaws



One method of razor blade inspection. Batches of 50 blades are so handled that blade edges are examined separately on each face and collectively in plan. Faults appear as faint gray specks or streaks

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with directional light, of which the intensity is of secondary importance.

Color, as an inherent characteristic of most objects, is an important factor in inspection practice. Where color variations are great, they generally indicate improper assembly, foreign substances, or faulty operating methods. Where differences are slight, the spectral composition of inspection light is critical. The proximity to which artificial light should approach daylight color depends entirely upon the industry and the importance of an exact match. Daylight blue lamps, or their equivalent, are a step in the right direction and in many cases are satisfactory.

The two most important conditions in color inspection are uniformity and reproducibility. The first essential is to select a standard light and then reproduce it at all inspection points. Day and night shifts on the same inspection job require light of similar spectral composition, which usually means eliminating daylight entirely. Obviously, 200 or 300 foot-candles of daylight mixed with 50 or 100 foot-candles of artificial daylight is not the equivalent of the same 50 or 100 foot-candles of artificial daylight alone at night.

Color is sometimes involved in plating inspection, for example, chromium and nickel plating. Both are white, except that chromium has a slight bluish cast, nickel a slight yellowish cast.

Compromise Usually Made

The fact that inspection lighting can be divided into six different classes, does not necessarily mean that each one will fit every particular problem. Mr. Slauer points out, since a defect rarely is found alone, and since inspection seldom is so important that the object must be inspected by more than one person or by one person under more than one form of illumination, a compromise between the different methods, is generally the rule.

If blisters were the only defect in a surface, a single lamp directed toward the inspector would be sufficient, but there may be irregularities of color and composition requiring a vertical panel of light to provide a directional component.

This is true for products with shiny surfaces. Totally diffused light only discloses surface conditions — pin holes, plating voids, color, deep scratches — while dents, contour irregularities and groups of minor scratches are not seen. If the object cannot be re-inspected, a practical substitute for directional component, is to mark the primary or secondary light source with black lines. The images of these on the surface of the product are regular as long as the surface itself is regular.

In all inspection practice, it is

pointed out, human factors, such as tiring eyes, surrounding conditions, and routine of work, must be considered in ultimate production efficiency. The background of the inspection point bears an important relationship to annoying glare, while at the same time affecting the ease of inspection.

As a general rule, white background should be avoided. Whether the intensity is 10 or 200 foot-candles, a white background reflects more light than the object itself, and thus produces annoying glare. The smaller the object, or the total area of objects, in proportion to the background, the harder it is to distinguish surface details. Shiny surfaces, such as glossy paints, are therefore undesirable as backgrounds. A green or brown mat finish is most often the best. In the first place, both colors are used by nature for its normal backgrounds and thus give a restful eye reaction. Secondly, brown, and even more rarely green, are uncommon in metallic products.

As long as the personal element plays such an important part in visual inspection problems, their solution cannot well be reduced to mathematical figures, concludes Mr. Slauer. This condition need not embarrass those in lighting work, but it must be understood. The factory engineer who seeks to improve inspection efficiency must realize that the lighting engineer can supply technical knowledge and experience to particular problems.

Making Molds for Plastics From Cast Beryllium Copper

(Concluded from Page 35)

ability of pack-hardened machine steel molds was questioned. At that time the industry believed that such molds did not stand up satisfactorily. Nevertheless, because of the economy of production of these molds, it can be reasonably estimated that fully 80 per cent of the molds now in use are pack hardened machine steel.

In comparison with pack-hardened mild machine steel, all properties, excepting hardness, are favorable to beryllium copper. Physical properties of beryllium copper have been determined as follows: Ultimate tensile strength, 150,000 pounds per square inch; ultimate compressive strength, 190,000 pounds per square inch; elongation in 2 inches, 2 per cent; Rockwell hardness, C 40; and brinell hardness, 360.

Rockwell hardness of ordinary pack-hardened machine steel molds generally is C 58. However, the thickness of the crust having this hardness is only in the neighborhood of 1/32-inch. The hardness of beryllium copper is more evenly distrib-

uted throughout the mass. Therefore, it would be expected that beryllium copper molds would have less tendency to cave in or give way under working pressures.

The first step in making a beryllium copper mold is the pattern, which is a reproduction of the article for which the mold is desired. This pattern may be made of almost any material that is not affected adversely when in contact with plaster of Paris. An article that has already been made can be used, but consideration should be given for shrinkage which will be encountered in the casting operation. This shrinkage is approximately 1/32-inch per inch, but it will vary according to the detail of the part for which the cast mold is desired. Patterns should be built only after complete and detailed recommendations have been obtained.

In conclusion, the article states that the plastic industry should consider cast beryllium as a new tool. Like all new tools, it will be some time before its true place will be determined. The material should be considered supplementary to materials now employed and should be used only after all factors governing its use have been studied.

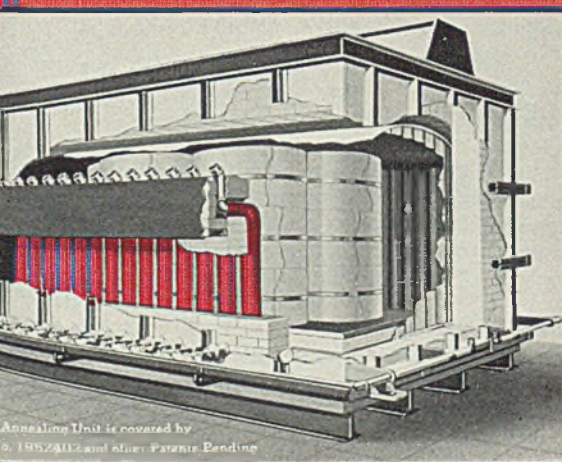
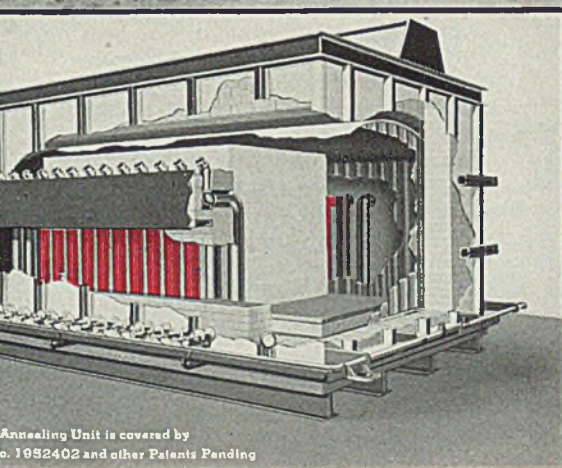
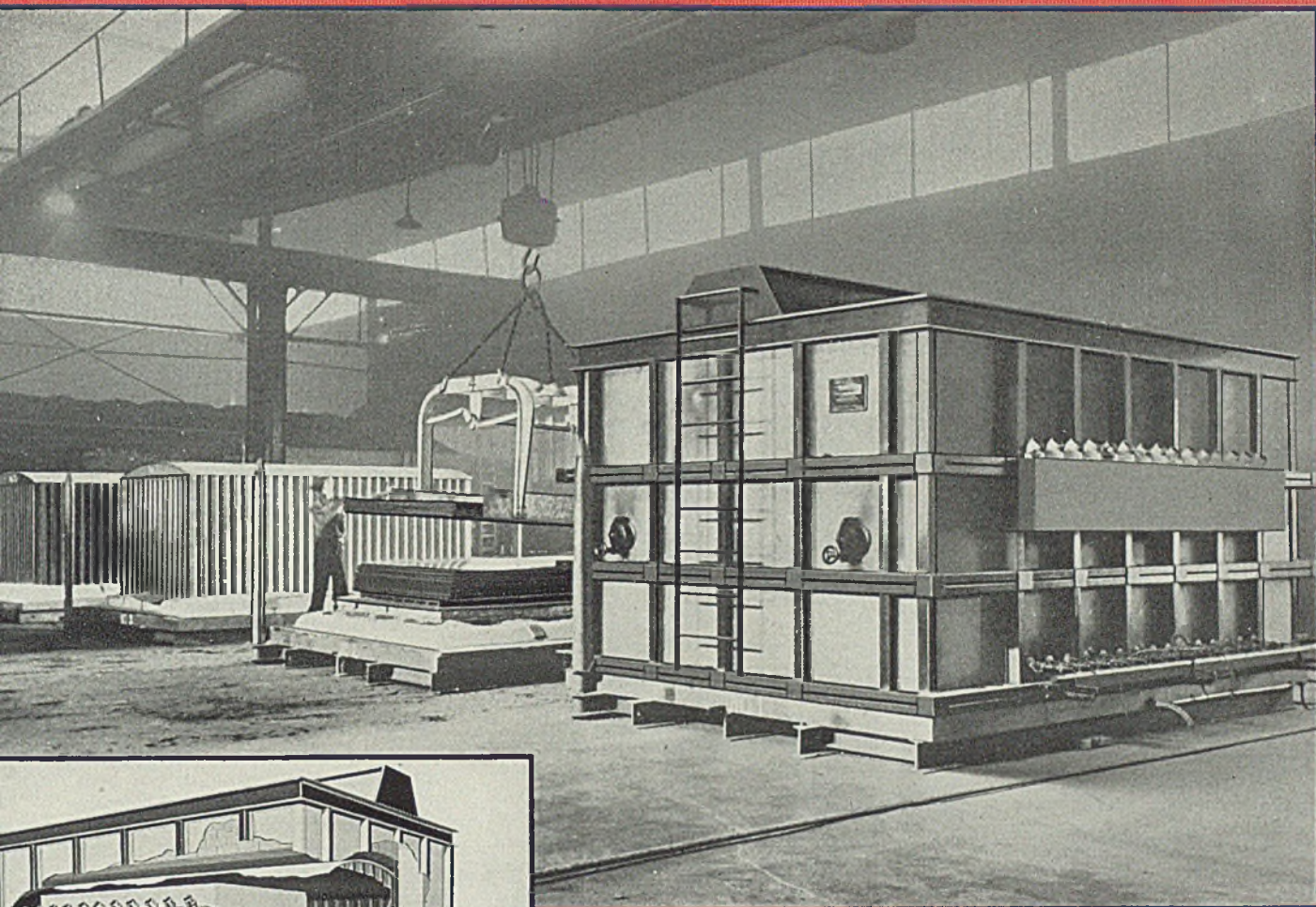
Three Types of Fuel Oil Heaters Produced

Steel is used extensively in three types of fuel oil heaters manufactured by the Patterson-Kelley Co., East Stroudsburg, Pa. Type "O" in the straight tube pattern with multipass design has shells, tubes and tube sheets of steel and the rear head casting is of semi-steel. The oil chamber, formed by an extension of the shell, also is of steel. Tubes of retort annealed, seamless drawn steel are used. The qualities of this type tubing make it specially suitable for the severe service of oil heating. The heaters are designed for 250 pounds oil working pressure and 150 pounds steam working pressure.

The type "D" U-tube heaters designed for heating lighter oils and where oil and steam pressures are lower than in industrial installations are fabricated from steel shells, tube sheet, tubes and semi-steel oil chambers. Working pressures up to 125 pounds are to be used in this type, especially adapted for installation below the water line of a steam boiler using the water as a heating medium.

A number of U-shaped steel tubes through which steam is caused to flow are placed inside the shell of the suction type heater designed for installation in oil storage tanks to heat the oil as it is withdrawn. The cast iron steam chamber is surrounded by a steel shell.

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Surface Treatment and Finishing



Electrodeposition Of Tungsten

MANUFACTURERS of equipment which must withstand extreme conditions of corrosion, heat and abrasion will certainly find the time required to investigate the possibilities of electrodeposited tungsten alloys well spent. The process is so new that complete data on field service trials are not available, but a brief summary of the properties of tungsten and its alloys indicates almost without a doubt that here is a finish which will fill a long felt need.

A fairly good idea can be obtained from the characteristics of tungsten alloys, which are known to metallurgists, as to just what can be expected from their electrodeposited films. Tungsten is a dense metal, having a density of 18.6-19.1 as compared to a density of 7.81 for some manganese steel or 6.92 for chromium. The self-hardening properties of tungsten tool steels are common knowledge to every user of machine tools. The high resistance of tungsten and its alloys to acid and alkali solutions is well known to chemists and metallurgists. Other characteristics of tungsten alloys have been thoroughly investigated by metallurgists and considerable data have been published or at least recorded.

Alloyed with Other Metals

The electrodeposition process has undergone considerable laboratory research and many alloys have been deposited successfully. To date, binary alloys of tungsten-nickel, tungsten-cobalt, tungsten-tantalum and tungsten-iron; ternary alloys of tungsten-nickel-cobalt, tungsten-nickel-tantalum, and tungsten-nickel-iron have been applied successfully. Polynary alloys of four and more metals have also been produced. In the tungsten-nickel group the best results have been obtained with deposits ranging from 30 to 50 per cent tungsten and 50 to 70 per cent nickel.

It is claimed that any intelligent electroplating operator with a reason-

able knowledge of chemistry can readily operate the bath. It is also claimed that the temperatures and other conditions are not at all extreme and that the bath vapors are less toxic than many of the electroplating baths now in use. The reagents required are available in the market at reasonable cost.

From the known fact that tungsten alloys harden under heat in a carbon atmosphere, it would appear that the greatest use of this finish will be on the valve seats of internal combustion engines. Since the original deposit is claimed to be adherent and ductile, the valves will be well seated before the hardening process is completed under operation. Other uses, such as protection for electrotype, photoengraving, pump liners, turbine blades, blast burner nozzles, hospital equipment, submarine parts, army ordinance and the like, will suggest themselves.

It must be borne in mind though that commercial data are meager and much pioneer work in that line remains to be done. However, in these days of keen competition and rapid advance, it is the bold pioneer that takes advantage of new processes and cashes in heavily. No figures are available with regard to production costs, which will undoubtedly be the controlling factor regulating the application of this process.

The process is completely covered by patents and procedures for its use under license are now being arranged.

Bright Zinc Plating May Be Answer to Cadmium Cost

RECENT development of cadmium-silver bearing alloys and their adoption by the automotive industry has created a critical situation among users of cadmium plate. The increased demand has more than doubled the price of cadmium, and even at the increased price electroplaters will find that the automotive industry has absorbed most of the supply.

The supply is limited by the fact that cadmium occurs in nature with zinc and is a by-product of that industry. Zinc producers, naturally,

cannot see their way clear to building up large stocks of zinc to supply the increased demand for cadmium. Even if improving business conditions increase the production of zinc, it is highly doubtful that enough cadmium can be produced to bring the price down to its former level. The problem of finding a substitute for cadmium now confronts some electroplaters and, naturally, their first thought is zinc.

Cadmium Retains Luster

Chemically, zinc and cadmium are similar, and there is little, if any, difference between them with respect to relative merits from the standpoint of corrosion resistance. Cadmium has been winning out because of its lustrous finish and because it does not darken as rapidly as zinc.

Recently a new bright zinc plating process has been announced and users of cadmium are well advised to investigate the process and judge for themselves the results which can be obtained. No definite data are available as yet.

Since zinc, at present, costs about one tenth as much as cadmium, this process should be of particular importance at the moment, providing the plate will remain bright for a reasonable length of time. Other alternatives are open, but they cannot compete with a bright zinc plate which will have the same appearance as cadmium, initially at least.

Cleaning Paint Equipment With Alkali Solutions

EVERY user of painting equipment is confronted with the problem of cleaning out mixing tanks and feed lines, when changing colors and when solidified material threatens to cause trouble. Cleaning practice varies with many shops and different procedures will be found in each. The general practice is to use inexpensive solvents, which are recovered and used in low-cost finishes which are dark in color, or placed in a settling tank which has a draw-off just above the sludge level. The top layer is drawn off and used for cleaning purposes again or in finishes

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as mentioned above. This practice is, however, expensive and the use of dirty solvents in a finish only makes that finish poorer.

Economy urges the use of alkali solutions wherever possible since they will thoroughly clean the equipment and the solutions can be thrown away after they have been used. This eliminates the use of extra storage tanks and special handling required for solvents, and the low cost of alkalis as compared to solvents represents a saving.

The alkali cleaners vary in composition from straight caustic to mixtures of caustic and soda-ash. A little experimenting will determine what strength of solution works best for any specific job. The solutions can be used cold or heated by steam jacket or live steam depending on the rate of action desired.

Use of an alkali cleaner should be followed immediately by a thorough

rinse with fresh water and, if desired, with a thinner containing a high percentage of alcohol, to dry out the lines. A thinner used in this manner would not be contaminated with old paint or lacquer and could be used over again or in some finish. Of course, mechanical means should be used to chip heavy coatings of paint out of the containers before using any type of cleaning solution.

The use of caustic solutions for cleaning painting equipment is not widespread, no doubt due to the fear of caustic embrittlement and corrosion. While both may take place to a small extent, the equipment will not be endangered if the solutions are not left in contact longer than is necessary and the rinses are thorough. It is especially important that the equipment be dried out thoroughly if it is going to be allowed to stand idle for any length of time.

hub caps used on the 1936 model, the setup was changed slightly. Again converting a standard plating machine, the continuous conveyor was so designed that alternate hub caps as they passed through the bath would serve as the opposite poles for the electrolysis. This is done by hanging the hub caps from conveyor arms that move along the shaft on rollers. As the work enters the bath, contactors on the conveyor arms make contact with bussbars carrying the alternating current. There are two bussbars on the shaft and the contactors are so placed that every alternate arm contacts the upper bussbar and the remainder contact the lower.

The current of course is conducted from the arms to the hub cap suspended in the bath and thus, because of the alternate contact arrangement, the alternate pieces of work being treated serve as the electrodes.

This alternate contact system makes it possible to use a rubber lined tank and this, together with the closeness of the poles, serves to reduce electrical losses materially. This latter unit uses the same chemical bath as does the first one mentioned, and the same current density—35 to 50 amperes per square foot. No heat is required to maintain the operating temperature of 155 degrees Fahr., the heat generated by the electrolysis being sufficient to control this temperature.

Unpainted Parts May Be Stored

This rustproofing process has been found to coat steel with a dense but smooth layer of zinc phosphate which not only forms an excellent base for paint and prevents the spread of rust when scratches break the finish, but also is strong protection even when unpainted. Therefore rustproofed parts may be stored in unpainted condition or may be shipped unpainted to distant plants and then when convenient may be painted without any further treatment than a tack-rag wipe to remove dust.

The treated surface is so smooth that it needs no sanding in order for finishes to have the proper coverage and luster. Uniformity of coating is assured because of the high dielectric resistance of the coating. This resistance prevents additional deposit being formed on spots already coated and directs the electrolysis to those spots that have not been protected, so that a coating of uniform thickness, free from pinholes, is built up over the entire steel surface.

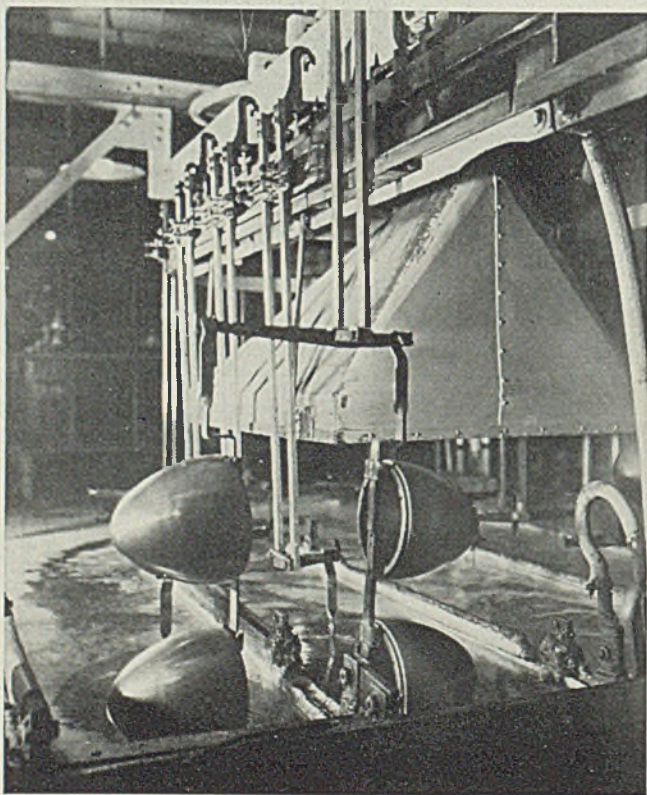
The simplicity and the foolproof character of the process, its uniformity, its low cost, and the fact that no special equipment except a special combination of transformer and switching gear known as a "granodizer" is necessary has led the developer of this process, American Chemical Paint Co., Ambler, Pa., to adapt it to meet a wide variety of rustproofing needs.

Headlamps Given Electrolytic Coating Of Zinc Phosphate for Rustproofing

RUSTPROOFING of headlamps and tail lights before final finishing is performed by a so-called electrogranodizing process at the Flat Rock, Mich., plant of Ford Motor Co. For this purpose a converted nickel plating machine is used; the sides of the plating tank serve as one electrode and

the lamps being rustproofed as the other. The electrolyte is a mixture of proprietary chemicals composed mainly of zinc phosphate. Only 4½ minutes electrolysis is used to obtain the coating.

In adopting this process at the Rouge plant, for rustproofing the large



FOUR headlamp shells enter the automatic rustproofing bath where they remain 4½ minutes in a solution of zinc phosphate and phosphoric acid at 155 degrees Fahr. The bath shown is a converted nickel plating machine

A. S. T. M. Meeting Reviews Present-Day

High-Strength Constructional Metals

THE symposium on high-strength constructional metals held at the William Penn hotel, Pittsburgh, March 4, and constituting the program for the 1936 regional meeting of the American Society for Testing Materials, attracted wide interest and ranked around the top for regional meetings so far arranged by the society.

Conducted on the mid-day of the spring group meeting of committees, March 2-6, the symposium was well attended. Registration for the week was in excess of 600, a figure which was close to an all-time record. During the week, something in the neighborhood of 150 committee meetings were held.

The program for the regional meeting included a morning session dealing with nonferrous alloys, an afternoon session on ferrous materials, and a dinner meeting. Speakers at the latter were Dr. S. M. Kintner, vice president in charge of engineering, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and B. H. Witherspoon, president, Pittsburgh Testing Laboratories, Pittsburgh, and H. S. Vassar, president of the American Society for Testing Materials.

Reviews High-Elastic Steels

Speaking at the ferrous session, E. F. Cone, editor, *Metals and Alloys*, New York, surveyed the field of carbon and low-alloy steels. Referring to the rapid expansion in low-alloy high-tensile steel, Mr. Cone said: "Like many American tendencies, this movement has developed very rapidly, so much so that the number of those so-called low-alloy high-tensile steels has reached so large and formidable a galaxy, that the prospective user may well be and probably is bewildered as to the relative merits and claims. One is prompted to state that the solution to this situation and problem will be the survival of the fittest of these steels."

The author's paper surveyed the groundwork leading up to the devel-

opment of the more modern steels; discussed the earlier steels falling into the general classification of low-alloy, high-tensile steels; and presented the various more recent steels. No attempt was made to evaluate relative merits.

Mr. Cone referred to the lack of agreement upon the definition for an alloy steel and pointed out that some classification is sorely needed. "High elastic properties being more important than high tensile, it would seem," said the speaker, "that these steels could be more appropriately designated high-elastic steels, or perhaps more properly, high yield strength steels."

Lists 16 Proprietary Types

Among the earlier high-elastic type steels, the speaker listed nickel steels, medium manganese steels, silicon structural steels, chrome-vanadium steel, Cromansil, manganese-vanadium steel, carbon-molybdenum steel, and manganese-molybdenum steel. Coming to the more recently developed high elastic steels, Mr. Cone listed the 16 types primarily promoted by steel companies, stating that they might properly be classed as proprietary steels. With three exceptions, the steels had been put on the market since the fall of 1934.

An outstanding characteristic of the numerous high-elastic steels developed by steel companies is that for the most part they may be regarded as improved copper-bearing steels. Copper in varying amounts is present in all of them, emphasizing the extent to which copper has come to be recognized as an effective alloying element, observed Mr. Cone.

In five of these so-called proprietary steels, and to a lesser degree in two others, nickel enters as an important factor. Molybdenum also comes into the picture in at least four types. In several of them, the presence of chromium is considered essential and in one vanadium is found. An interesting and significant fact, continued the speaker, is

the extent to which phosphorus as an alloy has come to be regarded. In four of the company steels, the percentage of phosphorus stipulated averages 0.10 to 0.20 per cent. The alloying possibilities of phosphorus are receiving greater attention and study as is evidenced by recent discussions in the technical literature.

In addition to their other benefits, these steels possess one advantage which has not been fully considered. By use of these steels, the range of stress within which undesirable concentrations of stress are avoided is considerably enlarged. It is well known that in the connection of members such local concentrations do occur, and that sometimes they are sufficiently great to cause plastic flow of the metal. While this flow relieves the stress in adjacent areas, there is reason to believe that it may lower the resistance of the part to fatigue at the points in question. The flow undoubtedly occurs in the vicinity of rivet holes or other discontinuities, and it is not entirely absent in welded joints.

May Raise Fatigue Limit

Since the range of elastic behavior of the steels in question is higher than that of ordinary grades, it follows that, for a given unit stress, there will be a correspondingly wider uniform distribution of stress throughout the member before local plastic flow occurs. If accompanied by reasonably good ductility, this should result in raising the fatigue limit of members of high-elastic steel—at least, this is the view of some sponsors, said Mr. Cone.

A word of caution also was offered with respect to those structures in which deformation (deflection) under load is strictly limited. Since the modulus of elasticity is approximately the same (29,000,000 pounds per square inch) for all grades of steel, it follows that, where a constant depth of member is used, there will be greater deformation under a high working stress than under

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a low one. If deformation is critical, however, its magnitude can be reduced by increasing the depth of member. Of course, it is pointed out, in many cases deformation is not a controlling factor.

In concluding, Mr. Cone stated that thus far these steels have found varied applications including railroad cars and trucks. In railroad equipment alone, future possibilities are enormous. If light-weight railroad equipment finally becomes the rule, it is evident that the steels will be extensively applied in time to ships, bridges and other construction. The supply of high-elastic steel is ample, but the cost of each one will be an important factor in the survival and consumption of the various types.

THE field of corrosion-resisting steels, limited to applications in which real design is required to supply sufficient strength, was discussed in a comprehensive paper by E. E. Thum, editor of *Metal Progress*, Cleveland. These materials included the straight chromium and chromium-molybdenum steels high chromium iron alloys, chromium-nickel steels, and clad steels.

In concluding his discussion of these materials, Mr. Thum asked: "What of the future?" Progress is so rapid that it is difficult to see far ahead, but in his opinion it is probable that progress will be made along several lines.

First, will be changes leading to a reduction in price, the thing which so often turns the scale against stainless steel. Lowered prices will come through better steel making methods which will utilize raw material to better advantage and convert a larger percentage of the ingot into salable form. Development charges and special mill machinery will be written off, and the number of alloys reduced and compositions standardized. Fabrication costs (a part of the total will also be lowered by easier machining, less complex heat treating and welding, more rapid finishing, and a wider understanding on the part of capable shopmen.

Uses will be better known and there will be fewer misapplications and expensive failures, continued the speaker. Better methods will be available for utilizing the combined strength and chemical stability of certain alloys, or the supporting of corrosion-resistant linings by other structures especially designed for carrying loads. Or, working in another way, there is a possibility of getting alloys suitable for many uses with lower amounts of the costly alloys nickel and chromium. In this line, one may expect interesting results in the chromium-nickel-iron-

manganese system, with or without copper.

Other alloys will of course be developed with highly specialized properties. While the universal alloy will never be found, the stainless alloys will continually become more adaptable and foolproof.

The recent discovery of the combined action of nitrogen and carbon in the high chromium-iron alloys is of first importance. It leads one to hope that the chromium-irons can be alloyed usefully with boron (a nearby chemical element in the periodic table). The result should not be a mere substitute for something we now have, but another family of alloys of unique properties, perhaps of that desired family of stainless alloys, which can be worked and fabricated in the soft state, and then hardened and strengthened as a whole structure either by mere age or by a mild heating. The metallurgical theory for this process of precipitations hardening is well known and applied to many other alloys, some of them of excessive hardness and strength. By this means, asserted Mr. Thum, will eventually be found the alloys for high pressure containers (and bolts) to operate at temperatures upwards of 1500 degrees Fahr.

Indeed, one such high chromium

alloy has been known for a long time but we have not brought it under control. F. B. Foley recently published data on an old valve steel alloy containing about 10.5 per cent chromium, 0.50 per cent carbon and 1.5 per cent each of nickel and aluminum. Apparently, the nickel and aluminum form an intermetallic compound which is fairly soluble in the austenite at 1600 degrees Fahr. and can be kept in solution by air cooling. Reheating later at 1000 degrees precipitates a cloud of the NiAl particles through the metallic crystals and the alloy achieves a strength of 180,000 pounds per square inch with 20 per cent elongation.

Higher Strength Cold Worked

Another thing we would like, and probably will get, according to Mr. Thum, is an 18-8 or equivalent austenitic alloy which will have a very high elastic limit, and proof stress when severely cold worked for high ultimate strength. This will be hailed by chemical engineers, constantly on the search for metals with which to build process equipment for high temperature, high pressure reactions that have been proved in the laboratory stage, or for installations in other places where the contamina-

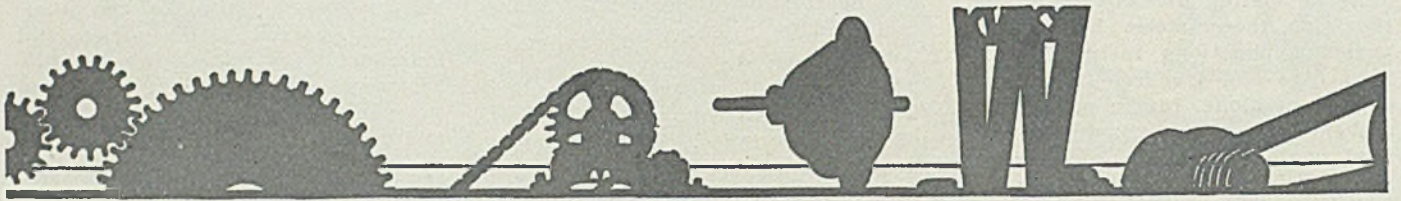
(Please turn to Page 75)

Less Truck, More Bread



BAKERY products are delivered hot from ovens to the 25 stores of Hanscom Baking Corp., New York, in this light-weight, stainless steel, insulated truck designed and built by Edward G. Budd Mfg. Co., Philadelphia. The truck, first of a fleet, has a body in which both structural framing and sheathing are of stainless steel. Capacity is 280 pans of bakery products, a load of approximately 5 tons. Exterior is stainless steel with attractive contrast obtained by painting some of the furrows of the corrugated steel green to match the cab. The lettering is of formed letters of stainless steel applied against the corrugated surface and outlined in green. Truck and chassis were built by the Autocar Co., Ardmore, Pa.

Power Drives



Save Ears and Dollars

INDUSTRIAL plants are not expected to be silent when in operation. However, much of the noise is not only preventable but, since it results from excessive wear, grinding, or slipping, its prevention has a dollars and cents value in addition to providing less distracting surround-

ings. Some safety engineers believe that shrill and screeching noises are an accident hazard, especially to certain types of individuals. Such noises, to say the least, are unpleasant and, it is commonly agreed, often exhaust the nerves of the workmen and result in lowered efficiency and poorer work.

Two types of such noises are not

only unnecessary but easily and profitably preventable. These are the screech of a slipping belt and noisy gearing.

Any belt which slips enough to screech will overheat and char or burn the life out of the belt fibers. Its scream is a plea to the belt man to save it from further injury. If tightening the belt is not sufficient a larger or more flexible belt, or one with a special gripping surface, should be installed. Perhaps the belt is too stiff to grip well on the small diameter pulley; or possibly the use of special surface pulleys may be needed.

Grinding and screeching gears are usually indicative of excessive wear. And the greater the wear the more noisy they become until finally a tooth fails or the excessive backlash interferes with the quality of production.

The use of the so-called silent or noiseless gears, most of which are nonmetallic, not only reduces the noise but also the wear, especially on larger and more expensive gears. Even though the nonmetallic pinion should wear more rapidly than the metal unit it replaces (this is not necessarily true in most properly designed and fitted installations) it is saving the large gear and so establishing its worth.

◆ ◆ ◆

Most bearing trouble is caused by the lubricant not reaching the bearing surface, due to improper application or the wrong type of oil, rather than poor oil.

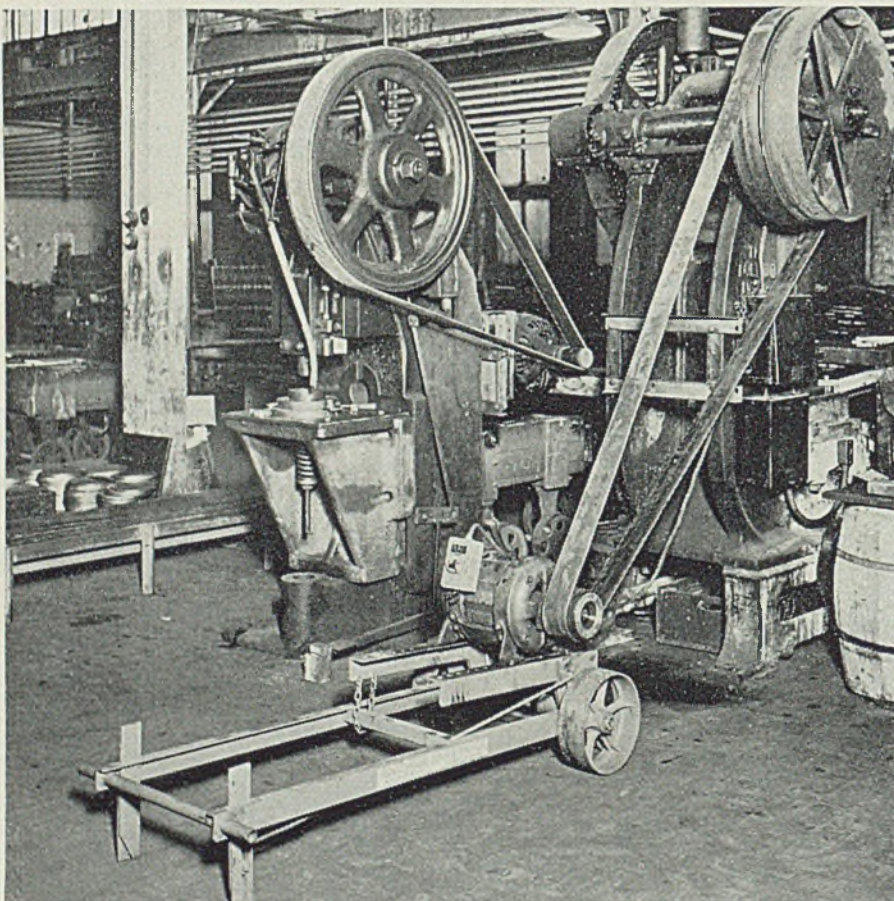
◆ ◆ ◆

Make the power dollar yield 100 cents in production. In many plants the power dollar has been deflated, but initiative can put it back to full value.

◆ ◆ ◆

The reduction of a small fraction of a horsepower per bearing by using the proper lubricant may not only affect the power consumption but in large installations may even permit use of a smaller motor. Remember, every machine has bearings in addition to those on the lineshaft and motor.

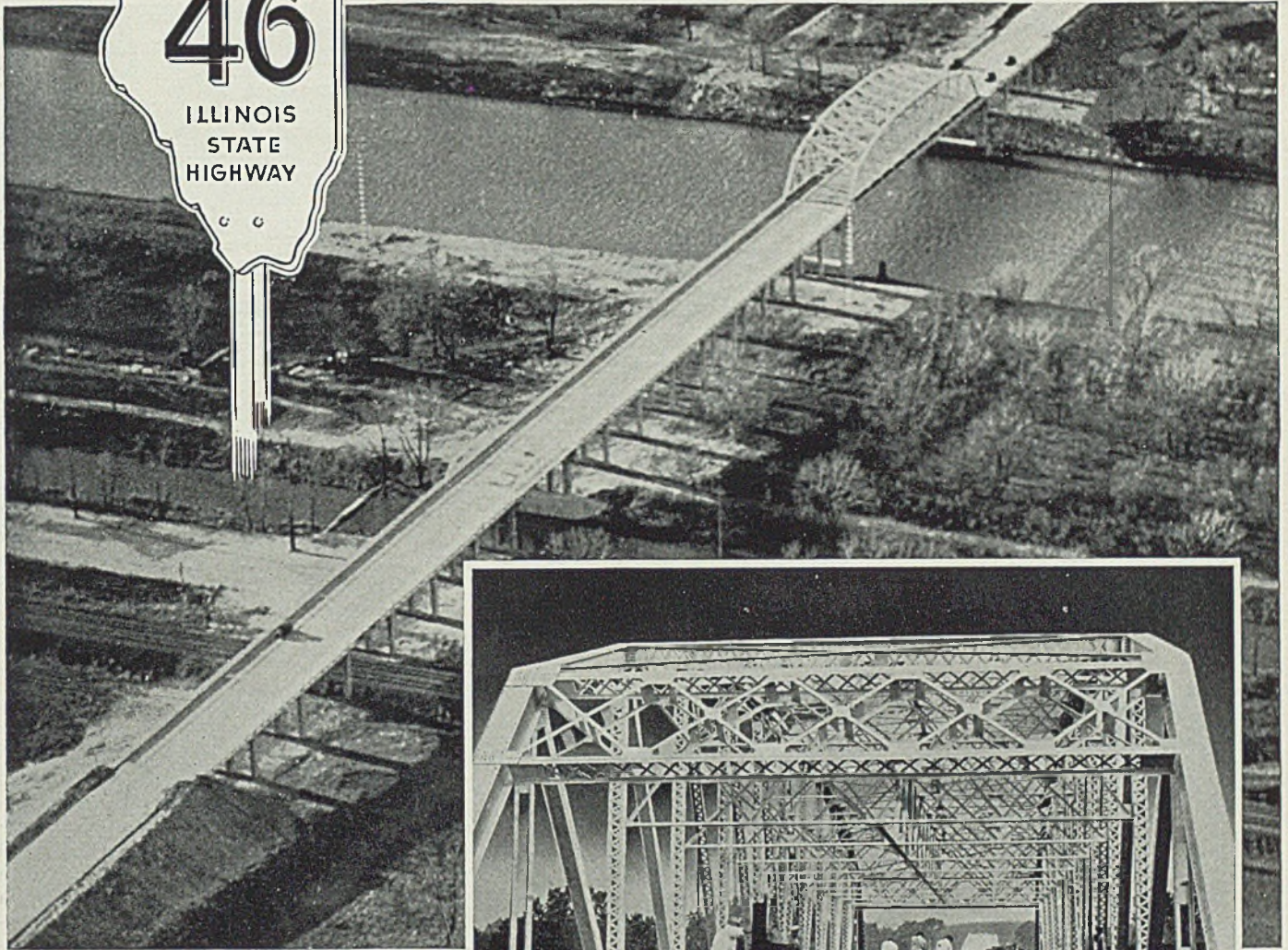
Portable Power Truck



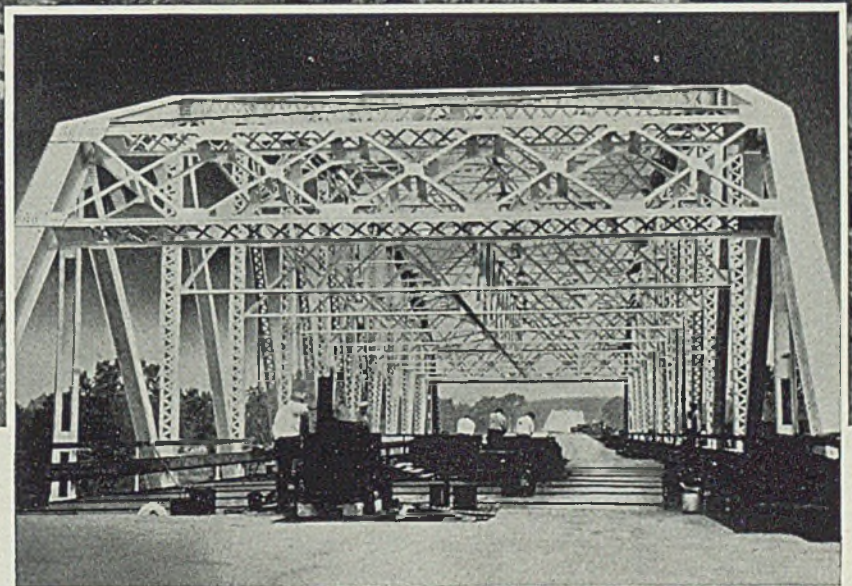
ESPECIALLY designed for temporary service, such as replacing a drive being repaired or powering separately a machine usually group-driven, this drive truck carries a motor mounted on a special base which is pivoted on the truck axle. For operating, the truck is wheeled into position, the belt placed on the pulley and tightened by pulling down the handle which also sets a stop in the floor to hold the drive in position. Practically any motor up to 10 horsepower, or a small gasoline engine, can be used on the pivoted base, which automatically maintains belt tension. The truck and base are manufactured by the Rockwood Mfg. Co., Indianapolis



Spans Canal and Railroad



(Above)—Mannheim Road Viaduct built for the State of Illinois, Department of Public Works and Buildings, Division of Highways—Ernest Lieberman, Chief Highway Engineer.



(Above)—The 262 foot through truss span over the Canal has a roadway of asphalt plank supported on a welded steel plate deck; the beam spans have a concrete slab roadway.

A 262 foot truss and 19 deck beam spans carry the 44 foot roadway and 5 foot sidewalk of Route 46 across the Sanitary District Canal and over the Alton Railroad at Justice, Ill. This structure, approximately 1200 feet in length, is typical of others projected by the Illinois Division of

Highways in an extensive program of highway improvements throughout the State.

All structural steelwork for this bridge was fabricated by American Bridge Company from rolled steel structural shapes supplied by the Carnegie-Illinois Steel Corporation.

AMERICAN BRIDGE COMPANY, Pittsburgh, Pa.; CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh, Pa., Chicago, Ill.; TENNESSEE COAL, IRON & RAILROAD COMPANY, Birmingham, Ala.

Pacific Coast Distributors: Columbia Steel Co., San Francisco
Export Distributors: United States Steel Products Co., New York City



UNITED STATES STEEL

Methods and Materials



Need Quality Sheet for Air Conditioning Ducts

Much study has been given to the causes of an avoidance of corrosion of equipment for air conditioning, but little study has been given to the causes of and remedies for corrosion of the sheet metal air ducts. However, the life of ducts made from galvanized ferrous sheets is known to be affected by the following factors:

1. Moisture, originally present in the air as water vapor or as moisture

held in mechanical suspension, deposits out on the sheet as a result of temperature changes. It must be borne in mind that this condition obtains on both the interior and the exterior of ducts. A very cold air duct passing through a warm room will sweat on the exterior.

2. Moisture deposits out in certain critical areas of the ducts as a result of the circuitous, angular path oftentimes so necessary in duct installation—air flow obstructions cause deposition mechanically and physicochemically.

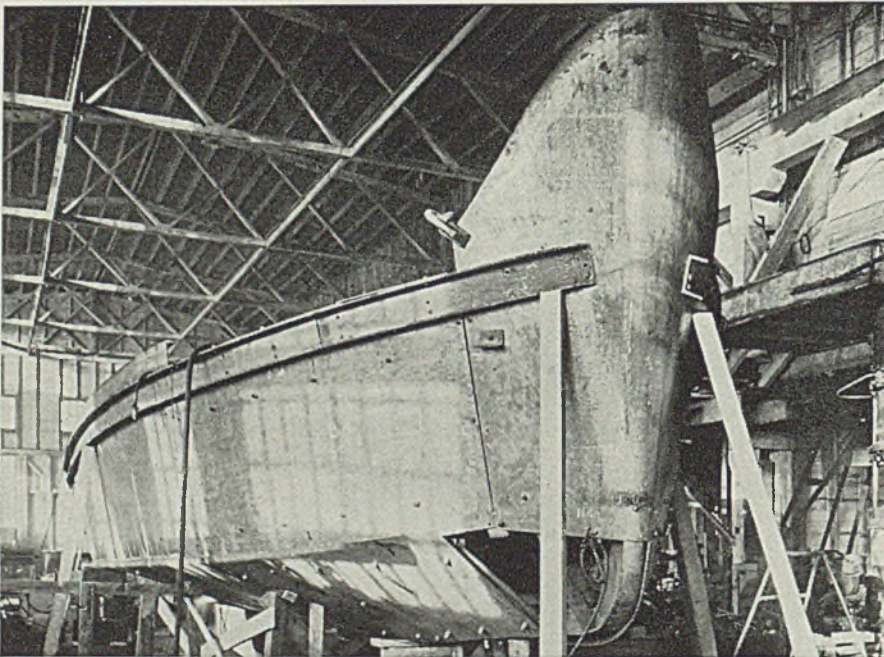
3. Moisture deposits out on the

sheet as a result of dust particles or hygroscopic products of corrosion.

4. Improperly or insufficiently filtered and washed air contaminates the moisture with sulphurous acid, sulphuric acid and hydrogen sulphide.

To meet these conditions, a high-quality, corrosion-resistant ferrous sheet, galvanized, is desirable because it affords highest degree of resistance to all the foregoing factors, thus assuring longest service performance; and because it will save much replacement, especially when ducts are built-in or otherwise accessible. This is especially true even though best operating control of treated water and air is assured.

"Mosquito" Tug Boat



THIS tug boat for shallow water work is of new design, entirely of steel, electrically welded. It is only 40 feet long by 13½ feet beam and draws 3½ feet of water. The first boat of this design was completed recently by the Commercial Iron Works, Portland, Oreg., for the Crown-Willamette Paper Co. It weighs but 35 tons, complete with superstructure and 100-horsepower diesel engine power plant. A peculiarity of the design is what is known as the "tunnel." From about the middle back to the stern, it is not on a flat keel but is tunneled out—in other words the bottom is concave. The propeller, rudder and monkey rudder operate in this cavity, enabling the tug to operate in shallower water. Furthermore, the design eliminates complicated hull curves, so that the craft resembles the ordinary flat-bottomed boat. Bottom and sides are fabricated from large pieces of sheet steel, ¼-inch thick for the most part, the bow and first strake being ½-inch. All were welded to an angle iron framework

Camshafts Are Hardened By Electrical Resistance

A process for hardening cam surfaces of cast iron camshafts, according to a recent patent, involves rapid heating electrically, and cooling in air, water or oil. Heating is through resistance, the cam being placed between two electrodes. Speed of operation is one of the features, it being stated that a camshaft with 10 cams can be treated in 30 seconds. Hardness can be controlled by adjustment of rates of heating, final temperature, and rate of cooling.

Chrome-Molybdenum Steel Cuts Gearmaking Cost

A maker of gears has found S.A.E. 4150 chrome-molybdenum steel to be particularly advantageous for the manufacture of a spur gear of the following finished specifications: Diameter, 9 inches; face, 1½ inches; web, ¾-inch; number of teeth, 52; and tooth hardness, 75-80 scleroscope. These gears are forged from annealed bars.

Several economies are effected in fabrication and heat treatment. The gears are cut, heat treated, machined, and put in service. One complete operation—grinding—is eliminated, and machining costs are lower.

As far as grinding is concerned,

WHEN THEY POINT WITH PRIDE TO THIS YEAR'S

*Streamlined
curves*



... They're merely showing what can be done with the finer, better sheet steels now available.

Complicated stampings and deep drawings, impossible five years ago, are being successfully and economically produced today, largely because of recent advances in the metallurgy and heat treatment of steels.

In this development of sheets and strip of superior forming qualities, greater weldability, and finer finish, our engineers have played an important part. Working with designers in every field of industry, they have developed and produced steels best adapted for all difficult fabricating purposes.

To the automotive manufacturer, and to other users of high-grade sheets and strip, we offer new strength—utility—beauty of finish—a higher sales appeal—and lower production cost in American Cold Rolled Sheets and Strip.

We would be glad to talk business with you.

AMERICAN SHEET & TIN PLATE COMPANY
Pittsburgh
AMERICAN STEEL & WIRE COMPANY
Chicago and New York
Pacific Coast Distributors: Columbia Steel Company,
San Francisco
Export Distributors: United States Steel Products Co.,
New York

AMERICAN
Steel Sheets & Strip



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warpage from heat treating is said to be so negligible that the gears can be simply lapped after assembly. This is particularly remarkable when the difference in section between the web and face is considered. Such abrupt changes in section are likely to cause warpage or distortion in steels that do not respond to heat treatment as readily as molybdenum steels. Quiet operation and even tooth wear cannot be assured unless such gears are ground. It was not possible to eliminate grinding in the case of the steel which was used formerly.

\$ \$ \$

To Improve Machining of Alloy Iron Brake Drums

A company manufacturing alloy cast iron automobile brake drums containing 3.50 per cent nickel and 0.60 per cent chromium experienced difficulty in machining some of the drums. Most of the castings giving trouble had been removed from the mold while cooling, indicating that air hardening had taken place.

An iron of this composition should not be disturbed in the mold until it is below a red heat, to avoid danger of air hardening at exposed points. It is known, of course, that an iron with a high alloy content will necessarily have to be machined at a somewhat slower speed than a plain gray cast iron.

In addition to the foregoing precaution, it is also good practice with a brake drum iron, which is to be heated subsequently by the braking action, to give it a stress relief anneal before machining by heating the castings slowly to a temperature of 1000 degrees Fahr. This anneal will remove casting strains without softening the material.

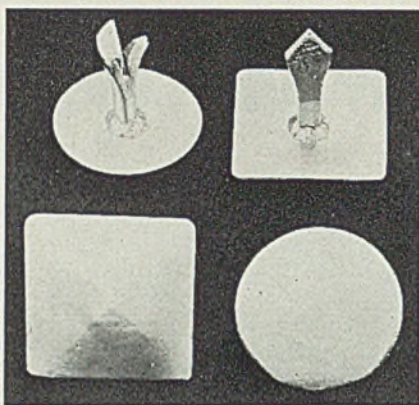
If some softening is desired, the temperature should be raised to 1200 degrees Fahr., but this temperature should be applied carefully and not be exceeded as it will result in a weakening of the iron.

\$ \$ \$

Develops Procedure for Coloring of Aluminum

Aluminum surfaces in various colors may be obtained by first providing an adherent oxide coating, and then treating that coating with various inorganic compounds, according to a recent patent. The oxide coating may be obtained electrically in a 7 per cent sulphuric acid or 3 per cent chromic acid solution, or without electricity in a boiling bath containing 2 per cent sodium carbonate and 0.5 per cent potassium dichromate.

Brown color is obtained by im-



Stainless steel markers of type shown here are used at pedestrian crossings in London

mersing in potassium dichromate followed by immersion in silver nitrate. Dipping first in uranyl acetate and then in potassium ferrocyanide gives red, while yellow is obtained by dipping in cadmium acetate followed by ammonium sulphide. Numerous other colors are produced with other reagents.

\$ \$ \$

New Electric Fan Employs Blades of Molded Rubber

In this day of rapidly changing product design, metals are challenged by a wide variety of non-metallic materials. Affording an example of this competition is a household and office electric fan which has flexible blades made of tough, molded rubber. These blades, though rigid enough to deliver a steady current of air, are sufficiently soft to prevent injury. Furthermore, the need for a metal guard is eliminated.

Developed by Samson United Corp., Rochester, N. Y., this new type fan is said to be noiseless and to furnish greater air delivery than conventional-type fans of equal wattage. The manufacturer further states that the motor—of radically new design

—operates so much cooler that its life is materially increased. The motor housing is finished in brushed chromium. Several models are available with blades in color—walnut brown, pastel green and ivory.

\$ \$ \$

London Adopts Stainless Steel Highway Markers

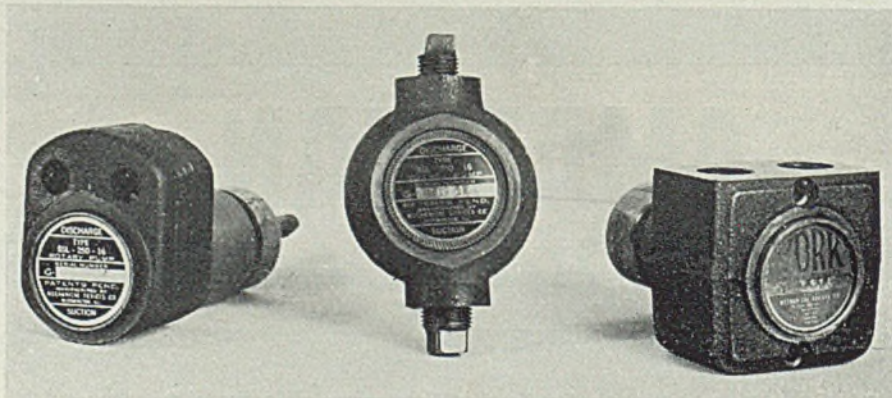
Road markers of stainless steel are being installed at some 10,000 pedestrian crossings in London. The English apparently have devoted considerable thought to the selection of a satisfactory material for traffic markers; and now a recent ordinance has made the use of stainless steel markers for new crossings mandatory in certain sections of the city. These markers are of the type shown in an accompanying illustration.

Widespread acceptance of stainless steel in England points to the possibility of utilizing this material for markers in the United States. Good service is afforded by markers made from stainless. Whether forged, cast, or pressed, this material offers definite advantages. The studs remain clean and bright under all conditions of weather and traffic and are easily visible. In addition, they are extremely hard and tough and will not break, distort or lose their finish under the severest conditions.

\$ \$ \$

Develops Suction Pumps For Burner Manufacturers

Three new suction pumps, for use by oil burner manufacturers, have been developed by the Mechanical Devices Co., Bloomington, Ill. Shown in the illustration below, their capacity ranges from about 15 to 60 gallons per hour, running at a speed of 1750 revolutions per minute. They are capable of creating a 24-inch vacuum on the suction side and of maintaining a pressure of 150



Suction pumps for oil burners have capacities for pumping 15 to 60 gallons per hour, running at speed of 1750 revolutions per minute

You can't beat these bars for "machinability"



AMERCUT Cold Finished Steel Bars are free from the roll scale that causes excessive machine wear and dulls a tool quickly. They are unsurpassed in machinability and cutting speeds. Available in any type or grade of bar you need—in the exact analysis and finish you require. An endless variety of parts are made from Amercut Cold Finished Bars in carbon steels and alloys. Complete stocks enable us to give you prompt service. Don't hesitate to call on us for technical assistance at any time.



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AMERCUT COLD FINISHED STEEL BARS



UNITED STATES STEEL

pounds per square inch on the discharge. The pumps employ a single face bearing on the rotor, thus permitting automatic takeup for lateral wear and insuring a maintenance of the vacuum qualities. The pumps are fitted with any surface finish to the specification of the purchaser, and with the purchaser's name plate.

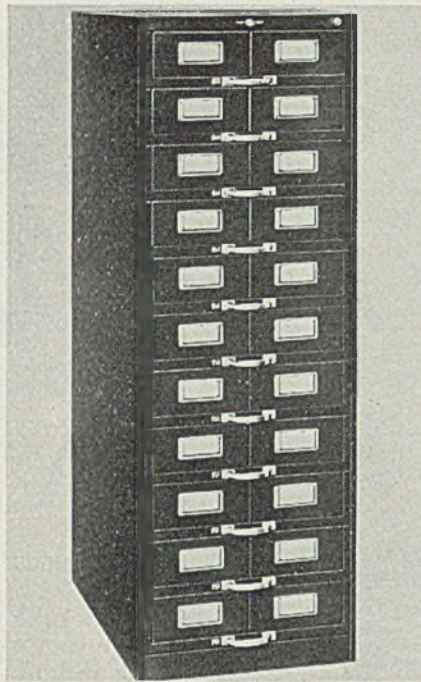
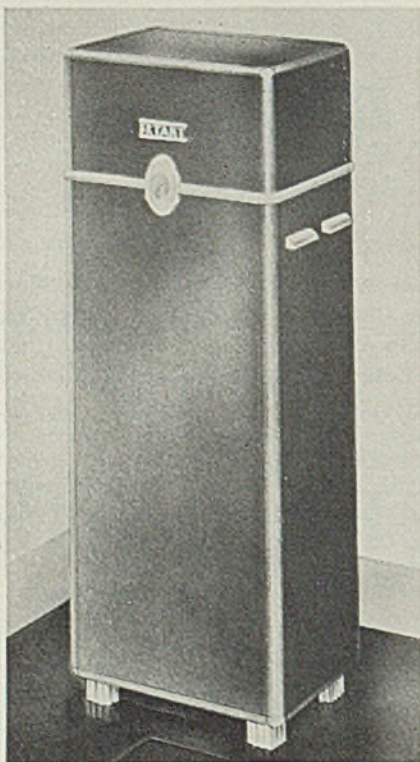
\$ \$ \$

Redesigns Gas Furnace, Sales Slip Register

Long a familiar sight in practically every type of business, the autographic sales slip register has been redesigned and simplified by Walter Dorwin Teague for the American Sales Book Co. Ltd., Elmira and Niagara Falls, N. Y. Finish is in black lacquer and chrome with a handle of Bakelite.

A gas furnace manufactured by the Bryant Heater Co. also has been redesigned by Walter Dorwin Teague. All the working parts, valves, etc., which are inside the main housing, are reached for repairs, and cleaning through two easily removable panels. The housing is of sheet steel construction employing the standard panels, corners and "snap on" molding. The molding, handles, dial trim and fluted corners of the cast-iron base are chrome plated. The exterior has a dark blue "crackle" lacquer finish which is baked on and does not show dust or grease.

Accompanying illustrations of these two products show the striking effects obtainable by application of



Card filing cabinet employs ladder-type construction at front

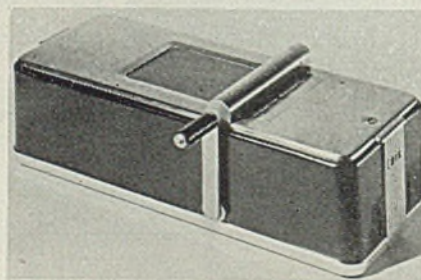
modern industrial design principles to articles in every-day use.

\$ \$ \$

Cabinet Provides Large Space for Filing Cards

Tabulating cards can be stored conveniently in a new steel filing cabinet being manufactured by Yawman & Erbe Mfg. Co., Rochester, N. Y. Though its small outside dimensions of 19 $\frac{7}{8}$ inches wide, 57 $\frac{1}{2}$ inches high and 28 inches deep take a comparatively small space, the filing length is 48 feet 2 inches.

Ladder type construction in the front of the file consists of a concealed cross member between each drawer shelf and insures adequate strength to support the weight of a capacity load. The cabinet has 11 sliding shelves mounted on ball bearing cradle type progressive slides. Each shelf is equipped with two removable trays, so constructed that each tray forms a drawer head



Striking effects obtained by redesigning in steel are shown by sales slip register (above) and gas-fired heater (left)

when returned to the sliding shelf. A collapsible ball handle at the front of the tray and a large hand hole at the back makes removal and carrying easy. The units are finished in olive green, mahogany or walnut.

\$ \$ \$

Solution Makes Magnesium Castings Corrosion Proof

Protection of magnesium alloy castings against corrosion can be accomplished by a 45-minute immersion in a bath containing 0.75 per cent by weight potassium dichromate; 0.65 per cent by weight ammonium dichromate; 3.00 per cent by weight ammonium sulphate; and 0.33 per cent by volume ammonia (specific gravity 0.880). The bath is used at the boiling point and is said to give as good protection as one requiring 6-hour immersion in a bath containing 1.5 per cent potassium dichromate; 1.0 per cent potassium alum and 0.5 per cent caustic soda.

\$ \$ \$

Streamline Service Stations Of All-Metal Construction

Fifteen modern service stations of streamline design, with rounded corners and completely enclosed by horizontal bands of plate glass, are to be built by the Standard Oil Co. of Ohio this spring.

Except for narrow red, white and blue porcelain enamel bands encircling the base and roof levels, they will have glass from top to bottom, with porcelain enamel sash to emphasize the horizontal sweep and curve of the panes.

All exterior portions of the new stations will be suspended from structural steel supports inside the buildings, much as a tent canvas is held up by the poles. No bare metal surfaces will be visible, although the stations are of all-metal construction. Outside illumination will be provided from concealed light troughs above the continuous bands of glass.

Fabrication of materials for the initial group of stations has already been started by the Austin Co., Cleveland.

\$ \$ \$

Floor Grating Now Made in Reversible Design

Open steel floor grating produced by Walter Bates Co. Inc., Chicago, now is made completely reversible, either side giving the same appearance, strength and traction. This reduces installation costs and insures safe traction in event of the grating being installed upside down.

In this grating, the cross bars, be-

sides acting as spacers, carry part of the load and increase the stiffness of the section. Side bands of the grating are now welded on as the material leaves the assembly press, instead of after the grates are cut to length. Use of automatic feeds in the cross bar department of the Bates company has materially speeded up production.

What Corrosion Is and How It Can Be Opposed

Corrosion, Causes and Prevention, by Frank N. Speller; second edition; cloth, 687 pages 6 x 9 inches, 141 illustrations; published by McGraw-Hill Book Co. Inc., New York; supplied by STEEL, Cleveland, for \$7, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

So much of value has been developed on the subject of metal corrosion and its prevention since the first edition was published in 1926 that the present edition carries the subject much further. The form of treatment and classification of factors in the first edition is followed in the present volume and the two can be used in conjunction for reference on certain subjects.

The subject is divided into two sections, the theory of corrosion, and specific methods for application of preventive measures. It presents summaries of the investigations of every important research in the field of corrosion; discussion as to whether modern methods of manufacturing affect the durability of iron and steel products; facts on the effect of composition on the durability of iron and steel; descriptions of the corroding action of agencies from 40 media external to the metal itself; outline of accurate methods of corrosion testing.

The book deals particularly with the ferrous metals but in scope and treatment it is planned to help engineers in all fields in combating erosion.

Issues Series of Manuals On Metal Cutting Saws

Four manuals dealing with the selection and care of metal cutting saws have been prepared by Henry Disston & Sons Inc., Philadelphia. These manuals, complete with illustrations, tables giving recommendations for saw use, and instructions for sharpening, should prove of value to metalworking plants. They are printed on 5 x 7 $\frac{1}{4}$ -inch page size and are perforated for ring binders.

Titles of the manuals are as follows: "Inserted-Tooth Metal Cutting Saws," 12 pages; "Metal-Cutting Hand Saws," 6 pages; "Solid-Tooth Circular Metal Cutting Saws," 8 pages; and "Hack Saw Blades," 4 pages. Copies are available upon request to the company.

Welding, etc. . . .



by Robert E. Kinkead

Moore on Fatigue

AMONG the great engineers of this generation is Prof. H. F. Moore of the University of Illinois. In delivering the thirteenth Howe Memorial Lecture to the A.I.M.M.E. recently, he surveyed the present knowledge on the correlation between metallography and mechanical testing. Until recently, mechanical testing and metallography appeared to be parallel paths. Prof. Moore, with his lifetime of research in the field of fatigue of metals and his profound intellectual grasp of the problems leading to correlation between mechanical testing and metallography, sees these paths beginning to converge.

Service life is a measure of value more absolute than may be expressed in any other single term. An automobile crankshaft which lasts six years is worth twice as much as one which lasts only three years. If we could predict service life from metallographic inspection alone or in combination with other known methods, it would save waiting six years to get the answer.

Knowledge about the service life of welds is sketchy and inaccurate in many cases. And in the exact degree that such knowledge is sketchy and inaccurate, the value is a matter of guess. No one is more competent to lead the way out than Prof. Moore.

* * *

Travel in Herds

IT HAS been said that a Chinese family could live comfortably on the food an American family wastes. It is often true also that many small competitors earn a profit by saving where large competitors waste human effort.

Nowhere is wasted human effort more striking among large companies than in the custom of having three to six men call on a customer in connection with business matters. It is customary to have the vice president in charge of sales, the local sales representative, a factory production

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.

man and one or two experts of various kinds call on a customer.

One gets the impression that these boys are afraid to come alone; that they herd together to buck up their courage. It does not impress the host with his own importance; it merely embarrasses him to have to try to be polite to a small army of people who are all trying to flatter him.

* * *

First Things First

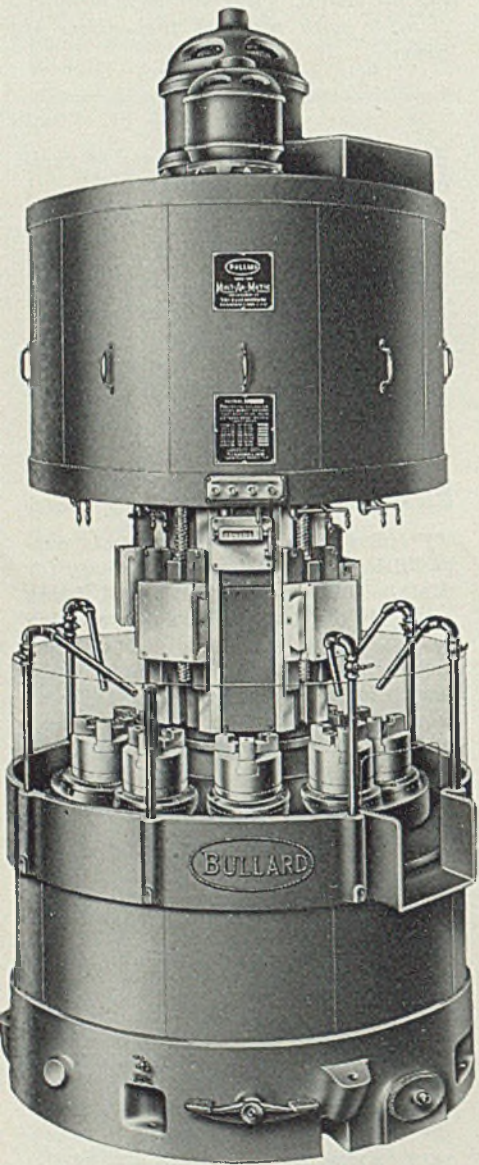
THE *Book of Stainless Steels* published by the American Society for Metals has the distinction of being probably the first book on alloys which deals adequately with methods of welding for fabrication of the metals. Welding information on the multitude of new alloys being offered for various uses is necessary for fabrication. In many cases, behavior of the alloy with a given welding process may be predicted accurately. But in every case, it is simple and inexpensive for a metallurgist to have a small weld made from which he can get all the information required.

One expensive way to obtain welding information is to put out a new alloy and send it out to the fabricating shops of the country "to see if they can weld it." There is enough knowledge of metallurgy available to any metallurgist to permit him to tell the whole story about what is necessary to weld any alloy and predict the results under fixed conditions. Knowledge of welding processes is not so well documented. But if the metallurgist is given an opportunity to do his job, the information about welding processes can be obtained in one way or another.

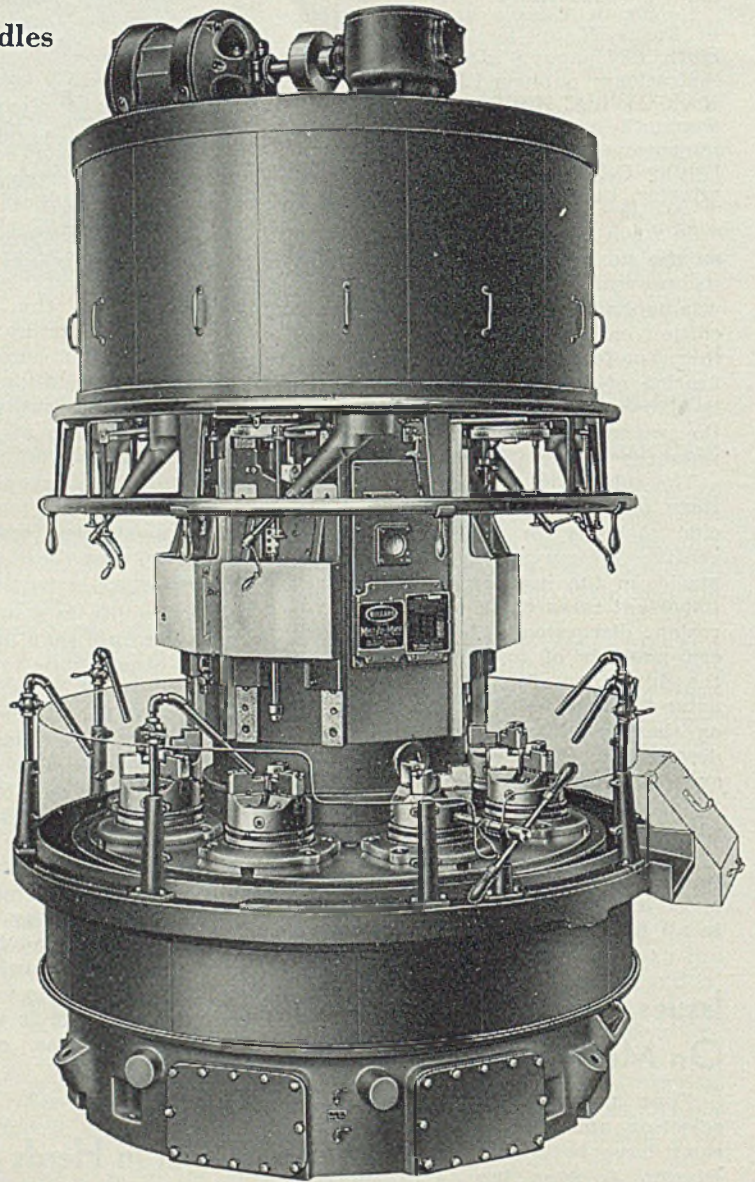
If a new alloy is to be offered for a use which requires fabrication, the first step is to find out the best way to weld it.

MULTI-AUTOMATIC
ECONOMY
On Large & Small Work

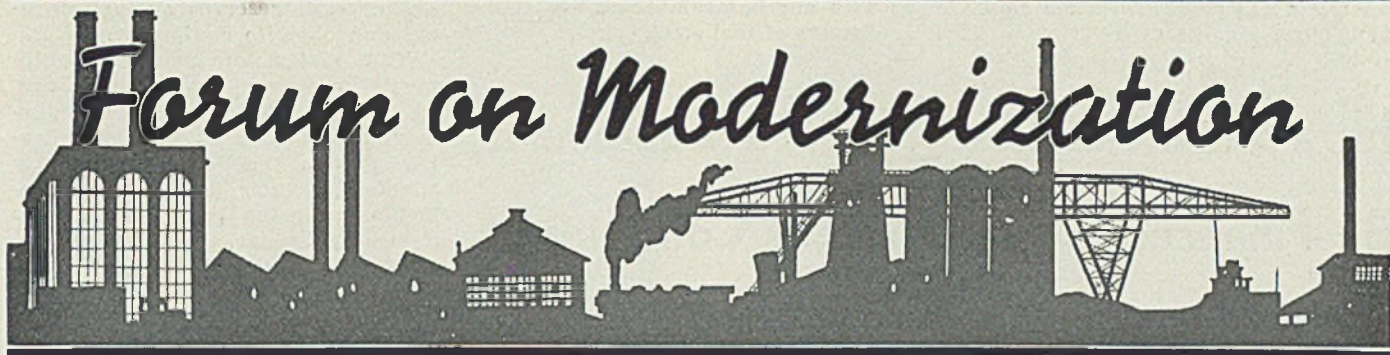
Type "D"
8" — 12" — 16" Sizes
with
6 or 8 Spindles



Type "J"
for
Small High Speed Work



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Forum on Modernization

Tool Steel Industry Is Prepared To Meet the Challenge of New Developments in Machines

BY R. EDSOM EMERY
President, Jessop Steel Co., Washington, Pa.



SALE of machine tools during 1935 was larger than at any time since 1929. The outlook for continued activity in this industry is promising, when we consider that approximately 65 per cent of the

machine tools in use in the United States are more than 10 years old.

Advancement in the development of machines and tools has kept pace with the constant demand for increased production in all lines of manufacture, the new modern tools being from 35 to 50 per cent more productive than those of 10 years ago.

Advantages of New Tools

The new machine tools are characterized by four major factors which give them their tremendous advantage over those made in previous years. These factors are: Increased speed, increased power, greater accuracy, and ease of operation. American tool steel makers have contributed much to the improved performance of these tools.

It is the edge of the cutting tool, or the point of the drill that often determines the ultimate success of

the machine. The introduction by the steel producer of new cutting mediums has made possible the increase in power and speed of the present-day machines.

The problems of the tool steel maker have become increasingly complex with the new requirements and specifications set up by the users of machines and tools. The manufacture of modern tool steels requires diligent research and the application of scientific methods of operation. Many variables enter into tool steel production: A wide range of raw materials, skilled specialists in metallurgy and chemistry, highly mechanized facilities, and a flexibility of operation are only the major necessities in the production of this "tailored-to-measure" steel.

Varieties of Steel Increased

In the earlier days of the industry, previous to the adoption of rigid standards of specifications by the tool user, steel was made in one of three general classifications: Carbon tool steel, high-speed steel, and oil-hardening steel. The user of tools made allowances for slight imperfections in surfaces due to decarburization, and was content with production records many times lower than that demanded of steels today.

Contrasting with the three general classifications of steel formerly available, there are today as many

as 25 varieties of specifications in the high-speed classifications. The purchaser of tool steel no longer buys by guess. He specifies a steel of a certain analysis and grain structure. He requires a steel that will form a tool which will guarantee trouble-free operation during a definite number of operating hours, or assuring a specific production. An order for tool steel is accompanied by specifications similar, in its requirements for accuracy, to a prescription issued to a druggist for medicines.

The introduction of the high-alloy steels, such as those containing tungsten, molybdenum, cobalt and vanadium, was the first step in producing a steel with a longer and more efficient life. The relatively recent introduction of the tungsten carbides has added further to the cutting qualities and speed of tools.

Chemistry and metallurgy have contributed an important part to the perfection of tool steels in use today. The results obtained from the combination of high alloys, controlled grain structure, and a closer control of the physical properties, from melting to the proper heat treatment of the finished steel, are only a few of the contributions of this highly skilled addition to the tool steel organization.

Continued Research Needed

The American tool steel producers have attained a record of outstanding service to the consuming industries. But, we cannot rest on these achievements. We are faced with a new era, an era of stimulated research and accelerated development to produce an unprecedented efficiency of service. Upon our ability to meet this challenge rests the continued progress of our industry. The tool steel producers must lead the way, offering new materials, making new studies of customers' problems, and obtaining a more thorough understanding of the requirements and uses to which tools are to be placed.

In this new era which we are now entering, science will be the guiding light. The work of the chemist, the metallurgist, the engineer and the physicist will assume a new signifi-

cance and a greater power. These scientists will be drawn into a closer and more significant relation with

our producing organizations, as well as with our immediate and eventual consumers of tool steel.

How Shall Purchases of New Equipment Be Financed Under Current Conditions?

BY S. D. MADDOCK

Vice President, Commercial Investment Trust Inc., New York

GENERALLY speaking, today there are three methods of financing equipment purchases: (1) From cash reserves or with short-term bank loans to be liquidated through conversion of investments into cash, (2) through preferred stock or bond issues, and (3) by installment buying.

The first method usually is pursued by plant owners who have so carefully husbanded reserves that despite unexpected changes in design, or other factors that necessitate retooling earlier than expected, the treasurer can produce within a reasonably short time the necessary cash for capital replacements. In such cases cash reserves have been maintained far in excess of normal requirements—either as bank deposits at little or no interest, or invested in short-term government bonds. In either case the earnings of such reserves have been negligible.

While such firms are prepared to purchase at any time for cash a single new tool, or finance a complete plant replacement, they are allowing funds meanwhile to remain idle that should be earning dividends if they are to serve their true function. This is an expensive policy because the capital investment in machinery and equipment must be figured at the full undepreciated cost, and the cost of capital invested must be calculated at the full expected dividend rate for all capital, or deprive stockholders of dividends that are rightfully theirs.

Borrowers Have Troubles

There is a second group whose fiscal policies may be characterized as just the reverse of the first. These plant owners depend exclusively upon borrowings through preferred stock or bond issues for their equipment purchases, and are inevitably at the mercy of the current money market when in need of fresh funds. They are bound to encounter serious handicaps during unsettled periods, and plant modernization is allowed to suffer, pending economic adjustments, to the detriment of stockholders. In addition, they must engage their full requirements at one

time even though they may need only a small portion at once and the balance progressively, because a major financing program of this character cannot be arranged piecemeal. Furthermore, when the debt falls due, they must resort to an expensive re-funding program which frequently cannot be accomplished without complete reorganization. This is often due to the heavy burden of debt charges over long periods of low production with no reduction of the principal debt, and a lack of sufficient true reserves to cover actual depreciation of capital investments.

Then there is the more modern type of capital financing that is arranged item by item as replacements are needed, and paid for out of earnings as used and depreciated, and which is commonly known as installment buying.

Installment Buying

At the moment when replacement of worn out and obsolete equipment is a matter of major concern to plant owners, it appears timely to draw attention to certain features of installment buying that have been overlooked by many firms that might profitably employ this system for financing their equipment purchases. Briefly these are:

1. Replacements, as pointed out above, may be made item by item as needed, without waiting until capital requirements have reached an amount that would justify an issue of new securities.

2. The charges made for funds are applied to the exact amount used, and not to a bulk transaction as in the case of a bond or stock issue, or a true reserve set aside in government securities, etc.

3. The funds representing the cost of the new equipment are disbursed in proportion, or nearly so, to depreciation and the debt is liquidated from earnings progressively with depreciation.

Plant owners financing their purchases of equipment on this basis are not burdened with the necessity of maintaining excess reserves in the form of cash or government bonds, or carrying debt in excess of immediate requirements. Neither are they handicapped by unfavorable

money market conditions, or shortage of cash reserves against worn-out and obsolete equipment.

This system of financing equipment purchases developed in response to a growing need of the durable goods industries for a more flexible system that could be readily adapted to their financing requirements. Impetus has been given to its use by legislation directed toward relief of industry through the provisions of the amended national housing act, and the inauguration of the FHA. It is to this modern method that plant owners are now turning for their requirements, as they come to a better understanding of the distinct advantages of the installment system of financing equipment purchases.

Develops Splint for First Aid to Broken Legs

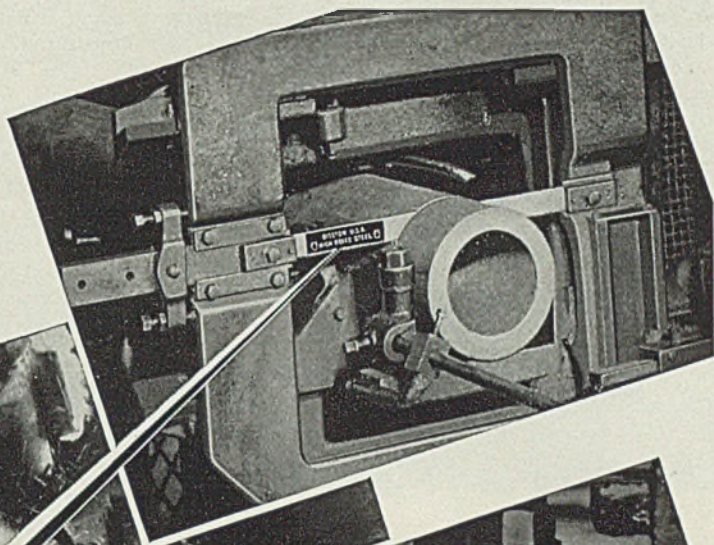
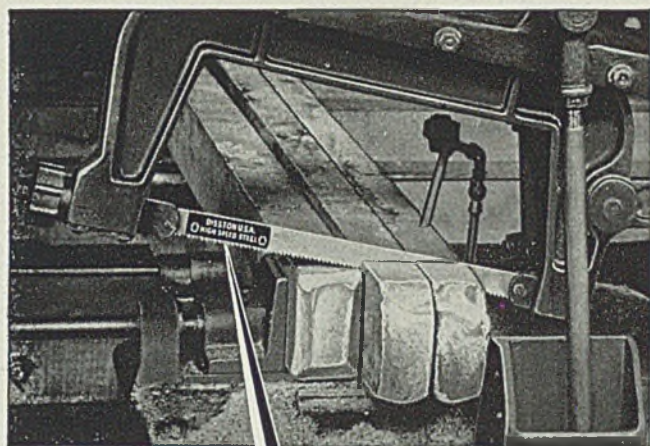
To enable industrial first-aid workers to take care of leg fracture cases easily and effectively, Davis Emergency Equipment Co. Inc., 55 Van Dam street, New York, is introducing an improved type of leg splint, known as the Greene traction splint.

Longitudinal members of the splint are made of wood, which is preferable to steel because X-rays can be taken without removing the splint. The upper end of the splint is formed by a half-ring of laminated wood, reversible for either leg, and the lower end by a cross piece of metal in which is mounted a hook which can be drawn forward by turning a wingnut.

With the half-ring lying flat, the splint can be put in position with minimum movement of the injured leg. The half-ring is fitted around the thigh, without cutting off circulation, and the leg is tied to the sides of the splint by triangular bandages at the thigh and ankles. The ankle bandage is then connected to the hook in the cross piece by a strong cord, and traction is applied to the leg by the wingnut.

Four more bandages, two above and two below the knee, are put on, and more traction is applied as needed. Finally, the splint is raised and a metal footrest is attached to the cross piece. It is said that the subject can be carried on a stretcher, in men's arms, and transported in a car without discomfort.

The splint weighs 7½ pounds and can be packed compactly in a flat case. All metal parts are of a non-rusting alloy. The splint was developed by Harold Greene, Aetna Life Insurance Co., with co-operation of Dr. Harry Archer, chief surgeon, New York fire department, and Dr. Robert H. Kennedy, American College of Surgeons.



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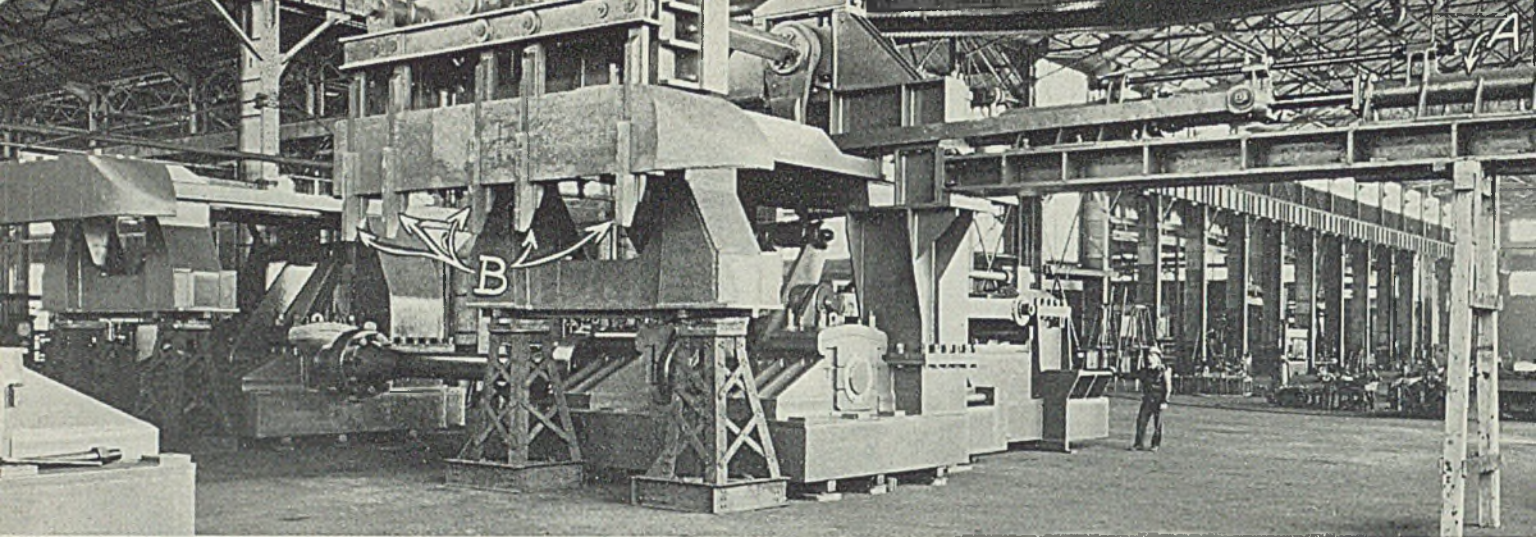
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ALL-WELDED manipulator fabricated from rolled steel plates. Cylinder A shown in an elevated position at the right, operates the tilting fingers, B, in one of the front manipulator heads

Hydraulic Manipulator of Welded Rolled Steel

BY J. D. KNOX
Associate Editor, STEEL

BLOOMING mill manipulators are subject to severe usage in guiding ingots into the various roll passes and turning them on the proper side for entering. Consequently, considerable interest centers around a recently built manipulator—one that has been fabricated from rolled steel plates by the arc welding process. This is said to be the first all-welded unit to be built in this country. Moreover, it will be actuated hydraulically.

The manipulator was fabricated by the Morgan Engineering Co., Alliance, O., for the Jones & Laughlin Steel Corp., Pittsburgh. It will serve

the new 44-inch 2-inch reversing blooming mill now being installed at the South Side works of Jones & Laughlin for the production of slabs 43½ inches wide and 3 inches thick; and also various size blooms and billets. Ingots weighing up to 25,000 pounds will be handled by the manipulator.

The unit is provided with four movable platens, with a stroke of 7 feet 6 inches, two being located on the front side of the mill and two on the rear side. Each platen supports a cast steel head which forms the sides of the roller tables in the immediate vicinity of the mill proper.

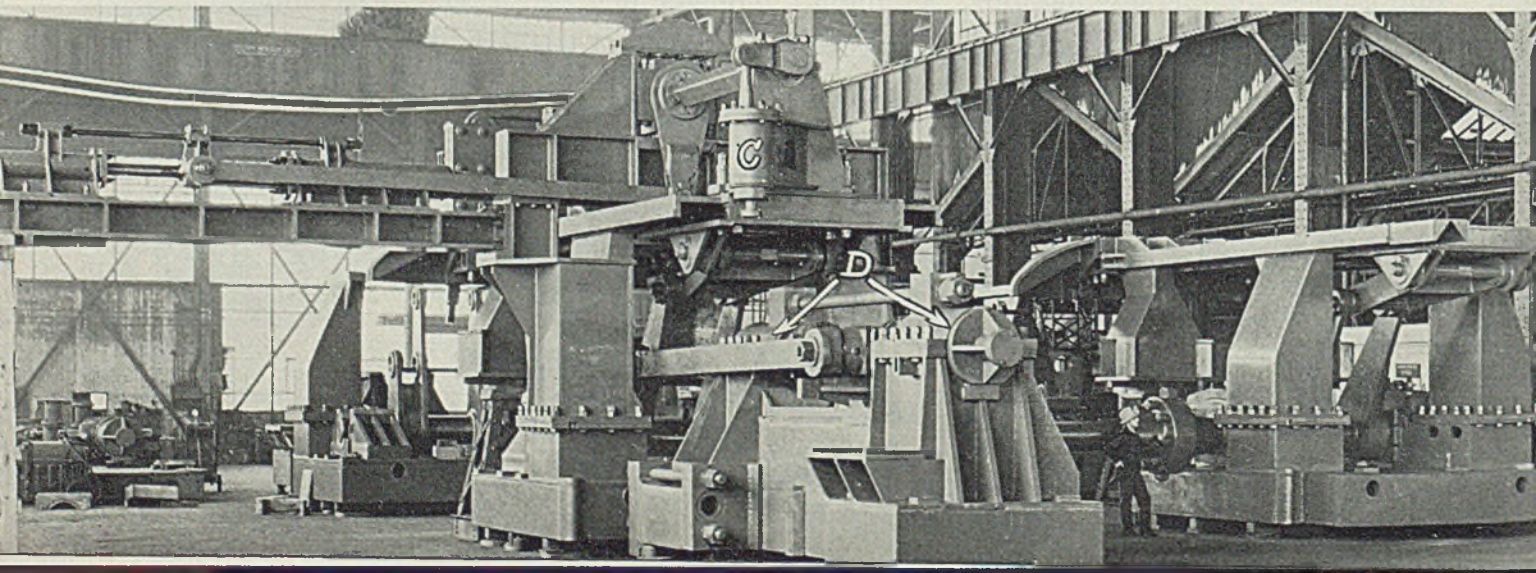
Each platen on the front side of the mill is connected through a set

of two parallel steel links and connecting rods to a double piston actuated by two hydraulic cylinders. Cylinders are designed to withstand a maximum pressure of 650 pounds per square inch. The platens and manipulator heads on the rear side of the mill are actuated by the hydraulic cylinder of their mates through a 16-inch forged steel shaft.

Five tilting fingers, each with a lift of 3 feet 6 inches, are provided on one of the front manipulator heads. These also are operated hydraulically through links, connecting rods, a square shaft and lifting arms. The square shaft bearing is spring mounted. One of the features of construction of the tilting fingers is that when they return from the elevated to the starting position there is no series of rebounds before coming to rest. This is accomplished by a dashpot which is an integral part of the lifting mechanism and serves to cushion the down stroke.

The manipulator is built of rolled

REAR of manipulator showing location of the dash pot, C, which serves to cushion the downstroke of the tilting fingers. Hydraulic cylinders designated D actuate the manipulator head



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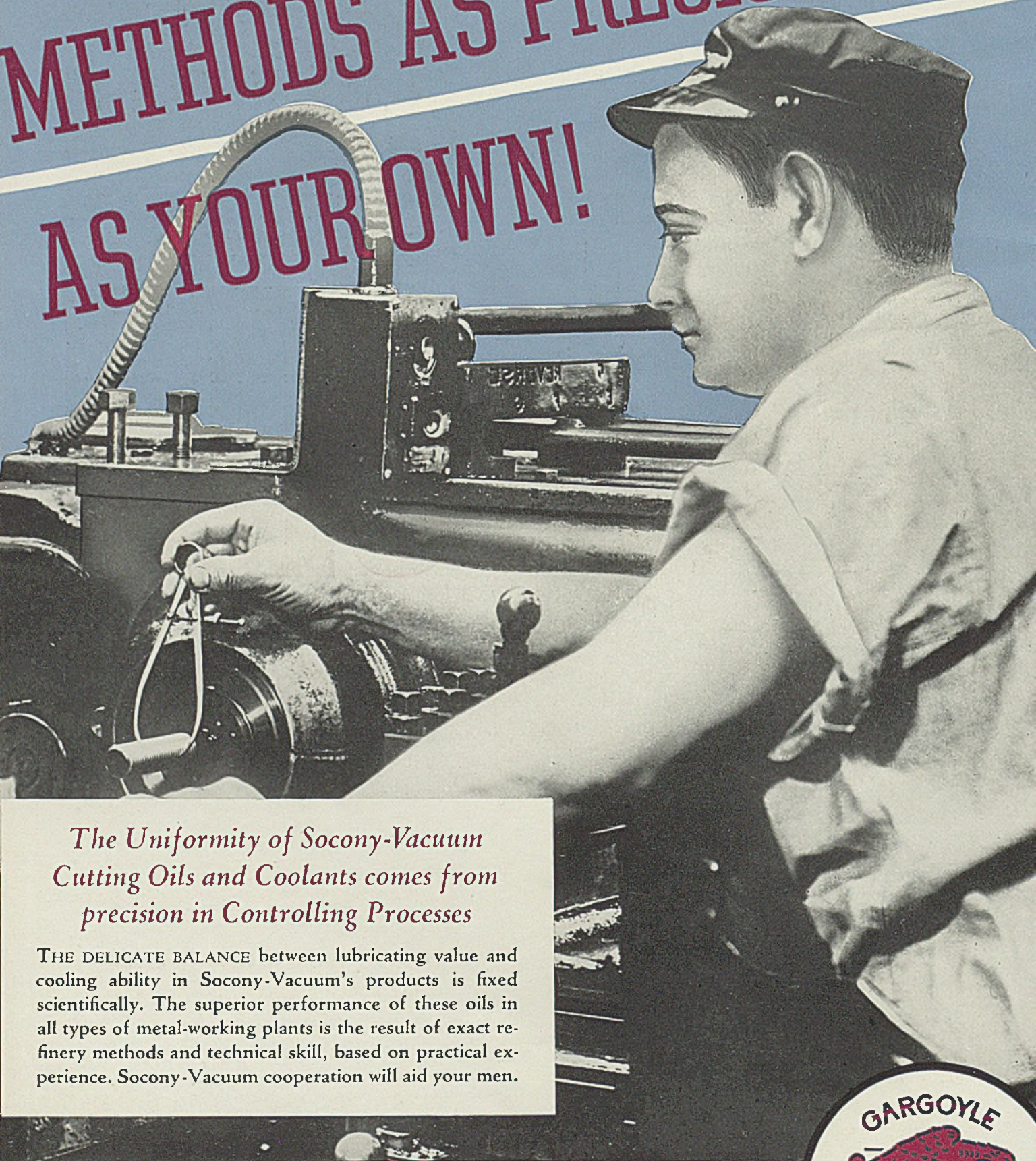
ON THE NEXT PAGE

—A MESSAGE OF

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steel plates and slabs of 0.16 to 0.22 per cent carbon and copper-bearing steel, the thickness used varying from 1½ to 4 inches. Slabs up to 12 inches thick also were employed where greater thickness was required. The base is heavier than that of most manipulators, to withstand the shock under rolling conditions, but the movable parts are lighter than those usually involved in manipulator design. The finished weight is estimated at 787 tons.

All plates as received in the shops of the Morgan company were flame cut by machine to the desired shape and contour, approximately 70,000 cubic feet of gas being used.

Drill Questionable Welds

Every weld was peened and each complete part was stress relieved before machining. The latter treatment was effected at 1100 degrees Fahr., the holding time ranging from 4 to 5 hours, depending upon the section. Where the soundness of any weld was questioned the inspectors drilled into the weld to explore the cause, if any. The number of fractures encountered compared to the total amount of welding was almost nil.

In joining the various sections 42,000 pounds of coated electrodes was required, the major portion of the tonnage being 3/16-inch rods. The complete manipulator involved a total of 1975 welded pieces. Approximately 16,000 lineal feet of welds was required to complete the job, averaging about 10 beads per weld. Tip travel of the rods exceeded 30 miles.

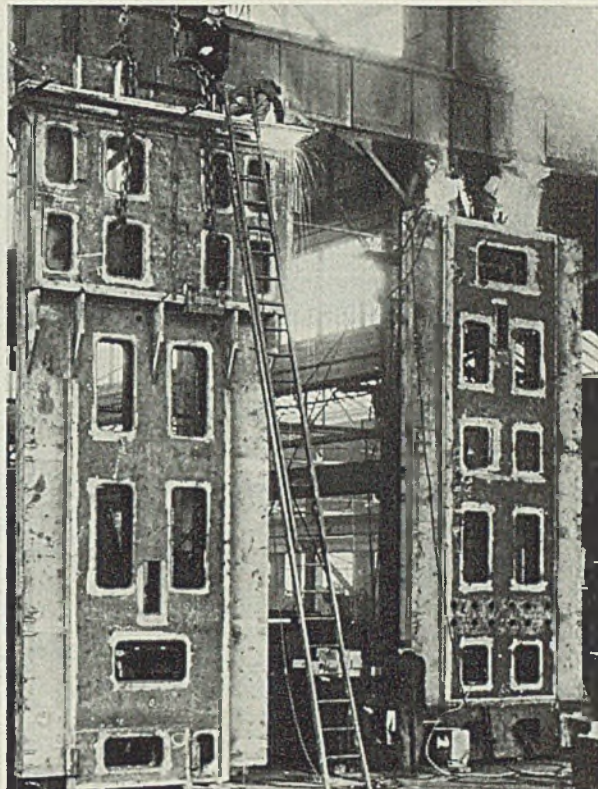
All connecting rods and links are of forged or welded steel. Pins used in the construction of the unit, whether movable or not, were case hardened as were all their bushings. Approximately 40,000 pounds of bronze was employed for bearings and at other points of friction.

Coated Murex electrodes were supplied by the Metal and Thermit Corp., New York.

Steel Finds Wider Use in Packaging

GROWING application of steel for packages and containers was revealed at the sixth annual packaging conference and exposition, sponsored by the American Management association and held at Hotel Pennsylvania, New York, March 3-6. Metal containers for a wide variety of uses were displayed, and, interestingly, the winner in the 1935-36 Irwin D. Wolf Awards competition for distinctive merit in packaging was a metal container—the Five Star Anti-Freeze container entered and used by E. I.

TWO of the four platens for the 44-inch blooming mill manipulator of the Jones & Laughlin Steel Corp. in the process of fabrication



du Pont de Nemours & Co. Inc., Wilmington, Del.

There were 70 exhibitors, or almost one-third again as many as were represented last year in Chicago. Of the number, 20 were manufacturers of packaging machinery, and their displays gave evidence of the substantial and, often, highly special steel requirements of this branch of the equipment industry.

Cans Hold Spotlight

Especially attractive displays, from the standpoint of steel, were those of the Continental Can Co., New York, and Wilson & Bennett Mfg. Co., Jersey City, N. J. The latter company featured particularly containers with high baked inner linings for various food products and sulphonated oils. These containers range from one to 65 gallons in capacity and are made of black sheets of 18 to 24 gage.

Stainless steel and stainless clad containers were also featured by this manufacturer. These containers are of 18 and 19 gage metal, and are produced in 15, 30 and 55-gallon sizes. Interestingly, a large national distributor of a soda fountain beverage has recently switched from the use of wooden kegs to stainless steel containers. Excessive absorption of the liquid by the wooden container is said to be the principal reason for the change.

In the variety of items displayed by the Continental Can Co., a patented beer container attracted no little interest. Metal reinforcements for fiber boxes and similar packages reflected the annual consumption of

good quantities of narrow strip and special staple wire. National Metal Edge Box Co., Philadelphia, had an interesting display along this line.

To Exhibit Die Castings and Products Using Them

American Die Casting institute announces an extensive exhibit of die castings and die cast products to be held at Metal Products Exhibits Inc., International building, Rockefeller Center, New York. This exhibit, beginning March 16, is scheduled to continue for seven weeks.

Enlarged production photographs, die castings and the articles into which they are assembled will be featured in many cases to tell the complete production story. Twenty-seven commercial die casters are co-operating in the exhibit.

Proposes New Treatment For Iron Made from Scrap

To increase the carbon content and reduce the sulphur content of cast iron, particularly that made from scrap which has been remelted numerous times, a method proposed in a recent patent treats the molten metal with carbonaceous material plus an oxidizing agent. The carbonaceous material may be graphite, charcoal, etc., mixed with 15 to 30 per cent sodium or potassium nitrate. Proper carbon addition is obtained by adding twice the theoretical amount required.

Progress in Steelmaking



Eliminates Big Bell Beam

A recently developed large bell rig for blast furnaces makes feasible the elimination of the big bell counterweights from the top of the stack as well as the beam from the big bell. By this arrangement a considerable amount of weight is removed from the top structure and the danger of damage from gas kicks between the small and large bells greatly reduced. The new rig permits the bell to be centered and adjusted more easily and affords the use of a smaller bell hoist than is employed on conventional types.

• • •

Recommends Red Lead Mix

Best rust-protecting qualities are exhibited by red lead priming paints, according to tests conducted abroad, while red lead iron oxide mixtures assume an intermediate position between red lead and straight iron oxide paints. A mixture recommended for red lead paints for use on steel structures is 80 to 85 parts of red lead and 15 to 20 parts boiled linseed oil of low acid number. Two coats of this paint will protect steel against atmospheric influences for two to three years. The so-called highly dispersed red lead requires

about 30 to 35 parts of boiled linseed oil and exhibits a larger coverage power, but it does not have the same protective qualities as ordinary red lead. Protective qualities of iron oxide paints can be improved by adding zinc chromate.

• • •

Spindles Removed Quickly

Piercing mill spindles now are being removed by a seamless tubemaker in about 40 minutes by the use of an oxygen lance. Removal of a 12-inch spindle by manual labor formerly was a 3-hour job at this plant.

• • •

Producer Is Water-Cooled

Welded, low-alloy high-tensile, corrosion-resistant steel is used in the design of a new automatic mechanical gas producer which affords a gasification rate almost 400 per cent greater than the mechanism which introduced the first stages of automatic producer gas making. The new unit is built with totally enclosed double reduction worm gearing, with bronze worm wheels and hardened and ground worms mounted on antifriction bearings. A dual

system of steam jet and turboblower is provided interchangeable in a few minutes time to assure uninterrupted gasification. An important feature of the new unit is the water-cooled shell, which eliminates the necessity for firebrick lining and prevents the adhesion of coal and ash to the sidewall. Omission of the lining permits a larger diameter, thus increasing the square footage of the fire zone and capacity of gasification. A central lubricating system affords the lubrication of all moving parts simultaneously. A water seal provided beneath the ash pan prevents the escape of the blast around the blast intake. The producer has a gasification rate of 6000 pounds of bituminous coal an hour continuously, with a short run maximum capacity of 7500 pounds an hour.

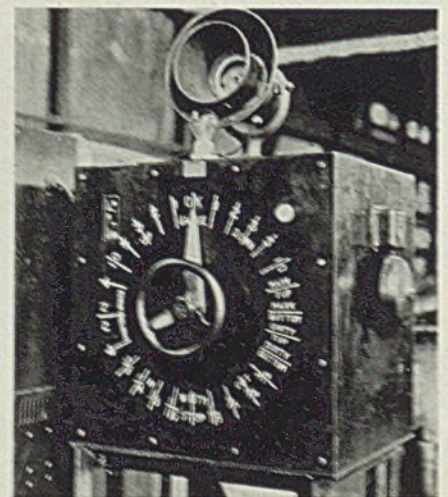
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Effects Savings in Power

Oil-flooded bearings, which replaced conventional grease-lubricated bearings, on a continuous hot strip mill, have effected a savings in power ranging from 45 to 60 per cent compared to previous practice on the same rolling schedules. In addition to power savings this type bearing also is credited with an increase of 1½ per cent in the average yield.

Signaling Device Affords Close Supervision of Rolling Schedules

A simple electrical device used to transmit signals between the inspection beds and the roller's station illustrates the close supervision exercised over rolling mill operation. This device permits the inspectors to signal the roller to change the thickness of the strip by 0.001 to 0.010-inch or the width by 1/16 to 3/8-inch or the length cut by the flying shear by 2 to 4 inches, or to indicate an unsatisfactory condition of either surface of the steel. To the layman, such accurate control of a steel strip delivered from the mill at 1000 to 2000 feet per minute seems uncanny. The receiver of the signaling device, shown in the accompanying illustration, is located at the roller's station. One or more transmitters with the same dial markings are mounted at points convenient to the inspectors. When the pointer on any transmitter is placed in a certain position, the receiver and other transmitters assume the same position and a bell or horn on the receiver gives an alarm. The roller observes the position of the receiver pointer, resets it to the "OK" position to indicate receipt of the message and makes the desired change on the mill. The device is made by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.



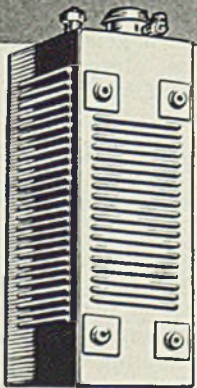
NO ROOM FOR

Prima Donnas

Jitters in the power unit of a materials-handling truck would be inexcusably expensive . . . because one breakdown can cost thousands of dollars in production tie-up. It is not surprising, therefore, that storage batteries power most of the trucks in steel mills—and that more than 70% of these batteries are Edison Steel-Alkalines.

Steel! That, say industrialists, is the proper material of which to build a battery for grueling service. Light in weight, the steel battery uses less of its own power to move its own weight. Strong—steel batteries even survive crack-ups unscathed. Durable—steel batteries use an alkaline electrolyte which is an actual preservative of steel.

All these qualities add up to Protected Power . . . protection against unexpected failure . . . protection against high maintenance costs . . . protection against gas fumes . . . protection of capital investment. Edison Steel-Alkaline Batteries for every heavy-duty service.



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Insulation of Soaking Pits Improves Operation

BY S. M. JENKINS
Armstrong Cork Products Co., New York

MANY changes in soaking pit equipment have occurred which are in keeping with other changes in steel plant equipment such as new improved hot blast stoves, new design of open hearths, and improved billet heating furnaces, continuous pair and pack heating furnaces, normalizing furnaces, annealing covers, etc. Until the soaking pit improves along with the rest of this heating equipment, it will be a drawback in the speed and efficient production of the steel industry.

There have been some fine installations of soaking pits, both of the regenerative type and the recuperative or one-way type, in the last few years and further development of the circular soaking pit. It is the purpose of this article to point out the important part that insulation plays in the advancement of this equipment. Insulation also is recommended for additional use which will further increase the efficiency of the soaking pit.

Soaking pit equipment, while operated at a high temperature, is of such a nature that the pit proper, the regenerators and flues can be insulated thoroughly with little effort, extra labor, or additional cost. This has been proven.

Brick Used for Pits

The latest soaking pits are brick insulated with sheet steel outer casing, or incased with a concrete outer wall. Soaking pit regenerators are made what they should be by insulation, which not only saves heat, but when encased with a steel shell or concrete wall prevents air infiltration. This air infiltration if through the pit, cools the ingots and gives them uneven temperatures; and if through the regenerator walls, lowers the temperature of the preheated air. Insulation also protects the steel or concrete outer wall and makes them practical and possible. Insulating brick wall construction gives a much more uniform temperature in the regenerator.

Increase in heat storage in firebrick walls gives uniform expansion to the firebrick and eliminates spalling. The uniform temperatures eliminate most of the rolling difficulties through the uniform heating of the ingots. This increased heat is returned from the regenerator and pit walls just the same as if extra checkers were used. The

wall being at high temperature also allows for a quicker combustion of gases in the combustion chamber. Insulated pits can be operated under forced draft, making it possible to add checkers or recuperative tile in flue. Here again insulation pays for itself, and adds to efficiency and fuel saving in operation.

How to Increase Efficiency

The efficiency of a soaking pit is low, or about 10 to 12 per cent. In the regenerator by using thin firebrick walls insulated with high-temperature insulating brick and a steel or concrete outer protecting wall, this efficiency can be improved greatly with little extra cost, requiring no additional floor space. Insulation is essential in the pit side walls inasmuch as the gases for combustion are rushed so they are only in the pit a short time; therefore, heat reflected from these side walls is working heat. The regenerator chambers and pit being thoroughly insulated, assist in the maintenance of the proper heat balance between the gas and air chamber on one side of the pit, and the gas and air chamber on the opposite side. It also gives a shorter working flame owing to higher preheated air.

The greatest quantity of heat enters and leaves the soaking pit below the regenerator arches and the pit cover. These sections should be thoroughly insulated for the reason that an air-tight insulated soaking pit is brought up to temperatures much more readily after Sunday shutdown. In other words, full temperatures are not turned on in an insulated furnace as many hours before same is required for production purposes as in an un-insulated furnace. Hydrostatic pressure of gas is set up in such an insulated air-tight regenerator chamber which helps to overcome the slight minus pressure of the average regenerator pit.

Heat penetration into the firebrick



walls of an insulating pit between reversals is little over 3 inches in depth of firebrick facing according to tests. With this gas pressure and hot regenerator walls, it is important to have every section of the pit insulated, inasmuch as the heat loss in the un-insulated section would be much greater owing to the high heat storage in the adjoining insulated sections.

First-quality firebrick and high-temperature insulating brick held together with steel shell, eliminates the necessity of bonding the walls with materials having different expansions, and different conductivities. While it is impossible to give a uniform pressure throughout the whole pit, insulation aids quick combustion and prevents it being carried over into the checkers. It also eliminates any cold spots except with the possible exception caused by the air that creeps in around the cover. If the heat leakage through all of the walls is practically stopped without weakening them, then it leaves the only other improvement up to temperature regulations, proper reversals and mechanical operating equipment.

Heat Absorbed Rapidly

An insulated wall will absorb the heat quicker from the outgoing gases due to the reflected heat from the insulating brick. It also will give the heat back to the regenerator chamber when it is most needed or when same is under draft as it prevents cold air being pulled through the wall, and reflects nothing but the high heat stored in it. The drop in temperature of the gas per second is a function of the loss by radiation (the amount of air infiltration), the temperature of the preheated air used for combustion, and whether hot ingots or cold ingots are being heated. The well-insulated soaking pit, incased in a steel shell or concrete wall overcomes these objections through the use of thin firebrick wall and high-temperature insulation. The temperature in this type of insulated soaking pit can be regulated much closer than ever before.

A thoroughly insulated soaking pit speeds up the pit tonnage which generally is the neck of the bottle in a steel plant. Working conditions are improved by the insulation of the regenerator arch besides holding the heat down in the steel girders and plates directly above and which cause sectional expansion.

Some data, which was accumulated on a recent job, are presented to prove the claims for insulation of soaking pits.

On this job thermocouples were built into the firebrick wall each $4\frac{1}{2}$ inches from the hot face of the firebrick, on the face of the insulating brick, $2\frac{1}{2}$ -inches in the insulating brick, in back of the $4\frac{1}{2}$ -inch insulating brick, in back of a 1-inch high-pressure insulating block, and in an air space between

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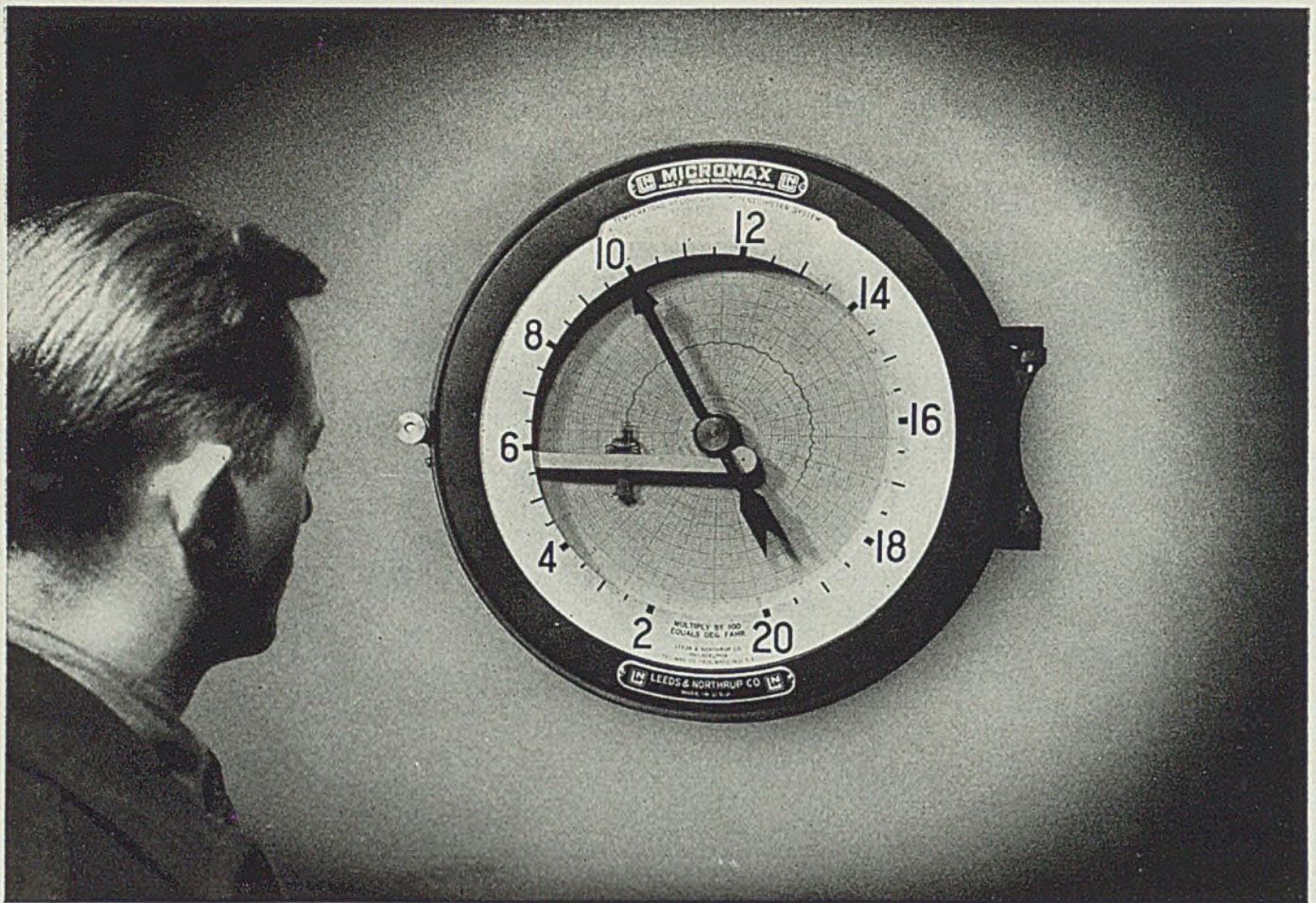
of the highest quality in confined spaces. This is impossible with a coating that chips off.

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Bethlehem has been concentrating for years on the development of steels that retain high physicals under such conditions. In this work Bethlehem's Bolt and Nut Division has drawn freely on the experience of a steel-making organization that is in constant touch with the steel problems of all industry. The steels mentioned here have been developed especially for high-temperature fastenings.



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S. A. E. 4140 shows excellent properties where temperatures do not exceed 900 deg. F. This is a chromium-molybdenum steel.

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To provide complete high-temperature fastenings, use Bethlehem Treated Nuts or Oil-Quenched Nuts with bolts or studs of the steels mentioned above. Tests have demonstrated the exceptional strength, structural stability and freedom from distortion of these nuts in high-temperature service.



BETHLEHEM STEEL COMPANY

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same and the outer concrete wall. The high points of and comments on the test follow.

A total of 34 thermocouples were installed in the walls, roofs and bases of these soaking pits, including some under the bottom of insulating brick under the flues, a set each in the gas and air checkers on both sides of pit below the ground line, a set in the gas and air chamber on both sides of the pit above ground level, in the arch over the regenerator chamber and the outside end wall of the pit proper and in the chamber proper thus giving temperatures of gases.

In the air chamber of one furnace where the air temperature due to reversals varied from 700 up to 1160 degrees Fahr. from 6 a.m. until 8 p.m., it was found that in the center of a 9-inch firebrick wall or back 4½ inches from face of wall the temperature varied from 820 to 890 degrees Fahr. on the hot face of an Armstrong's insulating brick. Nine inches from face of wall it varied from 785 to 800 degrees Fahr.; 2½-inches from the face of the insulating brick or at center of brick the temperature varied from 693 to 698 degrees; on the cool face of the insulating brick, 13½-inches total from face of hot firebrick wall it varied from 595 to 597 degrees; in the 1-inch air space in back of the wall of 11-inch block and outer concrete wall the temperature varied from 603 to 610 degrees. The outside wall was of 9-inch concrete. This outer wall preventing air circulation accounts for the high temperature in back of the insulating block. All tests were over a 14-hour period.

Temperatures Build Up

Temperature readings taken on the walls surrounding the gas chamber below the surface and also under the flues disclosed that these outside temperatures build up considerably owing to the heat storage in the surrounding ground. It is recommended that the flues be insulated thoroughly, and that a 2½ x 2½-inch air circulating flue be built directly on top of the concrete foundation. This is justified by the following reading in the flue bases.

The temperature on top of the concrete foundation, which was protected with firebrick and insulating brick, was approximately 850 degrees while over the arch of the regenerator chamber constructed of 13½-inches of firebrick and 2½-inches insulating brick, the temperatures which were many degrees higher than in the flue, showed 1550 degrees 9 inches back from the firebrick face, 1200 degrees on face of insulating brick, and 800 degrees in center of insulating brick and 260 to 310 degrees on the outside of the insulating brick. This temperature was subjected to the heat of the pit cover when removed and directly over the generator arches. The heat through the steel floor affected the outside air tem-

perature readings. It readily is seen how the air currents around a wall alter the results secured in various sections of furnaces whether above ground or below ground.

Based on the foregoing data and additional tests on open-hearth regenerators which gave about the same trend, the ideal soaking pit insulation is presented in the accompanying table.

From these figures it will be seen that a 9 to 13½-inch firebrick wall is of sufficient thickness for heat storage and strength. N-16 brick standing 218 pounds at 1600 degrees and the A-25 brick standing 100 pounds at 2100 degrees help to carry the load and make this thin wall construction possible without weakening the setting. Because of the strength of the insulating brick all of the support intended by the buckstays is carried through to reinforce the firebrick wall. Besides the additional

binding of the brickwork afforded by the steel shell, it also makes room for the maximum amount of checkers in a given checker space. The cost of such a wall is no more than the heavier firebrick wall and red brick formerly used.

The arches of regenerator chambers can be either 9 or 13½-inch firebrick shapes with 2½ to 4½ inches N-16 laid dry. After the arch has been allowed to heat up and expand through operation it should be tightened and grouted with insulating mortar into permanent place. This will eliminate cracking from firebrick expansion. The soaking pit side walls should be 27 inches of silica brick with 4½ inches of A-25 brick back against the steel or concrete outer wall. The breast wall should be 9 inches of chrome brick backed up with 4½ inches of A-25 brick against the cooling plate support. This helps to bring the lower section of the in-

Insulation Recommended for Ideal Soaking Pit

GAS AND AIR REGENERATOR SIDE WALLS UP TO WITHIN 2 FEET OF HEARTH OF PIT	
	Inches
Firebrick laid in fire clay	9
N-16 brick laid in Nonpariel-16 cement or laid dry	4½
N-16 brick laid in Nonpariel-16 cement or laid dry	2½
Total	16
REMAINDER OF SIDE WALLS OF REGENERATOR	
Firebrick laid in fireclay	9
A-25 brick laid in mortar or laid dry	4½
N-16 brick laid in Nonpariel mortar or laid dry	2½
Total	16
OUTSIDE AND INSIDE END WALLS OF BOTH GAS AND AIR CHAMBER. *BOTH COOL WALLS	
Firebrick laid in fireclay	9
N-16 brick laid in Nonpariel mortar or laid dry	4½
N-16 brick laid in Nonpariel mortar or laid dry	2½
Total	16
REGENERATOR ARCH OF GAS AND AIR CHAMBERS	
Firebrick laid in fireclay (or 13½" firebrick, 4½" N-16)	9
N-16 brick laid dry and grouted	4½
Total	13½
SIDE WALLS AND ARCHES OF FLUES	
Firebrick laid in fireclay	9
N-16 brick laid in Nonpariel mortar or dry, both waterproofed	4½
Total	13½
SOAKING PIT	
Silica brick wall (or 18" firebrick, 4½" A-25, 2½" N-16)	27
A-25 laid in mortar or dry	4½
Total	31½
SOAKING PIT COVER	
Firebrick laid in fireclay	9
A-25 brick mortar or fireclay	2½
Total	11½
FLUE BASES	
Firebrick laid in fireclay	9
N-16 brick (4½-2½ laid dry)	9
Calced earth concrete	4½
2½ air flues if built on a steel pan base	2½
Firebrick laid in fireclay	4½
A-25 brick laid dry	4½
N-16 brick laid dry	2½
2½" air flues if built on concrete foundation	2½ x 2½

got up to temperature. The flues should be 9 inches of firebrick insulated with 4½ inches of N-16 brick on the sides and two 2½-inch courses or one 4½-inch ring of N-16 brick over the arch. The bases should be 4½ inches of firebrick and two 2½-inch courses or one 4½-inch course of N-16 brick. If in moist soil better draft is secured by using a concrete outer wall. If the pit is operated under forced draft the flues should be insulated up to the fan equipment.

Soaking pit covers afford an excellent opportunity for insulation as it aids greatly in keeping the under face of the cover at a high temperature. It keeps the firebrick block at a more uniform temperature eliminating spalling through quick temperature change and reflecting heat down on top of the ingots. Insulation aids in preventing air infiltration. It also prevents the cover from getting cold when ingots are being charged or withdrawn from the pit. A pad made of insulating brick sometimes is built on the floor to provide a rest for the cover when the pit is open. This protects the floor and also keeps the underside of the cover at a high temperature.

Insulating firebrick is being tried out for soaking pit covers and so far results are encouraging. This would further increase the efficiency of the cover.

Uniform Heating Assured

In 1927 the recuperative type soaking pit was developed. Fuel for this one-way fired type of pit is admitted through burner ports in the wall near to the top of the pit. Burning gases are exhausted through ports located in this same wall but at a lower level. This causes the flame to travel across the top of the ingots and double back to the same wall but to the exhaust port located at the lower level. Insulated wall in the pit helps greatly to give the uniform heating desired.

Insulated pits 15 feet long holding 8 to 10 ingots can be fired successfully in this manner. A completely one-way soaking pit affords less first cost through less material being required and elimination of reversing valve.

An insulated recuperative type chamber due to the absence of regulating valve is easier to keep at a uniform temperature. It is not subjected to unbalanced checkers on the opposite ends of the pit or different amounts of friction caused by disturbed or clogged checkers.

Insulation of the pit wall aids in the low fuel consumption inasmuch as the flame travels the entire length of the pit twice, being in the pit double the time as in the regular pit. This allows the complete combustion of gases in the chamber. Insulated side walls give the maximum of efficiency in this type of pit due to the

large mass of insulated firebrick radiating heat to the steel.

Most recuperative pits operate under a positive pressure. This eliminates the air infiltration around the cover, and also increases the heat penetration into the firebrick walls. As is apparent, insulation is necessary. A thorough insulated one-way fired pit reduces scale losses and aids the ingot surface. This type of soaking pit differs from the regenerator type, as far as insulation is concerned, principally in the regenerator chambers. The thin wall construction recommended can be used for this type of pit. However, the insulation need not be over 4½ inches of N-16 in back of 9 inches of firebrick. The arches over recuperator are insulated

Steel Promotes Milk



THIS STEEL BOTTLE, manufactured by Webb City and Carterville Foundry & Machine Works, Webb City, Mo., is 17½ feet high, 6 feet 5 inches in diameter in the lower portion and weighs 1600 pounds. It is located on a tower at a dairy near Jefferson City, Mo., and is painted white to the cream line, with the lower portion bearing the name of the dairy. It was fabricated from No. 12 gage steel sheets and formed by using a circular steel band which was placed at the base and raised as the welders progressed with the closing of the joints. Formation of the neck was effected by solving a simple geometrical problem, translating this solution into a chalk lay-out on the office floor and cutting the necks for the strip in accordance with the lay-out

the same as the regenerative type equipment. The flue bases are not as a rule subjected to as high a temperature and flue insulation can be reduced to 4½ inches of N-16 brick completely surrounding the flues.

The circular soaking pit seems to be in the early stages of development and from the insulating standpoint offers an excellent opportunity for the use of the same type constructions recommended for the other type of pits, namely, the highly insulated refractory walls, bases, flues, etc.

Some steel plants are using such a pit for storing hot ingots to preserve the initial heat until they are placed in soaking pits. These large pits have 9-inch firebrick walls with a 4½-inch N-16 brick backing. The outside wall is generally concrete. The bases of these pits are built of 9-inches of firebrick with 5 inches of insulating concrete which protects the concrete base. The cover should be 9-inch firebrick insulated with 4½ inches N-16 brick laid dry, and grouted into place, or 9-inch A-25 arch brick unprotected.

Chemistry and Physics Handbook in New Edition

Handbook of Chemistry and Physics, 20th edition, fabricoid, 1951 pages, published by Chemical Rubber Co., Cleveland; supplied by STEEL, Cleveland, for \$6, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

The aim of the editors and publishers of this handbook throughout its various editions has been to present in condensed form as much accurate, reliable up-to-date information in the fields of chemistry and physics as is consistent with convenience of form and the possibility of wide utility and distribution.

New and revised material includes a table of physical constants of organic compounds. The most important feature of that table is the nomenclature worked out by Dr. Austin M. Patterson, vice president and professor of chemistry at Antioch college. As far as possible, every organic compound appearing in that table has been named in accordance with the rules laid down by the International unions.

To further improve the organic table and increase its usefulness, it has been changed from the tabular form to the paragraph or dictionary style.

A formula index of organic compounds of about 30 pages has been added. General rules of pronunciations of chemical names and a list of names with recommended pronunciations have been included. Sections on X-ray spectra and colorimetry have been revised. Numerous other additions and corrections have been made.



WEAR-RESISTANCE

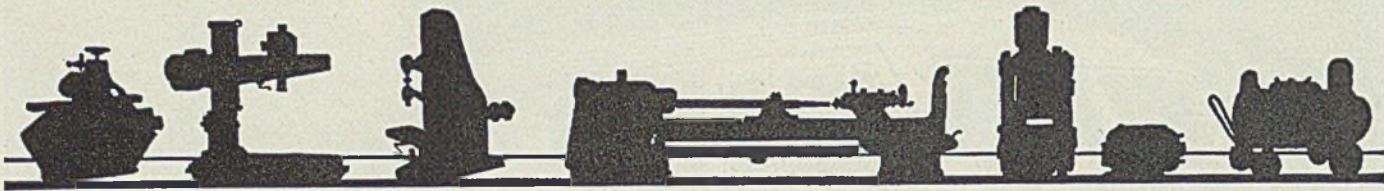
THE continued satisfactory performance of an automotive vehicle is dependent in large measure upon good wear-resistance in many of its steel and iron parts, such as cylinders, gears, shafts, cams and bearings. • Nickel Alloy Steels have been standard for many years in the transportation industries and have an enviable record of performance, especially under severe service as in heavy-duty buses and trucks. They respond well to all of the usual manufacturing processes. • Dense-structured Nickel Cast Irons with their improved strength, hardness and machinability are finding more widespread applications in passenger car, truck and bus engines. They are resistant to wear and the heat effects encountered, and they are easily handled in machine shop and foundry. • Our casting specialists will be glad to outline modern practices and to recommend the best compositions.

NICKEL CAST IRONS
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THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET, NEW YORK, N. Y.

New Equipment



Metallographic Polisher—

Hanson-Van Winkle-Munning Co., Matawan, N. J., announces a metallographic polisher as a companion piece to the Bausch & Lomb electroplater's microscope. The polisher, shown below, is designed for preparing a specimen for the measurement of plate thickness. It consists of a surface grinder with two fabric covered wet polishing disks mounted on the same chassis. The grinder which may be operated in a horizontal or vertical position, carries a 4 by 36-inch belt set up with metallographic emery. Polishing disks are mounted vertically on either side of the driving shaft and are encased in adjustable cast aluminum splash guards.



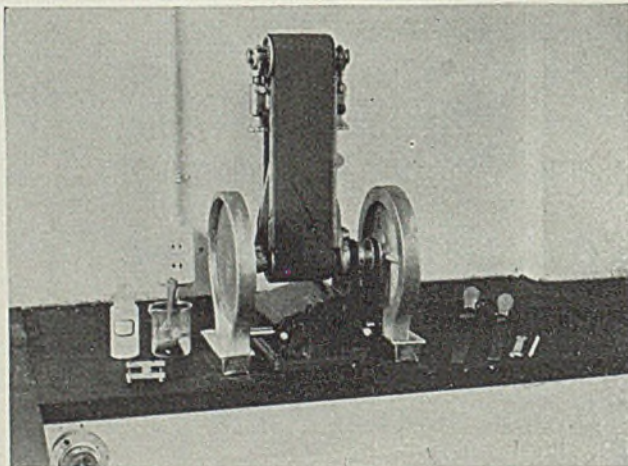
Metal Spray Gun —

Advance Engineering Corp., Duncannon, Pa., has announced a new metal spray gun for use in applying the lower melting alloys such as lead, tin and lead-tin compositions. One-hand operation, a ring holder to maintain the metal in place, fast spraying up to one pound of solder per minute, a turnhead knob to change from spraying to heating, and a ribbed tube to keep the butt of the gun cool, are features.



Milling Machine—

U. S. Tool Co. Inc., Ampere, N. J., is bringing out a new milling machine, shown herewith, which serves



Above—U. S. miller is dual purpose unit

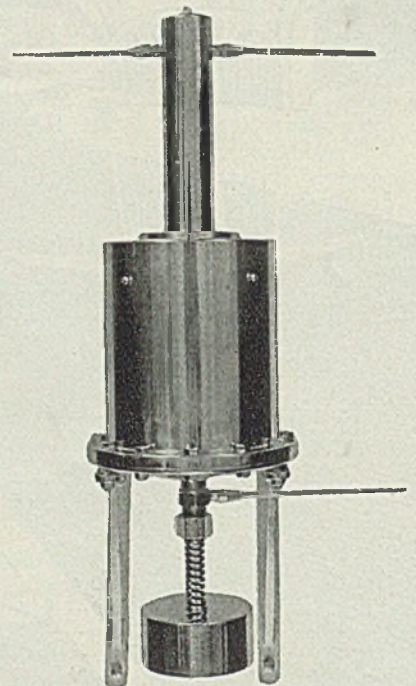
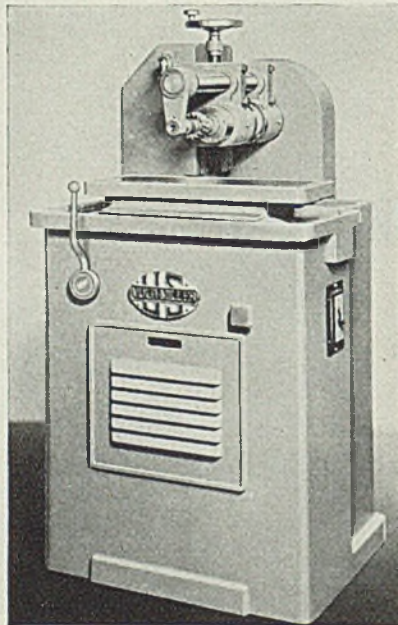
Left — H-V W-M metallographic polisher prepares specimens for measurement of plate thickness

either as a high-speed semi-automatic miller or a regulation hand miller. The power feed table is cam-operated which makes it possible to obtain any desired table speed or combination of speeds. Changes of table speeds and direction are controlled by a single cam and lever, eliminating all danger of "jamming" work. Hand operation is effected by a conveniently located hand lever.



Hydraulic Pressure Booster—

Martin-Decker Corp., Long Beach, Calif., has introduced an hydraulic



Martin-Decker hydraulic pressure booster for testing gages, castings, pressure vessels, etc.

pressure booster designed especially for testing gages, castings, connections and pressure vessels in the shop and laboratory. Shown herewith, the booster consists of two cylinders, one a low pressure, into which is connected a line from the plant water or air supply system, and the other a high pressure, with a lead out to the gages or lines to be tested. By simply manipulating a valve, pressures can be built up to 5000 pounds at a slow steady rate or as rapidly as desired.




Electric Excavators—

Harnischfeger Corp., Milwaukee, is announcing a new series of Ward Leonard electric excavators with capacities up to four cubic yards. Complete one-man control for all operations in travel and steering as well as digging, is combined with faster speeds, less weight and greater electrical horsepower per pound. Welded construction is employed. Large members such as the boom and the dipper sticks are of high tensile steel. Every motion in hoisting,



*Self-Matching
Pattern
Less Waste*



CENTRAL
Quality
PRODUCTS

Forging Billets Slabs
Sheared and Universal
Plates

"CENTRALLOY"
High Tensile Steel

Blue Annealed Sheets

Flanged and Dished
Heads

Steel Stampings

Rolled Steel Floor Plates
"Knobby"
"All-way-grip"

DESIGN of pattern in many non-skid floor plates, while primarily a safety feature only, prohibits a perfect continuation of tread style when pieced on the diagonal or right-angle match—necessitating a waste in shearing and an unattractive job when completed . . . Present day beautification of machines and their accessories call for effective symmetry in every surrounding detail.

Note the unity in composition, the perfect pattern, design and balance of Central's "ALL-WAY-GRIP" plate shown in full scale. Note the diamond and knob realignment to angle instead of vertical axis that forms this economical all-directional pattern that combines beauty with positive safety.

Write for a copy of Central's new folder describing and illustrating three distinct patterns in non-skid, rolled steel floor plates together with helpful data on sizes and weights.

CENTRAL IRON & STEEL CO . . HARRISBURG, PENNA.

THE CARBORUNDUM COMPANY

ANNOUNCES A NEW BOND

THE "180" FOR CRANK GRINDING

This wheel cuts faster. It cuts clean with the utmost freedom. The wheel face has just the proper breaking action to retain its sharpness without undue abrasive loss. It requires far less frequent dressing.

It has been produced to meet industry's need for closer tolerances, more perfect finishes and lower wheel costs in crank grinding operations.

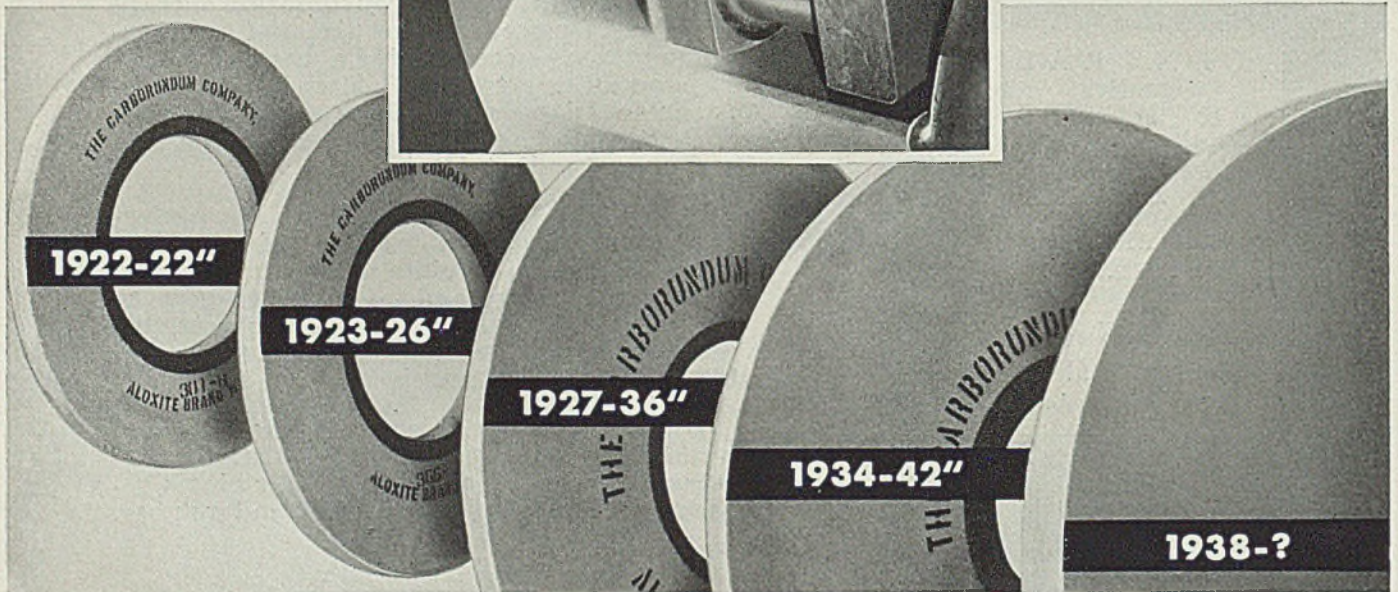
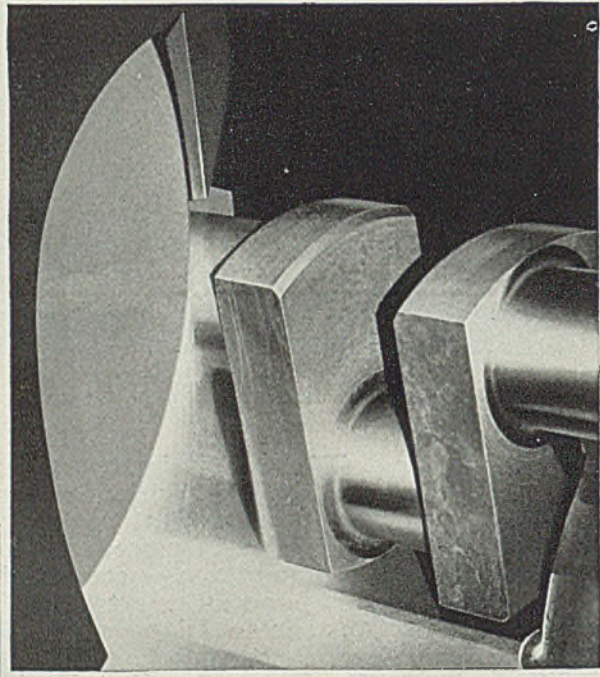
It is one more development in a succession of crank grinding wheels that have each set new standards of crank grinding. For the rough forged crank The Carborundum Company produced the "60" Bond Wheel for rough and finish grinding. Then the "30" Bond Wheel for turned

cranks where stock removal was reduced and closer tolerances and better finishes were required.

Now the "180" Bond Wheel. It has all the refinements necessary to do a better job of crank grinding and it goes hand in hand with the economical advantage of the increased wheel diameter.

Other recent Carborundum contributions to industry include an improved complete line of foundry grinding wheels — the sensational Aloxite "AA" and "280" Bond Tool Room Wheels.

THE
CARBORUNDUM COMPANY
Niagara Falls, N. Y.



Sales Offices and Warehouses in New York, Chicago, Boston, Philadelphia, Cleveland, Detroit, Cincinnati, Pittsburgh, Grand Rapids
(Carborundum and Aloxite are registered trade-marks of The Carborundum Company)



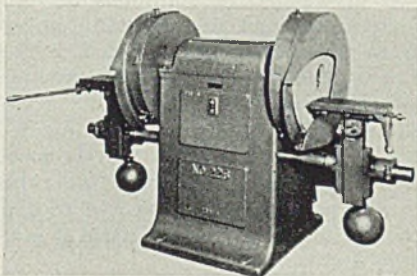
*Complete one-man control features
Ward Leonard excavator*

crowding, swinging and traveling is powered by an independent motor controlled separately by pushbutton from the operator's station. Shovels and draglines are offered in capacities from two to four cubic yards.

♦ ♦ ♦

Disk Grinders—

Gardner Machine Co., Beloit, Wis., has developed a new 200 series, single spindle disk grinders for motor drive which are heavy and massive. One of these is shown in the accompanying illustration, and the base is designed so that standard motors can be mounted on the bracket in the rear without extend-



*Gardner single spindle disk grinder
built for heavy duty*

ing beyond it. Spindles for the machines are made of high carbon steel, accurately ground all over to insure perfect running balance, and they are large in size. The spindles are mounted in two cartridges or pillow blocks, each containing two oversize, preloaded ball bearings. One cartridge is clamped in position and the other is allowed to float endways to take care of spindle expansion and contraction.

♦ ♦ ♦

Horizontal Break Switch—

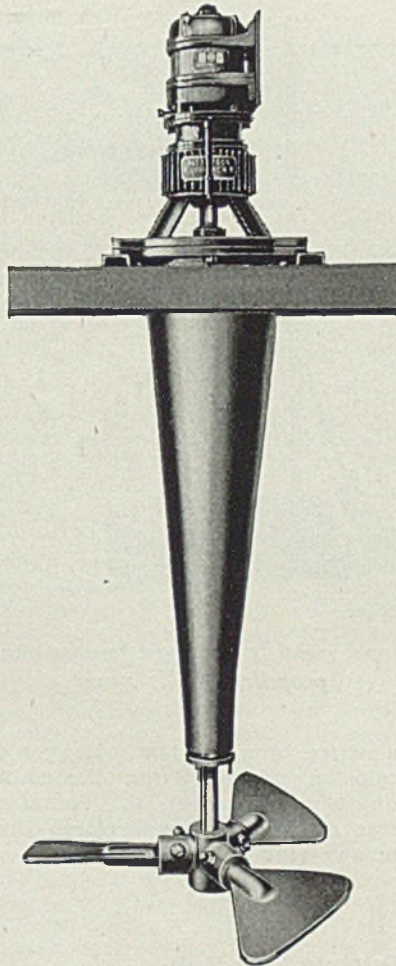
Delta-Star Electric Co., 2400 Block, Fulton street, Chicago, announces that to secure a rapid effective break its new PM switch has a blade consisting of two equal lengths contacting at the center point. Each half blade is carried on an insulator stack

mounted on ball bearings. When opening the blades travel at high speed, quickly introducing a wide gap carrying the arc out into air which is not ionized. This switch is assembled in three-pole combinations and can be either motor or manually operated.

♦ ♦ ♦

Agitator—

Patterson Foundry & Machine Co., East Liverpool, O., recently brought out a type UC agitator designed for difficult mixing jobs where a rigid guide for a stirrer shaft without the use of a step bearing is necessary. The unit, shown herewith, is built



Patterson type UC agitator for difficult mixing jobs

especially for handling gritty substances. Pressure type stuffing boxes protect the guide bearing from material. A variable pitch propeller, three-blade type, makes it possible to adjust the propeller to viscosity and specific gravity of the material being agitated.

♦ ♦ ♦

Polishing, Buffing Machine—

Packer Machine Co., Meriden, Conn., is marketing a polishing and buffing machine embodying 14 wheel

heads. Ten are equipped with 10 horsepower motors and four with 7½ horsepower motors. Each wheel spindle is driven by multi V-belts. Thirty-eight work holding fixtures are mounted on the conveyor chain which is operated intermittently by an indexing mechanism. Center distances between work holding fixtures are 24 inches.

♦ ♦ ♦

Fin Type Heating Unit—

General Electric Co., Schenectady, N. Y., is offering a new fin type Calrod heating unit designed principally for applications where the air is forced over the heating units. Shown herewith, the development consists of a steel-sheath Calrod heating element with steel fins copper brazed to the steel sheath. The copper brazing process provides excellent thermal contact between the fins and the unit sheath, delivering an increased amount of heat in a given space for a given rating.

♦ ♦ ♦

Industrial Vacuum Cleaner—

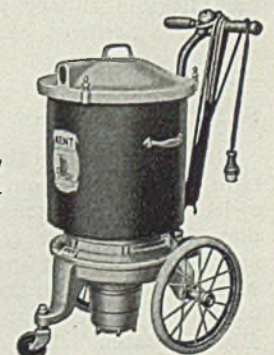
Kent Co. Inc., Rome, N. Y., is building a new vacuum cleaner employing a double fan, ¾ horsepower motor and 1½-inch hose. The bag is double, being designed especially to separate all dust and dirt from the air before air passes through the fans and is enclosed entirely in a



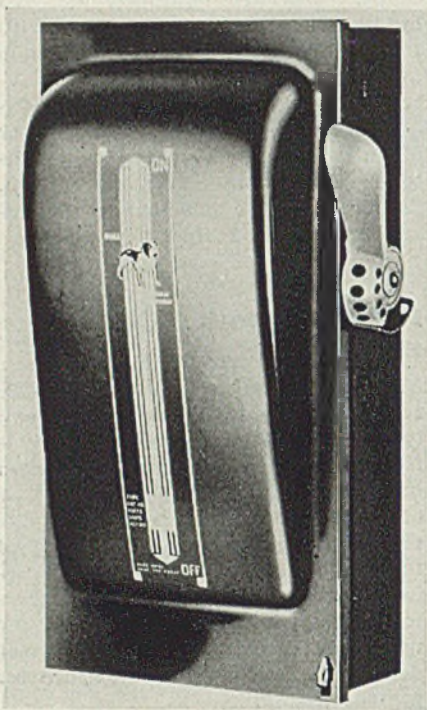
G-E heating unit embodies steel fins copper brazed to a steel sheath

sturdy steel can. This can rests on a base above the motor and fans, providing a unit of vertical design to conserve floor space.

The entire unit, shown, herewith, is mounted on two rubber tired wire wheels and a swivel castor. It is easily propelled by a "T" handle. The machine separates into two parts with handles conveniently located to make it easy to carry when



Kent vacuum cleaner for industrial use



Bull Dog Vacu-Break safety switch

necessary. There are tools variously adapted to many special kinds of tasks. For example, a tool is provided for spraying paint; one for spraying moth-proofing liquid; tools for cleaning boilers and furnaces; also a unique tool for cleaning dirt from trays of small objects without removing the objects, etc. This machine is suited to a variety of industrial uses, such as the cleaning of machinery, shelving, stock; protecting workmen from objectionable or injurious dust; insuring against damage from dust and dirt in processes; and the care of offices and equipment of all kinds.

◆ ◆ ◆
Portable Electric Sander—

Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago, has added a new U-58 portable electric sander to its line. The unit, shown herewith, may be taken apart for inspection or cleaning with ease. Inspection of the motor can be made while the sander is operating by simply removing two brush covers. Equipment furnished includes a 7-inch flexible rubber pad and a box of twelve assorted abrasive disks.

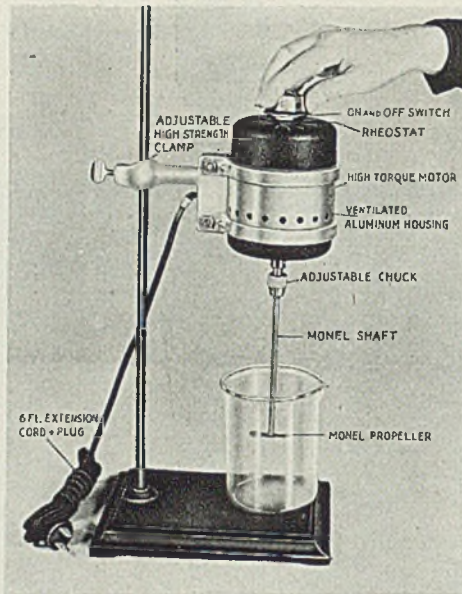
◆ ◆ ◆
Safety Switch—

Bull Dog Electric Products Co., Detroit, is bringing out a new safety switch, the Vacu-Break, in three complete lines—master (type A), standard (type C), and junior (type D). As shown herewith, the mechanism is housed in Stylined cabinets with handles to match. The design adopted

places the arc extinguishing structure on the moving contact (blade) instead of on the stationary contacts (jaws). This, together with other features, results in unusually high circuit rupturing ability. Solderless lugs are used for "line" and "load" wiring terminals.

◆ ◆ ◆
Laboratory Stirrer—

Chemical Publishing Co. of New York Inc., 175 Fifth avenue, New York, is introducing a variable speed, non-sparking laboratory stirrer, shown herewith. Actuated by a shaded pole type motor, speed may

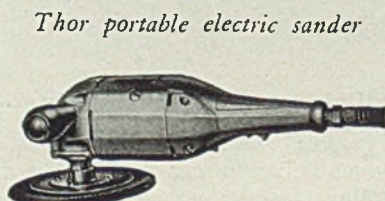


Monel metal is employed for shaft and propeller of this stirrer

be varied by a rheostat. Danger of explosion when mixing flammable liquids is eliminated, the manufacturer claims. A screw clamp that fits any ring stand is provided.

◆ ◆ ◆
Multiple Flat Belt—

Nucord Co., 605 West Washington boulevard, Chicago, is offering a multiple flat belt that consists of six parallel 1 inch wide cord belts harnessed together with a specially woven tough, flexible, gum-coated pulley-gripping fabric. It is designed to operate as a single belt but



Thor portable electric sander

with lateral flexibility for the crown on the pulleys, as well as to expand and contract under tension without side pull. Each 1-inch section contains 10 longitudinal cords which carry all the tension and are thoroughly impregnated and then covered with oil-resisting rubber to make the belt steam, water, weather, oil and acid fume resisting.

◆ ◆ ◆
Pulling Device—

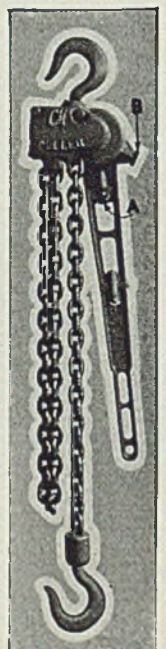
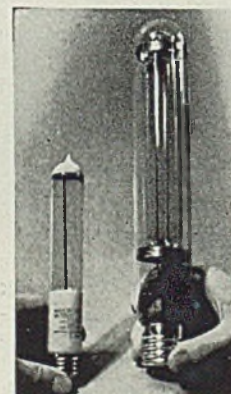
Chisholm-Moore Hoist Corp., Tonawanda, N. Y., is marketing a CM puller, shown herewith, a general utility tool for lifting or pulling vertically, horizontally or at any angle. Capacities are ¾ and 1½ tons. A gear reduction in both capacities provides for a minimum amount of effort to operate the ratchet handle—43 pounds to pull ¾ ton. Operation is controlled by two buttons which also permit quick adjustment of the chain.

◆ ◆ ◆
Mercury Vapor Lamp—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is announcing a new 250 watt high intensity mercury vapor lamp having an efficiency of approximately 30 lumens per watt and producing 7500 lumens of light for an average life of 2000 hours. With an overall length of 8 inches and a medium screw base, the new lamp, shown herewith, can be operated satisfactorily in existing fixture equipment if of the enclosed type. Since it also can be operated in any position it is expected to contribute to a wider application of mercury lighting.

Right — Chisholm-Moore puller made in two capacities

Below — New 250 watt mercury vapor lamp (left) is about one-third size of 400 watt design



New Trade Publications

Electric Fans—Emerson Electric Mfg. Co. Inc., St. Louis. A catalog, X1149, on its line of electric fans, in various types, with data and prices.

Grinders—Cyril A. Fox, Oliver building, Pittsburgh. A bulletin on his high-speed grinders for forge shops, foundries and steel mills, illustrated.

Clamshell Buckets—Wellman Engineering Co., Cleveland. Bulletin P3-43 on its new line of clamshell dredging buckets of Williams power-arm type, from ½ to 3 cubic yards.

Stacking Units—All-Steel-Equip Co. Inc., Aurora, Ill. Bulletin No. 182, on its new type of stack unit, with stacking rims on all four sides and greater strength.

Steel Switchboards—Laganke Electric Co., 2400 Woodland avenue, Cleveland. A bulletin covering its large variety of switchboards for various uses.

Plastic Molding Powder—Thiokol Corp., Yardville (Trenton), N. J. a leaflet on its oil-proof synthetic rubber molding powder, with instructions for its use.

Non-Sparking Tools—Superheater Co., 60 East Forty-second street, New York. Catalog No. 20,001-1 on its non-sparking tools, used as a safety measure where sparks create danger.

Plating Machine—Udylite Co., Detroit. a leaflet on its semi-automatic plating machines, for uniformly plated work, adapted to plants having a steady flow of production.

Skip Hoist—Palmer-Bee Co., Detroit. Section III of its general catalog No. 100, devoted to skip hoist and dragline machinery, with illustrations and diagrams.

Sprayed Metal Coating—Metals Coating Co. of America, 495 North Third street, Philadelphia. Folder No. 1203, on process and equipment; No. 1204 on operating equipment.

Century of Machine Tools—Taylor & Fenn Co., Hartford, Conn. A booklet covering 100 years of New England machine tool building, issued on the occasion of the 101st anniversary of the company's founding.

Flat Rolled Steel—Youngstown Sheet & Tube Co., Youngstown, O. Bulletin describing and illustrating continuous mill operations, entitled "Our New Continuous Hot Mill and Cold Reduction Mills."

Rolled Steel—Inland Steel Co., Chicago. A new edition of its booklet, "Sizes We Roll," giving complete lists of sizes of sheets, strip, bars, plates, structurals and semifinished steel, with reference tables.

Blast Cleaning—American Foundry Equipment Co., Mishawaka, Ind. A leaflet on its multi-rotary table wheelabrator for cleaning castings by abrasive blast, designed to give efficient application.

Electric Furnace—American Bridge

Co., Frick building, Pittsburgh. A booklet on the Heroult electric furnace, covering its construction and use in modern steelmaking; diagrams of installation and many illustrations.

Air Furnaces—Despatch Oven Co., Minneapolis. Bulletin No. 40 on its convected air tempering furnaces heated by gas; illustrated.

Speed Recorder—Leeds & Northrup Co., 4900 Stenton avenue, Philadelphia. Folder N-27 on its Micromax speed recorders for continuously indicating and recording speeds at any location, near or distant.

Steam Equipment—American District Steam Equipment Co., North Tonawanda, N. Y. Catalog No. 35, looseleaf, illustrated, on its line of expansion joints, meters, steam traps and other steam equipment.

Arc Welders—Hobart Bros. Co., Troy, O. A pictorial trip through the plant, which the company calls the most modern arc welder factory in the world; a minimum of text accompanies the illustrations.

Condenser Tube Cement—Debevoise Co., 968 Grand street, Brooklyn, N. Y. A booklet presenting a report for engineers and others interested in economies in power production and prevention of erosion from water in motion.

Idlers—Chain Belt Co., Milwaukee. Bulletin No. 266, describing Rex Stearns Timken idlers, showing in pictures how to handle materials on conveyor belts running on these idlers; construction and performance are described.

Heating—L. J. Wing Mfg. Co., 154 West Fourteenth street, New York. Bulletin D-1 on a new heater for heating the inrush of cold air at large door openings, as in shipping and receiving departments; illustrated with diagrams and installation layouts.

Computing Dial—American Wire Fabrics Corp., subsidiary of Wickwire Spencer Steel Co., New York. A circular rotating dial for use with the company's measuring tape in its insect screen cloth to compute point at which to cut for any desired length.

Pyrometer—Pyrometer Instrument Co., 103 Lafayette street, New York. Catalog No. 70, illustrating and describing is pyro-optical pyrometer, self-contained, direct reading and needing no corrections; furnished in various scale ranges to meet plant and laboratory requirements.

Sludge Pumps—Morris Machine Works, Baldwinsville, N. Y. Bulletin No. 156, on its line of slurry and sludge pumps, centrifugal pumps for handling slurry, sludges, fine abrasives and gritty mixtures; describes special design of parts to meet severe service.

Steel Storage Tanks—Chicago Bridge & Iron Works, Old Colony building, Chicago. Technical bulletin

No. 11, on steel oil storage tanks, containing general specifications, notes on design, joint efficiency and tables of standard capacity tanks, with various data tables.

Centrifugal Pumps—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Leaflet 2206, on its large low-head type S centrifugal pumps; Leaflet 3307, large high-head double-suction single-stage type S pumps Leaflet 2208, small double-suction single-stage pumps; Leaflet 2210, Type M multi-stage double-suction pumps.

Steel Mill Conveyors—Logan Co., Louisville, Ky. Bulletin No. 10 on conveyors for steel mills, containing practical, helpful information, photographs, sketches, engineering data; features new heavy-duty roller conveyor of flat and trough types, coil turnover, tilting section, turntable, runout tables, apron and live roll conveyors.

Conveyors—Mathews Conveyer Co., Ellwood City, Pa. A book, "Problems Solved with Mathews Conveyer Systems," for engineers and production executives; containing material of practical use for the layman, to suggest first, problems that may exist in various industries and then to offer a remedy for their solution.

Pumps—Worthington Pump & Machinery Corp., Harrison, N. J. Bulletin W-475-B10, B11 and B12 on its rotary pumps, types GS, Gr and GE; bulletin W-102-B2, on its horizontal duplex piston pumps, turret type; bulletin S-500-B30 on its vertical four-cycle direct-injection type D diesel engine.

A.S.T.M. Meeting Reviews High-Strength Metals

(Concluded from Page 45)

tion of product is still a factor or where danger of breakdown is too great.

And, finally, Mr. Thum hinted about an alloy which will not heat tint at oven temperature. "Think of stainless steel baking dishes and roasting pans that stay bright!" said Mr. Thum.

Three papers were presented at the nonferrous session. "Alloys of Aluminum and Magnesium" were discussed by E. H. Dix Jr., chief metallurgist, and J. J. Bowman, metallurgical division, Aluminum Research Laboratories, Aluminum Co. of America, New Kensington, Pa.; "Alloys of Nickel" were reviewed by E. F. Geiger, research and development department, International Nickel Co. Inc., New York; and "Alloys of Copper" were handled by C. H. Davis, metallurgist, American Brass Co., Waterbury, Conn.

Activities of Steel Users and Makers

BUDD INTERNATIONAL CORP., a subsidiary of the Edward G. Budd Mfg. Co., Philadelphia, has disposed of its controlling interest in the Pressed Steel Co. of Great Britain Ltd.

Its holdings of ordinary shares in Pressed Steel company were sold to the British Pacific Trust Ltd., of London, for approximately \$5,500,000. Its holdings of preference shares were sold to J. Henry Schroder & Co., international bankers, of London, for approximately \$500,000.

Proceeds of the sale will be used to pay the accumulated dividends of Budd International and to retire all its outstanding preferred shares, a part of which are held by the Edward G. Budd Mfg. Co. The balance, after payment of taxes, will go into the treasury of Budd International, in which the Edward G. Budd Mfg. Co. holds 84 per cent of the common stock.

Budd International will continue its foreign activities, in which are included a predominant interest in the Ambi-Budd Presswerk G.m.b.H., of Germany, the principal automobile body manufacturer in Germany. Budd International has an interest in Societe Francaise Budd, of France, and license royalty agreements with the most prominent concerns in Italy, Germany and France engaged in the production of automobile, railway and aviation products.

H. C. Donaldson Co. Inc. has removed its Los Angeles office to 3050 East Slauson avenue, Huntington Park, Calif. The mailing address is P.O. box 730, Vernon branch, Los Angeles.

Welder division of the USL Battery Corp., Niagara Falls, N. Y., has been moved to the Owen-Dyneto Corp., Syracuse, N. Y. A new line of arc welders is being designed to include many new features. J. L. Fosnight is sales manager of the Welder division.

Miller & Co., Chicago, has opened a branch office at 4209 Carew tower, Cincinnati, for the sale of pig iron and ferroalloys in that district. Pig iron handled includes Woodward iron and Globe silvery iron. The office is in charge of R. C. Landstrom and R. G. Ebersole.

Apollo Metal Works Inc., manufacturer of prefinished metals, has moved its general offices and mill from La Salle, Ill., to its new plant in the Clearing Industrial district,

near Chicago. Increased business, need for improved facilities and space, and a manufacturing site nearer to one of its principal markets were prime motives in moving to the Chicago area.

Link-Belt Co., Chicago, has appointed the Feenaughty Machinery Co. distributor for its shovels, cranes, and draglines in the Pacific northwest territory. Headquarters are in Portland, Oreg., with branches in Seattle and Spokane, Wash., and Boise, Idaho. F. A. Kingston is sales manager.

McNally-Pittsburgh Mfg. Co., Pittsburgh, Kans., has booked an order from the Sahara Coal Co., Chicago, for the coal tippie and Norton automatic coal washing system for its strip mine to be located near Harrisburg, Ill. The tippie and washing plant, when completed in June, will have a capacity of 1,500,000 tons of coal annually.

R. K. LeBlond Machine Tool Co., of Cincinnati, changed its sales policy in the New York territory, effective March 1. It is opening a direct sales office and display floor at 103 Lafayette street, New York, to combine the machine tool division and the Cincinnati electrical tool division at that address. This arrangement will supersede the present agency arrangement. W. E. Groene, eastern sales representative for the past eight years, will be in charge of the office.

Pusey & Jones Shipbuilding Co., Wilmington, Del., through a subsidiary there recently placed an order for a small alloy electric furnace with the Pittsburgh Lectromelt Furnace Corp., Pittsburgh. Detroit Alloy Iron Co., Detroit, likewise has ordered a small electric melting furnace from the same manufacturer.

Joslyn Mfg. Co., Fort Wayne, Ind., Burlington Steel Co., Hamilton, Ont., and the Kilby Car & Foundry Co., Anniston, Ala., have by now received deliveries on similar orders placed over the past few months with Pittsburgh Lectromelt for top-charge type furnaces.

Rice Award Is Made to Mathews Conveyer Co.

Mathews Conveyer Co., Ellwood City, Pa., has received the official "award of merit" issued by the Rice Leaders of the World association "for high character and worthwhile achievement." Membership in the association, founded in 1912 by Elwood E. Rice, is by invitation to American manufacturers qualifying under the association's standards,

which include attainments in honor, quality, strength and service.

Said Dr. Rice, president of the Association, in honoring the Mathew company:

"The activities of such reputable, old-established concerns, directed by men with the clear vision, sound judgment and able initiative that President F. E. Moore possesses, have done much to build the great commercial prestige of our country. He and his associates have a record of achievement of which any manufacturer may well be proud."

Convention Calendar

March 16-18—National Association of Waste Material Dealers Inc. Annual convention at Hotel Astor, New York. Charles M. Haskins, 1109 Times building, New York, is secretary.

March 29-April 4—American Ceramic society. Annual convention and exhibit at Columbus, O. Ross C. Purdy, 2525 North High street, Columbus, O., is secretary.

April 13-17—American Chemical Society. Semiannual convention in Kansas City, Mo. Dr. Charles L. Parsons, 728 Mills building, Washington, is secretary.

April 14-18—Oil Burner Institute Inc. Twelfth national convention at Statler hotel, and show at Convention Hall, Detroit. G. Harvey Porter, 30 Rockefeller Plaza, New York, is managing director.

April 16—National Council of American Shipbuilders. Annual convention at Whitehall club, New York. C. C. Knerr, 11 Broadway, New York, is secretary.

April 16-17—American Institute of Mining and Metallurgical Engineers. Meeting of open-hearth committee in Detroit. L. F. Reinartz, works manager. American Rolling Mill Co., Middletown, O., is chairman.

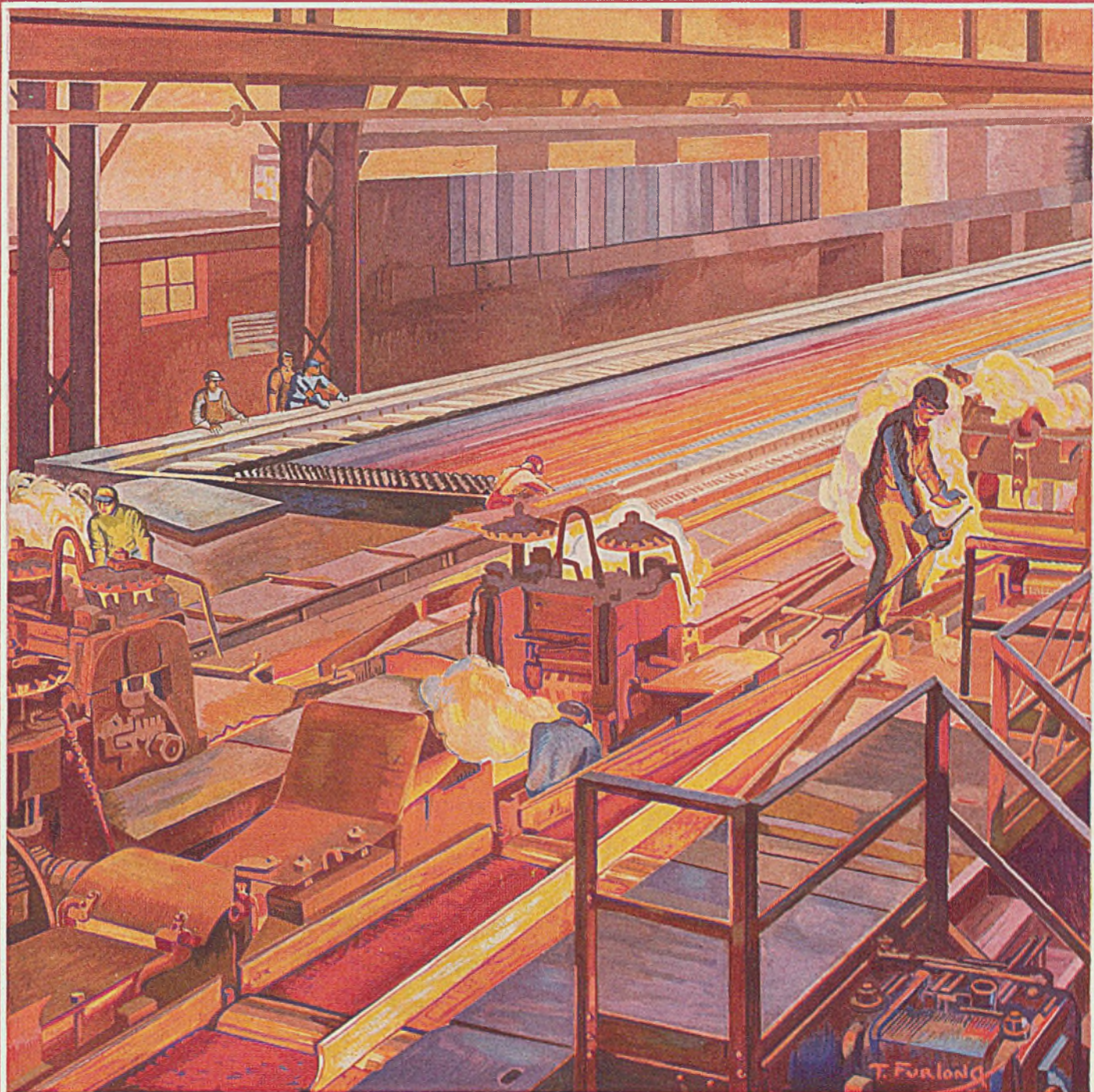
April 18—Spring Manufacturers association. Annual convention at Hotel Commodore, New York. L. A. Wheeler, 4 School street, Bristol, Conn., is secretary.

April 20-21—American Gear Manufacturers association. Twentieth annual convention at Adelphia hotel, Philadelphia. J. C. McQuiston, Penn Lincoln hotel, Wilkinsburg, Pa., is manager-secretary.

April 20-23—American Hardware Manufacturers association. Convention at Hotel Peabody, Memphis, Tenn. Charles F. Rockwell, 342 Madison avenue, New York, is secretary.

April 20-24—Midwest Power Engineering conference and Midwest Engineering and Power exposition. Conference at Palmer House, exposition at International Amphitheatre, Chicago. G. E. Pfisterer, 308 West Washington street, Chicago, is secretary.

April 22-23—Association of Iron and Steel Electrical Engineers. Spring engineering conference at Ohio hotel, Youngstown, O., under auspices of combustion engineering division. Brent Wiley, 1010 Empire building, Pittsburgh, is managing director.



The Background of Experience

At a time when plant modernization arrests the attention of the entire industrial world, it is worth while to remember that the effectiveness of all facilities depends upon a background of manufacturing experience. Bethlehem's mills bristle with young men, but also guiding the operations are older experienced heads which contain many years' knowledge

of the making and forming of steel. Bethlehem has been a pioneer in the rolling of bars, the development of alloy steels, the production of wide-flange shapes, and other advances. Bethlehem products therefore are made not only with the advantages of wide facilities, but also according to the standards which are based upon many years of experience.



BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

Leading Products of Bethlehem

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

Carbon billets, blooms and slabs, rerolling and forging quality; sheet bars and skelp.

Fabrication and Erection of Buildings, Bridges, and Other Steel Structures

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 SILVERY 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.



Oil-Burning Equipment

BETHLEHEM-DAHL mechanical-atomizing oil-burning system for stationary and marine service.

Trackwork

for Steam, Electric, Mine and Industrial Railways

Frogs, switches, Bethlehem and NEW CENTURY switch stands; crossings, steel ties, gage rods, rail braces, BETHCO rail anchors; silico-manganese and manganese special trackwork; hook-flange guard rails, compromise joints.

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.

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.

Stainless Steels

BETHADUR and BETHALON, covering practically every requirement for stainless steels.

Tools

Rivet sets, punches and dies; chisel blanks and chisels; hot and cold friction saws; steel stamps (letters and figures for hot and cold work); slitting shears, shear blades; special high-speed tool holder bits; special tools.

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.

Flanged Products

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



BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

District Offices: Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. Export Distributor: Bethlehem Steel Export Corporation, New York.

Steel Price Changes Aiming at Stabilization

Concessions Withdrawn;

More Tonnage Placed;

Sharp Motorcar Rebound

WHILE discussion of steel prices for second quarter was prolonged last week to an unusually late period, the psychology of buyers who have been receiving concessions was such as to drive in considerable tonnage for delivery before April 1, raising steelworks operations 1 point to 55½ per cent.

The price changes so far announced, and in prospect this week, appear to be on the side of stabilizing the openly quoted levels—and to this extent representing an advance—rather than contemplating any general upward movement. Steelmakers have been scanning the wage factor, the probability of higher taxes, and the actual increase in raw material costs.

First result was to stop the raid on sheet and strip prices by withdrawing concessions, which had amounted to as much as \$3 to \$8 a ton, and to formulate a quantity differential system. This is likely to be outlined this week and may also apply to many other products, including plates, shapes and bars.

Wire product prices named last week represent a compromise, being higher than the recent concessions, but below official quotations. Wire nails were reduced \$6 a ton, now \$10 a ton less than last July. Staples were cut \$3 a ton. Woven wire fencing was marked down \$3. These were for immediate effect. For the second quarter plain wire was advanced \$2 a ton, offset to some extent by elimination of size extras; spring wire up \$3; and fence wire \$4.

Prices reaffirmed included standard rails at \$36.37½ on orders booked during the second quarter, for delivery through third quarter; tin mill black sheets, and tool steels. In wire rods, a sliding scale was adopted according to gage, which results in relatively small change from the prevailing level. Butt-weld steel pipe was reduced 5 per cent, and lap-weld by a lesser amount.

In raw materials, scrap prices continued to rise, fluorspar was advanced 50 cents a ton, and bee hive foundry coke was reduced 25 cents.

To actual increase in consumer demand, as well as to their firmer stand on prices, steelmakers look for further improvement in the industry's operations. Contributing to this be-

MARKET IN TABLOID

DEMAND . . . Heavier.

PRICES . . . Firmer.

PRODUCTION . . . Steelworks operations up 1 point to 55½ per cent.

SHIPMENTS . . . Increasing.

lief, last week automobile production rose 32 per cent to 85,000 units. Detroit is convinced that the low point in automobile production has been passed, and appraises last week as a swift rebound.

Railroads placed 54,800 tons of rails, including Chicago, Milwaukee, St. Paul & Pacific's 28,000 tons; Chesapeake & Ohio, 20,000; and Nickel Plate, 6800. Erie is in the market for 19,000 tons, and it is estimated eastern roads will order 70,000 tons shortly.

Pacific Fruit Express is inquiring for 3000 refrigerator cars; Illinois Central is to rebuild 1600 freight cars, and Lehigh Valley has purchased about 10,000 tons of steel for 1000 coal cars to be built in its shops.

Structural shape awards in the week dropped to 8738 tons, while 12,168 tons of reinforcing bars were awarded.

Daily average pig iron production in February—63,411 gross tons—was 3.1 per cent lower than in January, and the month's total—1,838,932 tons—was down 9.4 per cent. Total output for the two months—3,868,236 tons—is 25 per cent higher than in the first two last year. A net gain of two active blast furnaces was made in February, to 120 operating at the close.

Youngstown district steelworks operations last week advanced 5 points to 68 per cent; eastern Pennsylvania 1½ to 39. Cleveland was down 2½ to 64; New England, 4 to 68, while other districts were unchanged.

STEEL's iron and steel price composite is up 1 cent to \$33.60, due to a rise in scrap. The finished steel index, which will not reflect price changes for second quarter until that period, is off 60 cents to \$53.10, on the reduction in wire nails. The scrap composite is up 4 cents to \$14.50.

Iron and Steel Scrap Prices

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

Table listing various types of iron and steel scrap such as HEAVY MELTING STEEL, COUPLERS, SPRINGS, ANGLE BARS-STEEL, RAILROAD SPECIALTIES, RAILROAD GRATE BARS, etc., with their respective prices per gross ton.

Iron Ore

Table listing different grades of iron ore like Lake Superior Ore, Lower Lake Ports, Old range bessemer, etc., with prices.

Table listing Eastern Local Ore (Cents, unit, del. E. Pa.), Foreign Ore (Cents per unit, f.a.s. Atlantic ports), and Foreign manganiferous ore.

Table listing iron and steel products like iron, 6-10% man., Swedish basic, Spanish No. Africa basic, etc., with prices.

Manganese Ore

Table listing Manganese Ore (Nominal) prices, noting that prices do not include duty.

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	
Cincinnati 3.22c	San Francisco 2.45c	Detroit, ½-in. 3.65c		
Cleveland 3.00c	Seattle 2.45c	Houston 3.00c	NO. 24 BLACK	
Detroit 3.09c	St. Louis 3.25c	Los Angeles.. 3.60c	Baltimore*†... 3.60c	Baltimore (c) 3.73c
Houston 3.00c	Tulsa 3.25c	Milwaukee ... 3.31c	Boston (g) ... 3.95c	Boston 3.90c
Los Angeles.. 3.60c	Young 2.30c-2.60c	New Orleans 3.55c	Buffalo 3.25c	Buffalo (h).... 3.55c
Milwaukee ... 3.11c-3.26c		New York†(d) 3.40c	Chattanooga.. 4.16c	Chattanooga* 4.13c
New Orleans.. 3.35c	SHAPES	Philadelphia* 2.98c	Chicago 3.85c	Chicago (h)... 3.50c
New York†(d) 3.31c	Baltimore*.... 3.00c	Phila. floor... 4.95c	Cincinnati 4.02c	Cincinnati ... 3.72c
Pitts. (h)..... 2.95c-3.10c	Boston†† 3.19c	Pittsburgh(h) 3.15c	Cleveland 3.91c	Cleveland (h) 3.50c
Philadelphia* 3.03c	Buffalo 3.25c	Portland 3.35c	Detroit 3.94c	Detroit 3.79c
Portland 3.50c	Chattanooga.. 3.56c	San Francisco 3.25c	Los Angeles.. 4.35c	Los Ang. (f) (d) 5.85c
San Francisco 3.25c	Chicago 3.20c	Seattle 3.55c	Milwaukee ... 3.96c	Milwaukee ... 3.61c
Seattle 3.70c	Cincinnati 3.42c	St. Louis 3.45c	New Orleans 4.50c	New Orleans 4.30c
St. Louis 3.25c	Cleveland 3.31c	St. Paul 3.45c	New York†(d) 3.89c	New York†(d) 3.81c
St. Paul 3.25c-3.40c	Detroit 3.42c	Tulsa 3.50c	Philadelphia*† 3.60c	Philadelphia.. 3.76c
Tulsa 3.25c	Houston 3.00c		Pitts.** (h)... 3.55c	Pittsburgh ... 3.50c
	Los Angeles.. 3.60c	NO. 10 BLUE	Portland 4.10c	Portland (f) (d) 6.15c
IRON BARS	Milwaukee ... 3.31c	Baltimore*.... 3.10c	San Francisco 4.00c	San Fran.(f) (d) 5.95c
Portland 3.40c	New Orleans 3.55c	Boston†† 3.30c	Seattle 4.40c	Seattle (f) (d) 6.15c
Chattanooga.. 3.36c	New York†(d) 3.37c	Buffalo 3.62c	St. Louis 4.10c	St. Louis..... 3.75c
Baltimore*.... 3.05c	Philadelphia* 2.98c	Chattanooga.. 3.36c	St. Paul 3.90c	St. Paul 4.02c
Chicago 2.75c	Pittsburgh(h) 3.15c	Chicago 3.05c	Tulsa 4.75c	Tulsa 4.65c
Cincinnati 3.22c	Portland (l).. 3.50c	Cincinnati 3.22c		
New York†(d) 3.36c	San Francisco 3.25c	Cleveland 3.11c	NO. 24 GALV. SHEETS	
Philadelphia* 2.93c	Seattle (l).... 3.70c	Det., 8-10 ga. 3.14c	Baltimore*†... 4.30c	Baltimore*†... 4.30c
St. Louis..... 3.25c	St. Louis 3.45c	Houston 3.35c	Buffalo 4.00c	Chicago 3.27c
Tulsa 3.25c	St. Paul 3.45c	Los Angeles.. 3.75c	Boston (g).... 4.65c	Cincinnati (b) 3.22c
	Tulsa 3.50c	Milwaukee ... 3.16c	Chattanooga.. 4.86c	Cleveland (b) 2.85c
REINFORCING BARS		New Orleans 3.55c	Chicago (h).. 4.55c	Detroit 3.18c
Buffalo 2.60c	PLATES	New York†(d) 3.31c	Cincinnati 4.72c	New York†(d) 3.36c
Chattanooga.. 3.36c	Baltimore*.... 3.00c	Portland 3.35c	Cleveland 4.61c	St. Louis 3.45c
Chicago 2.10c-2.60c	Boston†† 3.21c	Philadelphia* 3.08c	Detroit 4.72c	
Cleveland (c) 2.10c			Houston 4.40c	TOOL STEELS

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Mar. 5

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	
	£	s d	Quoted in dollars at current value	**Quoted in gold pounds sterling
PIG IRON				
Foundry, 2.50-3.00 Silicon	\$15.54	3 2 6	\$13.66	1 13 0
Basic bessemer.....	15.54	3 2 6	12.13	1 10 0
Hematite, Phos. .03-.05..	17.71	3 11 0	.....	.....
SEMIFINISHED STEEL				
Billets.....	\$29.19	5 17 6	\$18.99	2 7 0
Wire rods, No. 5 gage....	42.33	8 10 0	36.39	4 10 0
FINISHED STEEL				
Standard rails.....	\$41.09	8 5 0	\$44.47	5 10 0
Merchant bars.....	1.72c	7 15 0	1.13c to 1.18c	3 2 6 to 3 5 0
Structural shapes.....	1.66c	7 10 0	1.12c	3 1 6
Plates, ½ in. or 5 mm....	1.80c	8 1 3	1.55c	4 5 0
Sheets, black, 24 gage or 0.5 mm.....	2.16c	9 15 0	2.12c	5 16 0††
Sheets, gal., 24 gage, corr.	2.61c	11 15 0	2.29c	6 5 0
Bands and strips.....	1.94c	8 15 0	1.42c	4 0 0
Plain wire, base.....	2.05c	9 5 0	1.92c	5 5 0
Galvanized wire, base....	2.39c	10 15 0	2.15c	5 17 6
Wire nails, base.....	2.66c	12 0 0	1.74c	4 15 0
Tin plate, box 108 lbs....	\$ 4.67	0 18 9	.....	.....

British ferromanganese \$75 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d (\$43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£	s	d	French Francs	Belgian Francs	Reich Marks
Fdy. pig iron, Si. 2.5....	\$17.43	3 10 0(a)	\$17.34	260	\$13.12	385
Basic bessemer pig iron...	17.43	3 10 0(a)	12.67	190	11.94	350
Furnace coke.....	4.86	0 19 6	6.34	95	4.18	122
Billets.....	29.29	5 17 6	28.68	430	18.93	555
Standard rails.....	1.83c	8 5 0	2.01c	671	1.70c	1,100
Merchant bars.....	2.04c	9 1 0	1.69c	560	1.00c	650
Structural shapes.....	1.95c	8 15 0	1.66c	550	1.00c	650
Plates, ½ in. or 5 mm....	2.01c	9 1 3	2.11c	700	1.23c	800
Sheets, black.....	2.45c	11 10 0	1.81c	600†	1.35c	875†
Sheets, galv., corr., 24 ga. or 0.5 mm.....	2.95c	13 10 0	2.87c	950	2.31c	1,500
Plain wire.....	2.05c	9 5 0	2.72c	900	1.77c	1,150
Bands and strips.....	2.21c	9 16 0	1.96c	650	1.23c	800

*Basic. †British ship-plates. Continental, bridge plates. ‡24 ga. †1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 66.00 per cent over paper sterling.

Bars

Bar Prices, Page 80

Pittsburgh—Merchant steel bar producers will have a revised card on extras to announce soon although expectations are that 1.85c, base, for 5 to 25-ton lots will not be altered for second quarter. Improved automotive specifications have enlivened the bar market and last week's buying was equal to the best week in January. Alloy steel bars remain quoted unchanged on the basis of 2.45c, base, Pittsburgh.

Prices on tool holder bits, effective with the second quarter, will be on a unit basis plus quantity extras, instead of the former per pound basis. All base prices on tool steel bars have been extended unchanged for the second quarter.

Cleveland—Demand for steel bars continues of a miscellaneous character, only slight improvement being noted in specifications from automobile manufacturers and forge shops. Substantial releases are being received from manufacturers of agricultural implements and road machinery.

Chicago—Steel bar sellers still are accepting business only for delivery during the remainder of March, deferring opening of second quarter books until the announcement of prices. Sales and specifications are holding recent gains and are expected to increase soon as a result of a prospective betterment in automotive needs. Requirements of farm implement manufacturers are steady, with this industry holding operations near capacity.

New York—Buying of steel bars is steady. Prices are expected to be reaffirmed for second quarter.

Philadelphia—Bar specifications continue fair, with improved orders noted from cold drawers, who are experiencing especially good demand from the machine tool builders. Most trade interests look for an early reaffirming of the 1.85c, Pittsburgh, price in commercial steel bars.

Youngstown, O.—New business in bars is being given added impetus by the more favorable turn in the weather. Implement makers still are the best customers after auto partsmakers, while railroad car repairers are a close third. Shipments from mills continue to improve.

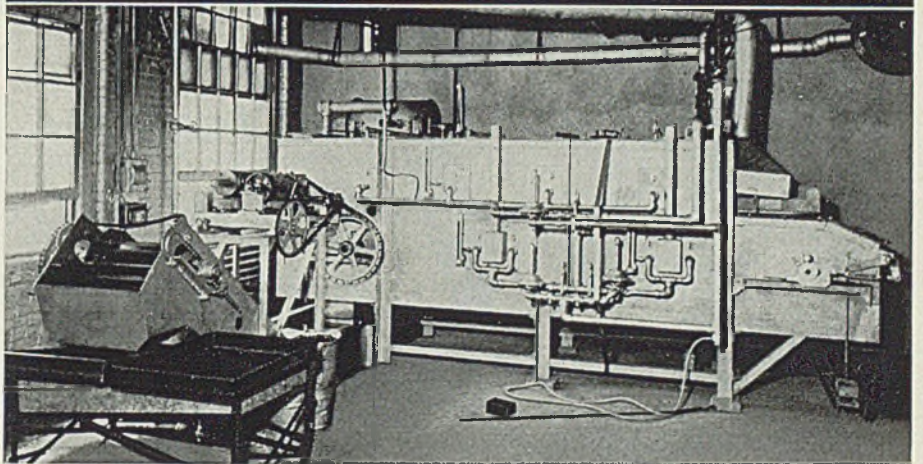
Tin Plate

Tin Plate Prices, Page 80

Pittsburgh—The market on No. 28 gage tin mill black sheets of 2.75c,



...when furnaces are built with **Armstrong's EF Brick**



USE of Armstrong's EF Insulating Fire Brick insures accurate temperature control—and more! Because it requires no fire brick protection, this lightweight semi-refractory brick can be laid up in thinner walls. The result is less time needed to bring the equipment to temperature, with a consequent saving of fuel and speeding up of production.

This brick is available for two temperature ranges—EF-22 for temperatures as high as 2200° F.; EF-26 for temperatures as high as 2600° F. Armstrong's EF Insulating Fire Brick can be

SHOWN ABOVE—Gas-fired, muffle-type hardening furnace for heating and hardening cap and set screws and other small parts—built by W. S. Rockwell Co. with Armstrong's EF-22 Insulating Fire Brick.

used for any type of furnace—gas, oil, coal, or electric-operated.

We'll be glad to supply you with samples and data on EF Insulating Fire Brick—also the other high temperature insulation products in the complete Armstrong Line. Write Armstrong Cork Products Co., Building Materials Division, 985 Concord Street, Lancaster, Pennsylvania.



Armstrong's

HIGH TEMPERATURE INSULATION

STEEL

Pittsburgh, is being extended unchanged through the second quarter. The \$5.25 per base box quotation on standard tin plate was previously named for the balance of 1936. Both of these markets are firm. Tin plate production averages about 75 per cent. Most hot tin mills are operating at an average of less than 75 per cent, but practically all of the cold reducing departments are about 100 per cent, and have sizable backlogs. Tin mill inventories of finished plate made up largely for packers' cans have not been moved to any extent.

Plates

Plate Prices, Page 80

Pittsburgh—Base price on plates, f.o.b. Pittsburgh, is probably being extended unchanged into second quarter at 1.80c per pound. However, many recent bids on barges indicate a preference on plate prices or some other variable in the form of labor or other costs. Youngstown Sheet & Tube Co. is fabricating 4920 feet of 18-inch dredge pipe

for the federal engineers at Philadelphia.

Cleveland — Recent concessions of \$3 a ton in sheet prices led to concessions of \$1 to \$2 a ton in thin gage plates, some sellers overlooking the dividing line between the two. In a few instances \$2 a ton off also was reported for standard plates. This market has been one of the quietest spots in this district, only small lots having been booked for some months. Some fairly good tonnages are being figured for bins. A Columbus, O., contractor is planning to have built a number of concrete mixers, to mix concrete at railroad stations, for delivery by truck to the jobs, and for this prices were taken on about 100 tons.

Chicago — Plate mills still look to railroads and structural fabricators for principal sources of business. Industrial tank work is slow to improve, though oil companies have improvement and extension programs under consideration.

Boston—Plate producers have not opened second quarter books. Current business is good and showing improvement. Several important tonnages have been placed, including 400 tons of plates and 200 tons of floor plates for two ferryboats to be assembled at Burlington, Vt., to ferry automobiles across Lake Champlain.

New York—Platemakers are expected to extend present prices into second quarter although books have not been opened formally. Placing of plates for part of the Lehigh Valley carbuilding program has stimulated the market, which is dragging in some respects. Award of the South African ships is said to be pending the return of a leading official.

Continued delay in placing 15,000 tons of hull steel for the United States liner is because formal approval to the contract with the Newport News Ship Building & Dry Dock Co., Newport News, Va., has not been given by the shipping board. This is due to minor alterations in the plans.

Philadelphia—Miscellaneous plate tonnage has shown improvement. A feature of new business is the placing of an oil tanker by the Atlantic Refining Co., Philadelphia, with the Sun Shipbuilding Co., Chester, Pa. Approximately 5000 tons of hull steel will be required. The last tanker booked by this yard was for the Sun Oil Co., as noted at the time. District platemakers are also interested in the opening March 11 of bids on the coastguard cutter HOLLIMOCK, requiring approximately 300 tons of plates and 150 tons of shapes and bars. However, as this boat is for operation on the Great Lakes, it is

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PARALLELED by its permanent lustre and non-corrosive qualities, are the fabricating possibilities found in all SUPERIOR Stainless Metals. Deep and sharp draws with a flawless finish are daily accomplishments on many presses.

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Philadelphia, Penna.

Corporation

Steel Sales Corp.
129 South Jefferson St.
Chicago, Ill.

H. L. Brown,
2001 Carew Tower
Cincinnati, Ohio

—The Market Week—

believed likely that construction will go to a mid-west yard. Platemakers are expected to open books shortly for second quarter at the present market of 1.90c, Coatesville, Pa., or 1.99 1/2c, Philadelphia.

Seattle—Tacoma has called bids March 16 for 18,990 feet of 48-inch water pipe which, if awarded all steel, would require 2000 tons of plates. However, 16,240 feet are specified either steel or lock joint steel cylinder reinforced concrete and as the city allows a differential of 33-1/3 per cent for the latter, plate fabricators hold little hope of obtaining the job. Of the total at least 2750 feet will be steel, totaling about 235 tons.

Contracts Placed

- 1200 tons, 36-inch welded pipe line for treasury department, Berkeley, Calif., to Steel Tank & Pipe Co., Berkeley, Calif.
- 800 tons, four all-welded steel tank barges, 175 x 35 x 8 1/2 feet, for Standard Oil Co. of New Jersey to Marietta Mfg. Co., Point Pleasant, W. Va.
- 730 tons, pipe line for Cajalco dam, Cajalco, Calif., to Consolidated Steel Corp., Los Angeles.
- 325 tons, 82,000-barrel tank, Public Service Gas & Electric Co., Jersey City, N. J., to Dover Boiler Works, Dover, N. J.
- 300 tons, pipe for Iron Mountain pumping plant, metropolitan water district, Los Angeles, to Consolidated Steel Corp., Los Angeles.
- 150 tons, 24-inch welded steel pipe, Inglewood, Calif., to Western Pipe & Steel Co., San Francisco.
- 120 tons, breeching and stack, Fisher Body Corp., Grand Rapids, Mich., to Jones & Laughlin Steel Corp., Pittsburgh.
- 100 tons, 500,000-gallon tank, treasury department, Los Angeles, to Lacy Mfg. Co., Los Angeles.

Contracts Pending

- 1500 tons, Hetch Hetchy pipe line, Burlingame, Calif.; bids in April.
- 600 tons, tanks for Phelps Dodge Corp., Ajo, Ariz.; bids opened.
- 235 tons, 48-inch water pipe for Tacoma, Wash., bids March 16.
- 180 tons, flotation cells, Phelps Dodge Corp., Ajo, Ariz.; bids opened.
- 150 tons, gas holder, San Diego, Calif.; bids opened.
- 100 tons or more, remodeling lighthouse tender Rose; bids at Portland, Oreg., March 18.

Cold Finished

Cold Finished Prices, Page 81

Pittsburgh—The cold-drawn carbon bar market holds at 2.10c, Pittsburgh, base. Apparently cold-drawn bar sellers have solved the problem of allowing differentials for quantity buying, especially when compared with the recent strip and sheet markets. Demand for cold-drawn bars, largely predicated on automotive assemblies, was improving last week.



CORRECT lubrication is certainly "doing things" to industrial costs these days! It may be rude to point—but look:

They were pouring the oil over the spool of material. (This was in the steel shank department of a shoe factory.) The operation was one of cutting off and stamping. Oil was naturally dripping on the floor, inviting fire from a match or a spark—the waste was a scandal. A Standard Lubrication Engineer made a practical suggestion: "Put a sight feed oiler ahead of the die." They did. Oil consumption was reduced 95%! The fire hazard was eliminated . . . and so was the mess on the floor.



After one month's use of Standard Oil products a large paper mill had cut its lubrication costs to 28.5 cents per ton. They were pleased. But the *real* surprise was coming. After 8 more months of Standard Oil products—and *service*, they'd cut costs to 5 cents a ton! What really brought this *added* saving? A suggestion here, a reduced feed there, a better method of application or two—SERVICE.

CORRECT LUBRICATION means Standard Oil (Indiana) Products, Standard Oil Service—and the practical suggestions embodied in Standard Oil Monographs.

The *service* of Standard Oil engineers is entirely without obligation. Reach them by phone at your local Standard Oil (Indiana) office.



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) 910 South Michigan Avenue, Chicago, Illinois (287)

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STANDARD OIL COMPANY (Indiana)

CORRECT LUBRICATION

Transportation

Track Material Prices, Page 81

Placing of rails continues, three lots being distributed in the past week to a total of 54,800 tons. Numerous further tonnages are pending, including those of the Chicago, Rock Island & Pacific and the Chicago & Eastern Illinois. Distribution of the rail purchases of the Chesapeake & Ohio, Nickel Plate and Chicago, Milwaukee, St. Paul & Pacific follows.

Norfolk & Western is expected to take action Tuesday on its inquiry for 20,000 tons of rails, plus track bolts and accessories.

Lehigh Valley has placed substantial orders for steel for 1000 coal cars to be built in its own shops, 500 of which will be constructed of all steel.

Atchison, Topeka & Santa Fe is reported to have placed 20 to 25 stainless steel passenger coaches with Edward G. Budd Mfg. Co., Philadelphia.

The price of standard rails has

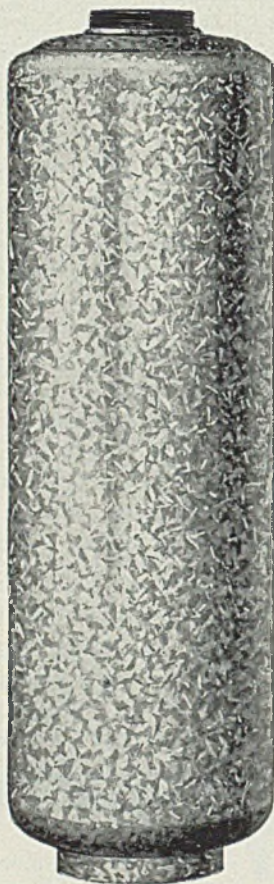
been reaffirmed at \$36.37½, mill, for orders booked during second quarter for delivery in third quarter.

Illinois Central states it will rebuild 1600 freight cars at its own shops and has ultimate plans to repair 141 locomotives and air condition 52 passenger cars. Lehigh Valley will build 250 50-ton all-steel coal cars from old material in its own shops, and in addition, will build 250 composite 50-ton coal cars from new material.

Domestic freight car awards in February totaled 6900, bringing the total for two months to 8950, compared with 830 in the same period of 1935. Other comparisons will be found in the following tabulation:

	1936	1935	1934	1933
Jan.	2,050	24	152	3
Feb.	6,900	806	19,725	0
2 mos.	8,950	830	19,877	3
March		0	30	5
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

40-GALLON Seamless Tank DEEP DRAWN



This example of Hackney work is constructed from seamless shell with integral bottom. A head is brazed or welded to open end. The threaded collar on head is flanged from metal of head, and is machined to receive cap.

Countless industries find the Hackney deep-drawing method of manufacture offers definite advantages in cost and efficiency. Hackney makes special shapes, shells, tanks, bottles, etc., to meet virtually any type of need.

A container of high uniform strength, unvarying thickness, and free from laminations is provided. The smooth surface of the metal permits a high gloss painted finish. Terne coating or galvanizing by the Hot Dip process after the tank has been completely assembled are obtainable.

Send details of your requirements to Hackney. Let our engineers study them, for possible recommendations for improved efficiency. No obligation.

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MILWAUKEE

DEEP DRAWN SHELLS AND SHAPES

Car Orders Placed

Atchison, Topeka & Santa Fe, 20 to 25 stainless steel passenger coaches, reported placed with Edward G. Budd Mfg. Co., Philadelphia.
California Despatch, five tank cars of 40 tons capacity, to American Car & Foundry Co., New York.
Chicago Surface Lines, Chicago, 83 street cars to St. Louis Car Co., St. Louis on bid of \$1,292,112.

Rail Orders Placed

Belt Railway Co., Chicago, 800 tons, to Carnegie-Illinois Steel Corp., Pittsburgh.
Chesapeake & Ohio, 20,000 tons of 131-pound: Bethlehem Steel Corp. 2000 tons; Carnegie-Illinois Steel Corp. 12,000 tons; Inland Steel Co., 6,000 tons.
Chicago, Milwaukee, St. Paul & Pacific, 28,000 tons; 21,000 tons to Carnegie-Illinois Steel Corp., 7000 tons to Inland Steel Co., Chicago.
Nickel Plate, 6800 tons: Bethlehem Steel Corp. 800 tons; Carnegie-Illinois Steel Corp. 4500 tons; Inland Steel Co. 1500 tons.

Car Orders Pending

Northern Pacific, unstated number of 50-ton convertible ballast cars; reported contemplated.
Third Avenue Railway System, 2396 Third avenue, New York, 100 street cars; bids asked.
United States engineer, Fort Peck, Mont., thirty 6-ton platform cars; bids in.

Locomotives Pending

United States engineer, Fort Peck, Mont., eight electric locomotives; At-

las Car & Mfg. Co., Cleveland, low.

Rail Orders Pending

Erie, 19,000 tons; loan authorized by RFC for purchase.

Sheets

Sheet Prices, Page 80

Pittsburgh — Sheet producers last week continued to consider second quarter prices. Apparently there are three major choices: The market could be advanced above the nominal levels of the early first quarter; the nominal first quarter could be reaffirmed, or the entire market could be written down on the basis of the \$3 a ton concessions which have grown widespread the last week. Furthermore, the application of quantity differentials and the revision in extras also was holding up the second quarter announcement. Late last week some mills indicated they would not be ready to announce prices before the middle of this week. Operations in the sheet mills find common black at about 65 per cent, full finished at 50 per cent, and galvanized at 55 per cent, with jobbing mills averaging 45 per cent.

Cleveland — Pending announcement for prices for second quarter last week concessions of \$3 a ton were freely offered on sheets, including enameling stock, for shipment prior to April 1. Considerable tonnage was placed by consumers anticipating producers' efforts to strengthen the market for second quarter. Little improvement was noted in automobile tonnage, but larger orders were placed by manufacturers of refrigerators and stoves.

Chicago—Sheet producers still are not ready to open second quarter books nor to disclose prices for that period. Some decision on these matters is expected to be announced within the next few days, however. In the meantime business is holding in steady volume at a relatively high rate despite the lack of definite improvement in automotive orders. A substantial pick-up in the latter, however, is anticipated within the next few weeks, with favorable prospects seen for a rising trend in automotive needs through April.

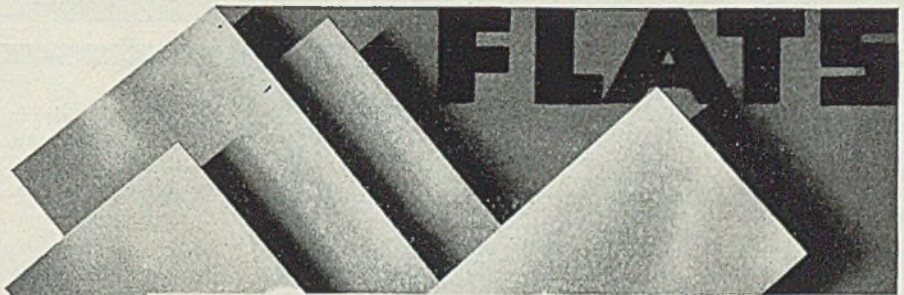
New York—Substantial buying of sheets for delivery over the remainder of the month developed early last week as consumers expected the market to firm up. Various sellers withdrew concessions pending the opening of books for second quarter. One large interest definitely re-established the 3.10c, base, Pittsburgh, price on deliveries of galvanized sheets before April 1, following

weakness which resulted in concessions to as low as 2.70 1/4 c.

Snead & Co., Jersey City, N. J., are low on metal shelving and filing equipment for the Archives building, Washington, estimated to require 5000 to 6000 tons.

Philadelphia—Full details of a new system of quantity differentials, whereby preferentials will be given to tonnage buyers are expected shortly. Meanwhile most leading sellers have withdrawn their special prices, which, in some cases represented concessions of \$5 a ton under book

prices, and in galvanized sheets, even a greater concession. Prospects of a firming up of the market have resulted in the placing of fairly substantial orders for delivery before the end of this month. More than 500 tons of stainless steel is under inquiry by the Edward G. Budd Mfg. Co., this city, this tonnage including requirements of 20 to 25 stainless steel coaches for the Atchison, Topeka & Santa Fe. The Coca Cola Co., with purchasing offices at Wilmington, Del., has in recent months been replacing wooden kegs with



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B & L Extra Wide Flats offer you these economies in making bed plates, stripper plates and backing plates for dies, patterns, jigs and other equipment parts.

These handy sections are cold drawn to uniform size, true flatness and close tolerances of plus .000" to minus .008" and free from surface blemish. Available in widths to 12" and thickness from 1/4" to 2"—cold sawed to accurate dimensions.

Try these popular bar shapes in your shop on work demanding precision standards—they save assembly time.



Cold Finished Bars and Shafting • Ultra-Cut Steel • Special Sections • Alloy Steels

BLISS & LAUGHLIN, INC.

HARVEY, ILL. Sales Offices in all Principal Cities BUFFALO, N.Y.

stainless steel containers for the distribution of this product. It is understood that its requirements for this year will involve close to 1000 55-gallon stainless steel containers.

Buffalo—Demand for sheets has improved with the result that production in Buffalo hand mills has increased from February averages of 60 per cent to around 75 per cent.

Youngstown, O.—District sheet mills are enjoying a fair pre-spring run of new business as consumers apparently are anticipating larger requirements. This is true as well

of galvanized building sheets as of the cold-finished autobody material. Better demand for galvanized sheets is appearing from the South and Southwest, supplementing the steady requirements from the domestic utensil makers. Efforts to stabilize wasters at 2.25c seems to be working out after these sheet grades had been offered down as low as 2.10c.

Cincinnati — Foreshadowing announcement of second quarter prices, sheet buying increased as users sought to cover on recent price concessions. Mills refused to book sec-

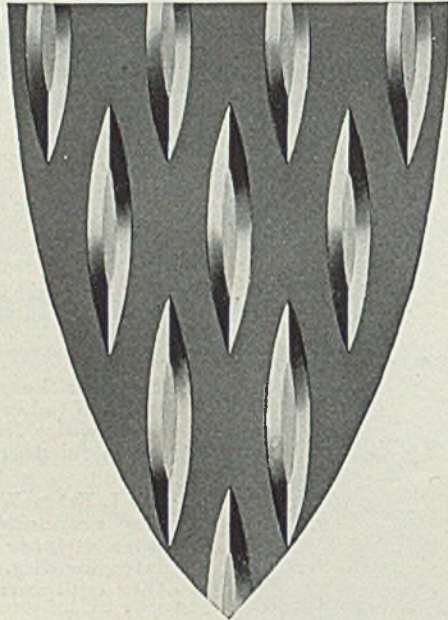
ond quarter material under the current price schedule. Shipments disclose a broad upward trend in demand.

St. Louis—Sheet demand continues to broaden. Price uncertainty has restricted buying in some quarters, but these demands will be filled later. Miscellaneous users are supplying the major part of current business.

Birmingham, Ala. — Demand for sheets is steady. Production is favorable. Agricultural buying is a little more active.

"A.W." ROLLED STEEL FLOOR PLATE

Diamondette pattern shown actual size.



Available also in Super-Diamond, Diamond, and other patterns.

LOW FIRST COST—NO MAINTENANCE COST

Quick installation without disturbing men or production. Cut to any required shape. Slip proof, oil proof, heat proof, crack proof. Toughest traffic can't damage or impair it. PERMANENT. Immediate delivery, in various patterns to meet all requirements.

ALAN WOOD STEEL COMPANY

CONSHOHOCKEN, PA.

BRANCHES:

Philadelphia, New York, Boston, Los Angeles, San Francisco, Seattle, Houston

110 YEARS' IRON- AND STEEL-MAKING EXPERIENCE



Pipe

Pipe Prices, Page 81

Youngstown, O.—Proposing to inaugurate a new plan of pricing wrought steel pipe, the Youngstown Sheet & Tube Co. has issued a new series of mill discount cards, effective immediately. This reflects a reduction of about 5 per cent in butt-welded steel pipe and a lesser reduction in lap-welded. The reduction in reality is a leveling down to prices that have been in effect in some important market areas in various parts of the country. No change has been made in prices of oil country tubular goods. Prices shown on the new cards to consumers for carloads are flat discounts and when sold through a jobber a specified per cent may be allowed "as extreme commission on the basing point value of the material." These jobbers' "extreme prices" apply to either sales from stock or to carloads for direct shipment from mill. There also is a "new suggested minimum out of stock selling price for consigned stock jobbers." Consumers are notified that the prices for carloads are flat discounts and are not subject to the preferential discount as heretofore.

Pittsburgh—Wheeling Steel Corp., Wheeling, W. Va., is shipping about 2500 tons of 6-inch pipe involved in requirements totaling 33 miles for the federal engineers at Tucumcari, N. Mex. Activity in large diameters of welded pipe is a feature, although buying in lap and butt weld, as well as seamless grades, is well sustained. Columbia Gas & Electric Co.'s Detroit gas line has not as yet proceeded to the contract stage, although one important producer is rumored for the eventual award on a seamless basis. No announcement on pipe prices for the second quarter has been made as yet.

Chicago—Cast pipe inquiries still consist principally of small lots, while orders are of similar size. Some work which was deferred dur-

ing the recent period of severe weather is being started, and producers look for a moderate pick-up in orders during coming weeks. The inquiry for 6000 tons of Keokuk, Iowa, on which bids recently were taken is not expected to develop into an actual purchase. Cicero, Ill., defers taking new bids on its proposed purchase of 7000 tons.

Boston—Cast pipe buying is fair, but several new projects are on the verge of being bid, particularly large tonnage for Harwich and Athol, Mass., and smaller lots for Andover, Mass. Prices are firm and unchanged.

New York—New lettings of cast pipe during the past week aggregated about 1000 tons. Several thousand tons are involved in new work on which bids have been opened, and on which awards are slated to be made within the next week or two.

San Francisco — United States Pipe & Foundry Co., Burlington, N. J., has been awarded 180 tons of 18-inch pipe for the treasury department, Oakland, Calif. Bids have been taken on 450 tons of 1½ to 8-inch pipe for Palos Verdes, Calif. Sheridan, Wyo., will open bids within the next two months on close to 4000 tons of cast or welded steel pipe.

Seattle—Business is slow and few new projects are developing. Some tonnages are pending, awaiting official confirmation. Tacoma takes bids March 23 for valves and other equipment. Twin Falls, Idaho, plans a \$300,000 bond issue to finance a 24-mile 24-inch cast pipe water line.

Cast Pipe Placed

- 3500 tons, 30-inch, for Allentown, Pa., to Donaldson Iron Co., Emaus, Pa.
- 600 tons, department of purchase, New York, to United States Pipe & Foundry Co., Burlington, N. J.
- 390 tons, Falmouth, Me., to Central Foundry Co., New York, through John MacDonald Construction Co., Boston.
- 300 tons, grade crossing elimination, Glendale, N. Y., to Donaldson Iron Co., Emaus, Pa.
- 240 tons, procurement division, treasury department, New York, for work at Buffalo, to United States Pipe & Foundry Co., Burlington, N. J.
- 200 tons, miscellaneous sizes, Morton, Wash., to Universal Pipe Co.
- 180 tons, 18-inch, treasury department, Oakland, Calif., invitation 232, to United States Pipe & Foundry Co., Burlington, N. J.
- 170 tons, Fall River, Mass., to United States Pipe & Foundry Co., Burlington, N. J.
- 125 tons, 2-inch, Los Angeles, specification X-10, to Crane Co., Los Angeles.

Cast Pipe Pending

- 4300 tons, 16-inch, Sheridan, Wyo.; bids in May.
- 475 tons, 6, 8 and 12-inch, procurement division, treasury department,

New York, for work at Bronx, N. Y.; Warren Foundry & Pipe Corp., Phillipsburg, N. J., low.
340 tons, 6 and 8-inch, procurement division, treasury department, New York, for work in borough of Queens; Warren Foundry & Pipe Corp., Phillipsburg, N. J., low.

Metallurgical Coke

Coke Prices, Page 81

Demand for metallurgical coke is fairly steady, but the entire Western Pennsylvania fuel market has been unsettled by a sudden drop in de-

mand, caused by warm weather and clearing of river ice, freeing barge shipments. However, coal and coke operators in the Western Pennsylvania district are cheerful over a large replacement market this spring in the northwest where stocks have been depleted.

On beehive grades of metallurgical coke, the market on standard furnace is firm at \$3.50 to \$3.75, although foundry grades, f.o.b. Connelville, Pa., ovens, are weaker.

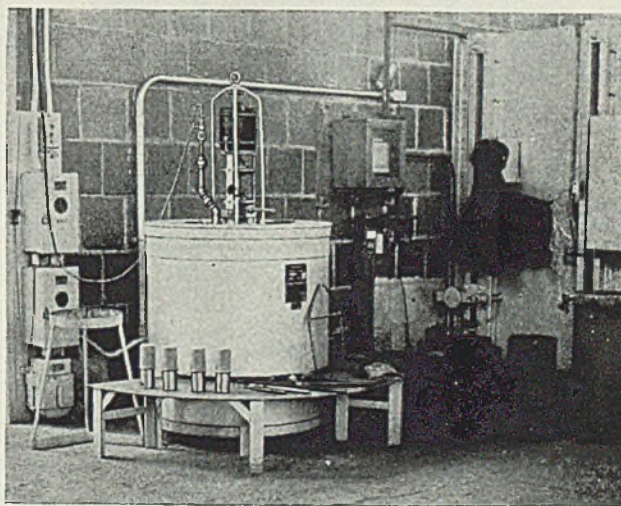
Chicago suppliers of foundry coke are shipping at capacity, with the price firm. In the St. Louis district

How Deep Do You Carburize??



Controlled Cases from .005 to .250 inch are being produced at Low Cost with the

Hevi Duty Vertical Retort Carburizer



Hevi Duty Vertical Retort Carburizer in the plant of a large machinery manufacturer

Send for Bulletin No. 931A, it describes the Electric Vertical Retort Carburizer

HEVI DUTY ELECTRIC CO.

MILWAUKEE **HEVI DUTY** WISCONSIN

HEAT TREATING FURNACES
« ELECTRIC EXCLUSIVELY »

foundries are melting more heavily and coke shipments have expanded. Birmingham, Ala., producers are shipping steadily and output is steady.

Fluorspar

Fluorspar Prices, Page 82

Cleveland—Washed gravel fluorspar has been advanced 50 cents a net ton to \$18 f.o.b. Illinois and Kentucky mines for all-rail shipment. The new price for barge shipment is \$19.

Shapes

Structural Shape Prices, Page 80

New York—The market in the general metropolitan territory is the quietest that has prevailed in some time. The only important addition to the list of tonnages pending is a Bronx, N. Y., involving about 2000 tons in the projected hospital building. However, considerable activity is expected in the near future. The market on plain shapes of domestic manufacture continues firm at

1.90c base, Bethlehem, equivalent to 2.06½c, delivered, New York. Foreign shapes continue obtainable at less.

Bookings of fabricated structural steel in January, according to statistics of the American Institute of Steel Construction, were 50.1 per cent of normal, an increase over previous months. Production for January was 34 per cent of normal, and shipments 31.5 per cent. Bookings for first half of 1935 were 37 per cent of normal, for third quarter 36.9 per cent, and for last quarter 41.4 per cent.

Pittsburgh—The 6500-ton order for purlins, angles and clips for the Fort Peck dam tunnel in Montana was formally entered by American Bridge Co., Pittsburgh, which also closed on a 435-ton municipal bridge at Cincinnati. Rust Engineering Co., Pittsburgh, has received an order for the construction of a large pulp and paper mill at Crossett, Ark., for the Crossett Lumber Co. The market on plain structural shapes will be quoted unchanged through the second quarter at 1.80c, base, Pittsburgh.

Cleveland — Demand for small lots of structural shapes is stronger, one of the leading producers finding it taking up much of the slack due to the lack of automobile tonnage. Bids will be taken March 17 on 2500 tons for Ohio bridges. Republic Steel Corp.'s ore dock here will require 1200 tons of sheet piling, of which only 600 tons will be new material. Bids are being taken on 250 tons for a horticultural building for the Great Lakes Exposition, Cleveland, 800 tons in all now pending for exposition buildings.

Chicago—Awarding of 15,000 tons of structurals for the outer drive development here is expected shortly following awarding of the general contract this week. Great Lakes Dredge & Dock Co., Chicago, is low for the latter. The Randolph street viaduct section of the outer drive link will take 2500 tons of shapes and bids will be compiled on this section soon. Awards are the lightest in several weeks, while new inquiries are limited to a few state bridges.



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GARAGE IN CONNECTION

(AT CASS AND BAGLEY AVENUES)

DETROIT

Shape Awards Compared

	Tons
Week ended March 7.....	8,738
Week ended Feb. 29.....	33,125
Week ended Feb. 22.....	30,697
This week 1935.....	9,242
Weekly average, 1935.....	17,081
Weekly average, 1936.....	22,280
Weekly average, February..	23,355
Total to date, 1935.....	128,660
Total to date, 1936.....	222,800

Backlogs of fabricators are increasing, however, and heavier demand for plain material is in prospect.

Boston—New lettings are slow and nothing new of any size is reported. New jobs on which bids are asked, however, involve close to 1500 tons, and considerable additional tonnage is expected to come out in the near future. The market on plain shapes of domestic manufacture continues firm at 1.90c base Bethlehem, equivalent to 2.20½c delivered, Boston. Foreign shapes continue obtainable at lower.

Philadelphia—Awards have been light. Public inquiry is featured by 800 tons for a Pennsylvania bridge in Lackawanna county and 500 tons for a New Jersey state grade elimination crossing at Westfield. While shape makers have not officially opened their books for second quarter, it is generally believed that prices will be reaffirmed at 1.90c, Bethlehem, Pa., or 2.01½c, Philadelphia.

Seattle—The week's awards approximated 500 tons. Bids were rejected as exceeding estimates for 425 tons required for the Washington state college stadium, Pullman. New tenders will be called under revised plans.

San Francisco — Shape bookings were the largest for any week of the year and totaled 8173 tons, bringing the aggregate since Jan. 1 to 28,414 tons, compared with 12,300 tons for the same period a year ago. The largest award went to American Bridge Co., 6014 tons for tunnel bracing for the Fort Peck dam, Montana.

Shape Contracts Placed

- 1000 tons, public school 234, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa., through Psaty & Fuhrman Inc., New York.
- 800 tons, Curtis high school addition, Staten Island, N. Y., to Lehigh Structural Steel Co., Allentown, Pa., through Psaty & Fuhrman Inc., New York.
- 760 tons, structural material, Wilson dock, Florida Relief administration, Key West, Fla., to Bethlehem Steel Corp., Bethlehem, Pa.
- 475 tons, state bridges, Indiana, to Central States Bridge & Structural Co., Indianapolis.
- 445 tons, bakery, Omaha, Nebr., to Truscon Steel Co., Youngstown, O.
- 435 tons, McMillan street bridge, Cincinnati, to American Bridge Co., Pittsburgh.
- 400 tons, building, for Bartmettler Biscuit Co., Omaha, Nebr., to Truscon Steel Co., Youngstown, O.
- 285 tons, high school building, Grand Forks, N. Dak., to St. Paul Foundry Co., St. Paul.
- 280 tons, bridge in Grant county, Oregon, to Virginia Bridge & Iron Co., Roanoke, Va.
- 275 tons, New York Central grade crossing elimination, Carnan, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.
- 265 tons, over pass, Hill county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.
- 265 tons, under pass, Montague county, Texas, to North Texas Iron &

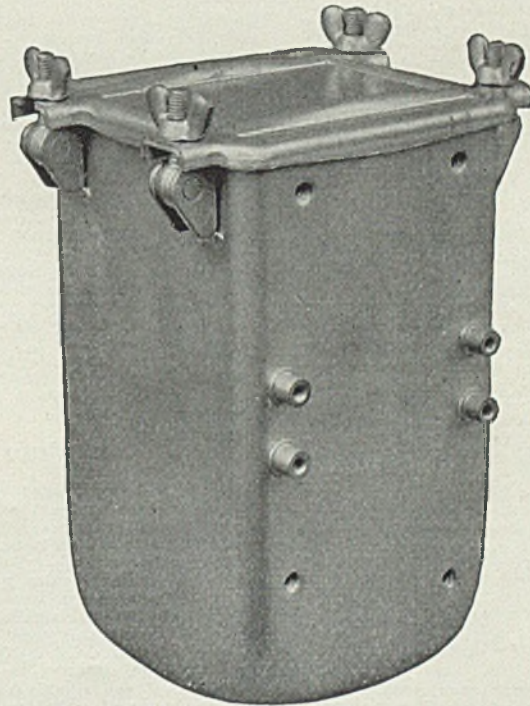
- Steel Co., Fort Worth, Tex.
- 250 tons, Brooklyn bridge storeroom, New York, to Ingalls Iron Works, Birmingham, Ala., through procurement division, Treasury department, New York.
- 215 tons, structural material, for Phelps Dodge Corp., Ajo, Ariz., to Bethlehem Steel Corp., Bethlehem, Pa.
- 205 tons, 320 barrel racks, Frankfort Distilleries, Louisville, Ky., to Bedford Foundry & Machine Co., Bedford, Ind.
- 200 tons, fuel conveyors, Weyerhaeuser pulp plant, Everett, Wash., to Isaacson Iron Works, Seattle.
- 195 tons, Missouri-Pacific railroad, bridge repairs, Marmaton, Kans., to Missouri Bridge & Iron Co., St. Louis.

- 155 tons, eight vertical tank towers, Gulf Oil Corp., Port Arthur, Tex., to Petroleum Iron Works Co., Sharon, Pa.
- 150 tons, state highway bridge, Ely, Minn., to Minneapolis-Moline Power & Implement Co., Minneapolis.
- 148 tons, highway bridge, Pettus county, Missouri, to Kansas City Structural Steel Co., Kansas City, Mo.
- 145 tons, Ohio state highway bridge, Quincy, O., to Bethlehem Steel Corp., Bethlehem, Pa.
- 145 tons, underpass, District of Columbia, to Dietrich Bros., Baltimore.
- 140 tons, New York State Realty & Terminal building, 437 West Thirtieth street, New York, to Jones & Laughlin Steel Corp., Pittsburgh.
- 140 tons, under pass, Webb county,

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Texas, to Alamo Iron Works, San Antonio, Tex.
 135 tons, crossing at Monida, Idaho, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
 135 tons, under pass, Bell county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex.
 125 tons, alterations to Fort Schuyler, New York, to Harris Structural Steel Co., New York.
 125 tons, Proctor & Gamble Co. extensions, Port Ivory, Staten Island, N. Y., to Frederick Wolfe Inc., New York.
 125 tons, high schools at Hoquiam and Arlington, Wash., to Isaacson Iron Works, Seattle.
 120 tons, naval ammunition depot, Panama Canal Zone, to Belmont Iron Works, Philadelphia.

100 tons, normal school, Cheney, Wash., to Isaacson Iron Works, Seattle.
 130 tons, open grill steel decking for Fremont bridge, Seattle, to Irving Iron Works Co., Long Island City, N. Y.

Shape Contracts Pending

2500 tons, sheet piling, Imperial dam, California; bids soon.
 2500 tons, Ohio state bridges; including 1300 tons over Black river, near Lorain; bids March 17, highway commission, Columbus.
 2500 tons, Randolph street viaduct, Chicago; bids to Chicago park district soon.
 2000 tons, Lebanon hospital building, Grand Concourse and 178th street,

Bronx, N. Y.; bids open March 22.
 1200 tons, state bridges, Illinois; bids March 13.
 800 tons, Pennsylvania state bridge, Lackawanna county; bids March 20.
 800 tons, Railway Express garage alterations, Boston.
 600 tons, sheet piling, iron ore dock improvements, Republic Steel Corp., Cleveland.
 500 tons, Central avenue grade crossing elimination, Westfield, N. J.
 500 tons, school repairs, Alameda, Calif.; plans being prepared.
 500 tons, hotel, Fairfax, Calif.; plans being prepared.
 500 tons, observatory, Mount Palomar, San Diego, Calif.; bids soon.
 350 tons, sheet piling, specification 8014, extension to quay wall, Pearl Harbor, T. H.; bids Mar. 25.
 300 tons, hotel, San Rafael, Calif.; bids soon.
 275 tons, John Mullin & Son warehouse, Jamaica, N. Y.; general contract to Tidewater Building Co., New York.
 275 tons, Pennsylvania state bridge, Columbia county, Bloomsburg; bids March 20.
 250 tons, horticultural building, Great Lakes Exposition, Cleveland.
 150 tons, building, Duane street, New York; general contract to Henry Kaufman, New York.
 150 tons, post office parcel post building, Worcester, Mass.; bids March 15.
 140 tons, school auditorium, Johnson county, Kansas.
 120 tons, over-crossing, American Falls, Idaho; Burgraft & Brennan, Pocatello, Idaho, general contractors.
 120 tons, repairs, state bridge, Allegheny county, Trafford, Pa.; bids March 20.
 100 tons, postoffice at Quincy, Ill.; bids postponed until March 10.
 100 tons, Bryant Electric Co. addition, Bridgeport, Conn.
 100 tons, school, Newton, Mass.
 Unstated, spillway, Kachess dam project, Washington; John King, Nyssa, Oreg., low.


Behind the Scenes with STEEL

Nervous Nubs

NO DOUBT you have seen many of these flourishing signatures of business letter writers that are far beyond decipherability. It has always seemed to us that the higher up an executive goes, the more illegible his signature becomes. We've wrestled with a lot of them, holding the letters up to the light, to mirrors, turning them upside down, etc., usually to little avail.

In case you don't know what we are talking about, we are reproducing herewith a signature, intact and unretouched, appearing on a letter received recently in this office. By all odds, it is the finest example of "palsied pen" we have ever inspected—too good to let pass unmentioned. Here it is, just as it appeared on the letter, of course with the writer's name and company obliterated:

Yours very truly,

_____, President,

 _____ CORPORATION.

We've been practicing up a little recently trying to work up a signature that couldn't possibly be read, hoping that some day someone may mistake us for a person in the "upper brackets." No luck, yet, though; you can still make out one or two of the letters.

Congratulations to the above signer upon creating a signature that will defy all attempts at deciphering for centuries to come. We will welcome the opportunity to inspect any genuine signatures that can come close to touching it.

Book-of-the-Week

HOT from the Penton presses is a 16-page booklet containing a mass of information on methods of investigating all types of electroplated coatings. It is a compilation of four articles which appeared recently in STEEL's *Surface Treatment and Finishing* department. Most of the information is hitherto unpublished, and the booklet should make a swell addition to your library.

Chemists and electroplaters these days are anxious for all the information they can get hold of to help their work. Here is an opportunity knocking. All it costs you is a quarter to cover costs of printing and mailing.

Drop a line to STEEL, Penton building, Cleveland, together with two-bits stuck on a card, or with 25 cents in stamps if you prefer, and your copy of *Control of Electroplating* will be dispatched pronto.

* * *

Canned Spuds

BEER in tin cans is old stuff now, but the idea is spreading dangerously. First it was oil in cans, then beer in cans, and now, if we are to believe news dispatches, a food packer in New York is experimenting with mashed potatoes in tin cans. The tin plate producers are no doubt rubbing their hands in glee, but it makes us a little sad to think of Thanksgiving dinner with all its traditional tasty viands, now to be topped off with a hot can of mashed potatoes! Guess we'll have to change to French fries.

* * *

Streamlined, Maybe?

LITTLE RED SCHOOL HOUSE ON WHEELS is what the Ferro Enamel Corp. calls its traveling extension course in porcelain enameling technique which is being taken around the country to interested enameling companies. Teacher is J. E. Hansen who, with his staff, presents lectures and moving pictures. No homework, they say.

* * *

More on Cadmium

WE ARE being flooded with letters (well, three or four) asking about some substitute for cadmium plating which will retain high luster and withstand weather attacks. This as a result of a similar inquiry published in this department a few weeks ago.

Some of the galvanizing interests wrote in, saying they were anxious to show what they could do, but further than that the situation is dormant.

Nubbin of the trouble seems to be that the price of cadmium has turned skyward following its recent application to cadmium-silver automotive bearings. So we are told by one of our experts who points out that nature has put zinc and cadmium in the same ore and that to meet the demand for cadmium it is necessary to store large amounts of zinc in reserve. This expert whispered something to us about bright zinc plating and about how the cost of zinc was only about 1/10 that of cadmium. We refuse to go out on any limbs, though (see p. 40).

—SHRDLU

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 81

Producers of bolts and nuts, effective with second quarter, will begin to eliminate the extra 10 points formerly allowed jobbers for shipments of bolts and nuts from the latter's own stock. First-quarter prices on bolts, nuts and rivets have been extended unchanged for second quarter, with 70-10-5 off quoted on small carriage and machine bolts, 70-10 off for large machine bolts and large structural rivets, 2.90c, Pittsburgh or Cleveland, 3.00c, Chicago. The market on small structural rivets will remain 70-5 off list.

Specifications for bolts, nuts and rivets are notably steady in the Pittsburgh area and include some attractive orders from railroad car builders.

At Cleveland, February volume was 12 to 15 per cent less than January's, but indications point to a recovery to the January level this month. Relatively little contracting has been done so far for second quarter since prices were reaffirmed, and there still are a few reports of concessions being offered.

Reinforcing

Reinforcing Bar Prices, Page 81

New York—New lettings in the East during the past week aggregated close to 2000 tons. Considerable additional work is pending or will come through shortly. Incidentally, state highway construction requirements in Virginia and North Carolina this year will be heavy. The market on concrete reinforcing bars rolled from new billets continues to show a firmer tendency, but the 2.05c, base Pittsburgh, price is not being adhered to in all cases. On the general run of tonnage the market now ranges from 1.85c to 2.05c, base Pittsburgh, equivalent to 2.20c to 2.40c, base, delivered, New York.

Pittsburgh—On 9528 tons of small rounds and squares for the Fort Peck, Mont., dam, Sheffield Steel Corp., Kansas City, Mo., has been awarded the contract at \$463,459.86, a bid which did not equalize for land grant freight rates. On a Pittsburgh base the new billet bar market is nominally quoted 1.95c to 2.05c, with many distributors placing heavy blanket contracts against the present market last week.

Cleveland—Demand for reinforcing bars for industrial work has picked up considerably. The Ohio highway commission, Columbus, will take bids March 17 on 35 highway and bridge projects, which fabricators estimate will require about 2000 tons of bars. New billet steel bars are firm, but concessions still are noted on rerolled bars.

Chicago—Prices have strengthened following the decision of sellers to withdraw prices of less than 2.10c, base for billet bars and 1.90c for rail steel bars. Insufficient business has been placed so far this month, however, to test thoroughly the new price stand. While a fair number of orders are being placed, few of these involve lots of more than 100 tons. A fairly large tonnage still is pending for sewer work in Chicago and

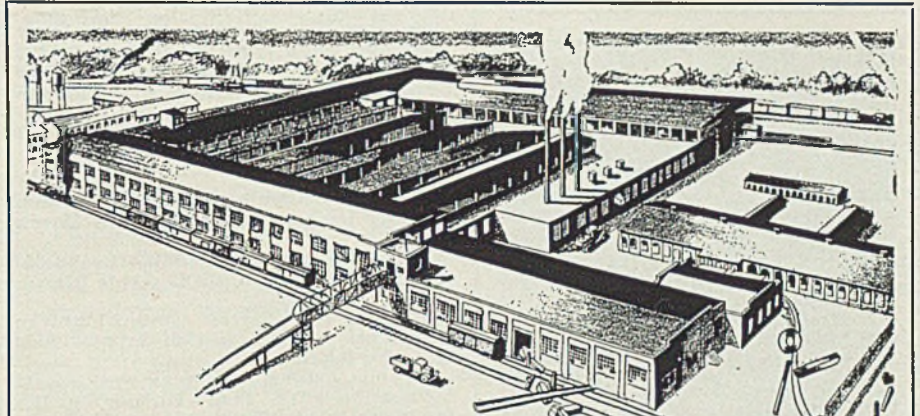
suburbs, while state bridge building also will require a moderate tonnage.

Philadelphia — Notwithstanding substantial business being figured, reinforcing bar awards over the past week have been exceedingly light. Meanwhile, prices have firmed up and await now the test of sizable business.

Cincinnati—The market is showing interest in governmental approval of a tentative general contract to Henry Bickel Co., Louisville, Ky., for a grade elimination project at Louisville requiring 4000 tons of reinforcing

bars and 2000 tons of structural steel. Contract has not been awarded for a filter plant for Cincinnati, requiring 750 tons of reinforcing bars.

Seattle—Local mills are well supplied with orders and are operating at greater capacity than a year ago. Considerable tonnage will be required for the approaches to three of the Oregon coast highway bridges, bids at Portland, March 12 and 13. The \$400,000 Washington state college women's physical educational building, bids at Pullman, March 20, also will require considerable ma-



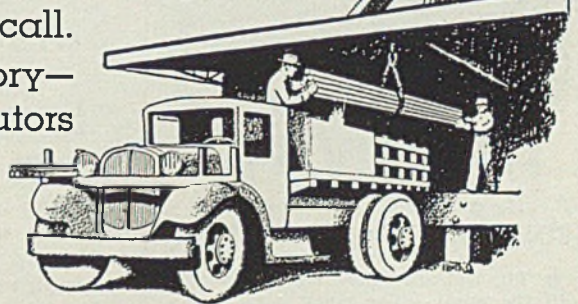
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Concrete Awards Compared

	Tons
Week ended March 7	12,168
Week ended Feb. 29.....	5,080
Week ended Feb. 22.....	10,542
This week, 1935.....	1,726
Weekly average, 1935.....	6,862
Weekly average, 1936.....	9,535
Weekly average, February..	8,992
Total to date, 1935.....	49,838
Total to date, 1936.....	95,354

terial. About 1500 tons are pending in this state awaiting PWA approval, general contracts awarded.

San Francisco — A fair volume of business is being booked. Outstanding lettings include 1100 tons for a plant for the General Motors Corp., Los Angeles, placed with Jones & Laughlin Steel Corp. To date this year 56,578 tons have been placed compared with 26,211 last year.

Reinforcing Steel Awards

9528 tons, Fort Peck dam tunnels, Wiota, Mont., to Sheffield Steel

Corp., Kansas City, Mo.
 1100 tons, General Motors Corp. plant, Los Angeles, to Jones & Laughlin Steel Corp., Pittsburgh.
 800 tons, Albert Pick Co. plant, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.
 175 tons, Yankee stadium addition, New York, to Concrete Steel Co., New York, through Leopold & Neckerman, New York.
 175 tons, Oak Park sewer, Illinois, to Joseph T. Ryerson & Son Inc., Chicago.
 170 tons, Boynton Realty Co. building, New York, to Concrete Steel Co., New York, through Thomas Crimmins Co., New York.
 120 tons, Pilgrim state hospital building, Brentwood, N. Y., to Jones & Laughlin Steel Service Inc., Long Island City, N. Y., through Caye Construction Co., Brooklyn, N. Y.
 100 tons, New Jersey state highway bridge, route 6, section 7, to Concrete Steel Co., New York, through Tide Water Stone & Supply Co., Hackensack, N. J.

Reinforcing Steel Pending

750 tons, boardwalk and comfort station, Long Beach, N. Y.; bids open March 10.
 500 to 600 tons, Public Works building, Sacramento, Calif.; bids March 24.
 435 tons, New Jersey state highway bridge, route 6, section 7; new bids to be taken.
 300 tons, extension to quay wall, specification 8014, Pearl Harbor, T. H.; bids March 25.
 225 tons, Hodges Reservoir dam, San Diego, Calif.; bids March 10.
 120 tons, pipe bands, etc., for Aberdeen, Wash.; bids in.
 108 tons, ward building, Koch hospital, St. Louis; H. B. Deal & Co., St. Louis, low on general contract.
 100 tons, bridge in three counties in Oregon; bids March 13.
 100 tons, state span, Okanogan county, Washington; bids in.
 Unstated, physical educational building, Washington State college; bids at Pullman, March 20.
 Unstated, approaches to three coast bridges; bids at Portland, Oreg., March 12 and 13.

Strip Steel

Strip Prices, Page 81

Pittsburgh—In spite of insistent demands by strip consumers for a price declaration, producers delayed through last week in naming a market for second quarter. A number of changes have been proposed, none of which has been definitely settled. Meanwhile, the market of 1.70c-1.85c, base, Pittsburgh, for hot-rolled strip and 2.45c-2.60c, Pittsburgh or Cleveland, for cold-rolled, continues.

Cleveland — Demand from automobile manufacturers and partsmakers generally is slow, although an Ohio partsmaker last week ordered about 1000 tons of hot rolled strip. General manufacturing demand for strip is quiet. A quantity price differential system is expected to be announced shortly.

Chicago—Strip producers are ac-

cepting business only for shipment during March but expect to announce second quarter prices and open books for that period within the next few days. Business still is restricted by lack of improvement in automotive consumption. Specifications from miscellaneous consumers generally are steady.

New York—Following a period of intensive competition during which concessions of as much as \$5 a ton were noted, the cold strip market here has firmed up, pending test of prices for second quarter, a test which may be deferred because of the substantial buying recently at concessions. Buying at such concessions involved material for delivery only up to the end of this quarter, but it may account for stocks which may hang over the market for several weeks.

Youngstown, O.—Narrow strip continues in fair demand, especially from both miscellaneous users and auto partsmakers. An increasing volume of inquiry for cold-rolled wide strip seems to indicate reviving interest by auto builders in both fender and body stock. Commercial stampers, refrigerator makers, etc., are aiding substantially in maintaining the current good demand for strip.

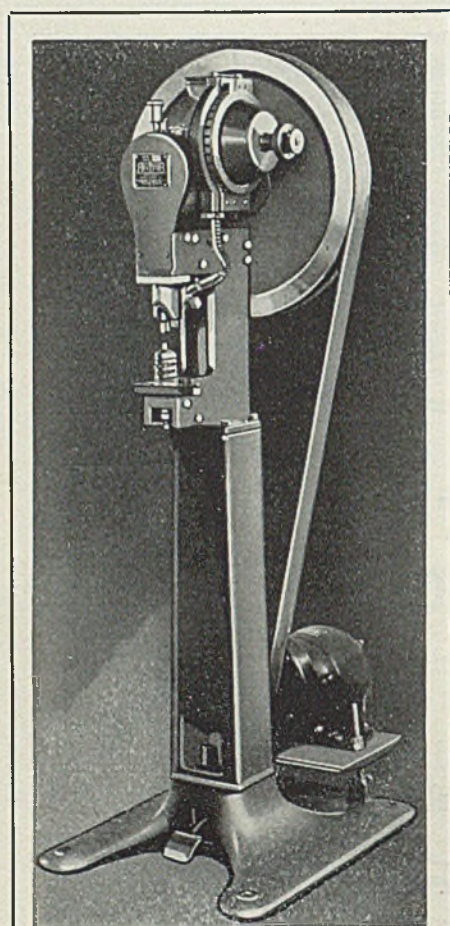
Wire

Wire Prices, Page 81

Pittsburgh—Effective immediately, the following prices on merchant wire products have been announced by producers: Bright and cement-coated standard wire nails, \$2.10, Pittsburgh; galvanized nails, 15 gage and coarser, \$4.10; galvanized nails finer than 15 gage, \$4.60; polished staples, 2.80c; galvanized fence staples, 3.05c; galvanized barbed wire, 2.50c, annealed fence wire 2.15c, and galvanized fence wire, 2.50c. Producers of woven wire fence have also announced the new price of \$58, per base column, Pittsburgh.

In manufacturing wire items, the following advances are in effect with second quarter: Plain bright wire, 6 to 9 gage, for manufacturing trade, 2.40c, up 10 cents, and spring wire, 3.05c, up 15 cents.

Cleveland — While wire nail prices have been reduced \$6 a ton to \$42, base Cleveland or Pittsburgh, for second quarter a net reduction of \$10 since last July, wire prices have been advanced \$2 to \$4 a ton. Plain manufacturers' wire is up \$2; spring wire \$3; galvanized fence wire and annealed fence wire \$4. For a time recently wire nails were selling at \$40 a ton. The advances so far have driven in little additional



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business for delivery before April 1.

Chicago—Changes in prices of wire rods, manufacturers' wire and wire products have been announced for second quarter. Wire rods, recently \$41, Chicago, have been revised to \$39 for 4-5 gage, \$40 for larger sizes up to 15/32-inch, and \$42 for 15/32-inch to 47/64-inch. Plain wire, recently 2.35c, Chicago, has been advanced to 2.45c, but the elimination of size extras largely offsets this advance. Nails have been reduced to \$2.15, Chicago, with a differential of 20 cents on less-carload lots and jobber discounts also adopted. Barbed wire and annealed and galvanized fence wire have been removed from the former differential over nails. Barbed wire now is quoted 2.65c, Chicago, annealed fence wire 2.70c, and galvanized fence wire 3.05c.

Boston—Wire contracts for second quarter are being booked. Manufacturing wire for second quarter is up \$2 per ton to 2.50c, base, Worcester, Mass., spring wire up \$2 to 3.15c, Worcester. Nails are down to \$2.10, Pittsburgh, per keg.

New York—Various changes have been announced by wiremakers for second quarter, with numerous changes, some of which represent compromises with low prices noted in nails and merchant wire in recent weeks.

Youngstown, O.—The recent wire nail price flurry did not create the sensation in this district it once might have done since wire products output here is limited. However, since quotations on annealed, galvanized, and similar wire products are calculated on the wire nail base, the appearance of an advance to \$2.10 per keg for nails for second quarter requirements and all that entails was received here with feelings of relief.

fore the \$1 a ton price advance late last year must be concluded, producers say, by April 1. The market is strong, aided by the steady rise in scrap. February shipments were practically equal to those of January. New orders also are slightly heavier, especially from manufacturers of implements and heating apparatus, and railroads.

Chicago—Moderate orders for second quarter delivery are being received. Shipments in February were off less than 10 per cent from the January volume, but for the first two months of this year showed a moderate increase over the corresponding period last year, despite the fact that foundries anticipated a large portion of their first quarter needs late in 1935. Automotive foundries anticipate a marked increase in schedules the second half of this month. Foundry operations elsewhere are well maintained.

Philadelphia—While sales are still spotty, sellers anticipate an improvement this month, as a number of plants during the cold spell allowed stocks to get low. To date there has been little interest in second quarter, although sellers have opened their books for that period at unchanged

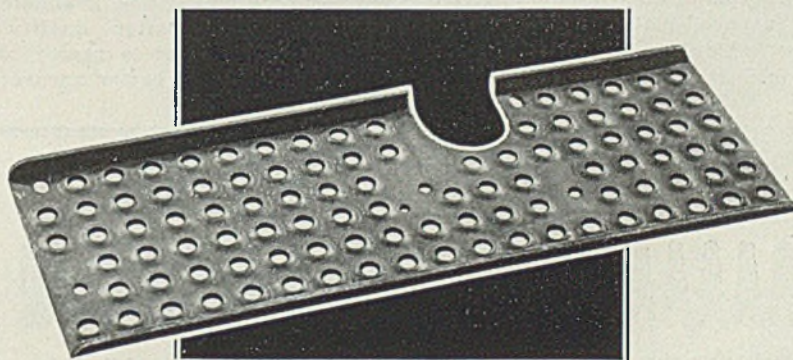
prices. A. P. Smith Mfg. Co., Orange, N. J., is figuring on 600 tons for future shipment, but this inquiry is one of the few exceptions.

Boston—Producers have opened their books for the second quarter at existing prices. Several contracts have already been booked, and considerable tonnage is under negotiation. There is an increased demand for spot carloads, and quite a few such sales have been made the past week. Melt again is rising, and March consumption is expected to show a higher daily average rate than February.

Buffalo—Shipments picked up rather smartly in the first week of March, following a disappointing February, and to date are running about five per cent ahead of those of the first two months of 1935. One hopeful development of the past week is the request, accompanying many orders, for rush delivery. This is taken to be an indication of small stocks and early repeat business. Opening of second quarter books brought only a mild flurry of covering.

Youngstown, O.—When the Hubbard, O., stack of the Youngstown Sheet & Tube Co. goes out of blast shortly, having used up its ore sup-

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RAILROADS, as with industry in general, are looking-up to the steel stamping as a combined economic and effective method of application to their equipment or product. This freight car step—a stamping by Parish—additionally serves a major safety factor by imparting a sharp, self-cleaning tread impervious to ice, snow, grease and wet shoe soles.

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Pig Iron

Pig Iron Prices, Page 82

Pittsburgh — As anticipated ten days ago, books for the second quarter were opened last week by local producers on an unchanged price basis. A disturbing price influence in the market has been the policy of a small midwestern merchant furnace, which has been attempting to liquidate a stock of about 22,000 tons, mainly foundry grades, at prices \$1 beneath the going market. Numerous users of low phos have been reappearing in the market the past week, and sales have totaled several hundred tons.

Cleveland — Shipments are increasing as all tonnages engaged be-

pies as planned, merchant furnace production will be curtailed by just that much. Malleable and No. 2 foundry is in fair demand by foundries, and more favorable weather is aiding in the movement of pig iron off furnace banks.

Cincinnati — Producers have opened second quarter books, at reaffirmed quotations, but so far buyers have been content to continue ordering for near requirements only. The small lot purchases, however, are getting closer and closer to the district melt, as old stocks vanish and contracts near exhaustion. Shipments so far in March exceed the February rate.

St. Louis, March 7—Gradual but steady expansion is noted in purchases of pig iron. Small lots for prompt shipment predominate.

Principal melters have cut heavily into their stocks the past 60 days, and are expected to enter the market soon. Inquiry for second quarter has appeared in fair volume.

Birmingham, Ala. — Spot orders still predominate, and no rush is noted on second quarter buying. Surplus stock of iron on furnace yards is still considerable. It is anticipated that spring will see renewed activity at shops where iron is the principal raw material.

Toronto, Ont. — Sales continue to average about 1200 tons weekly. Inquiries for iron are appearing in larger number but melters buy only for spot delivery. New foundries are starting up, and consumption of iron is expanding. One additional blast furnace has been blown in, making five out of 11 active. Prices are firm.

Scrap

Scrap Prices, Page 83

Pittsburgh—Firmness of No. 1 steel at \$15.50 to \$16 per ton, delivered, Pittsburgh, has forced several consumers here to turn to consideration of lighter grades of open-hearth scrap. One mill has been using cast iron borings in its open hearth and others have been taking in heavier lots No. 2 steel, flashings, light bundled skeleton and cotton ties. In low phos plate scrap, failure to advance proportionately with No. 1 steel has found some of the former material being applied on No. 1 steel orders. Minor price advances occurred last week in billet and bloom crops, railroad malleable and cast iron borings. Since the market is now at its highest level in five years, fully 40 per cent of the scrap in three large yard holdings here has been liquidated in the last six weeks. Not long ago these aggregate holdings amounted to more than 300,000 tons.

Cleveland—While some of the New York Central steel scrap recently offered here was taken by Cleveland dealers at the advanced price, yet mills here are slow to make new commitments. This has tended toward a bit slower market and some sentimental softness, but without changing quotations.

Chicago—Scrap prices continue strong as dealers and brokers find only limited quantities available at current prices. Better quality of heavy melting steel is scarce, with bids of \$14.75 and better uncovering

only limited lots. The top of the consumers' market nominally continues \$15. Only a small increase in movement of scrap from outlying districts has resulted from moderation in the weather, with snow still a handicap in collection.

Boston—Yard operators are firm on prices and as a result dealers have been forced to pay higher prices here to bring out certain grades. On the whole scrap is coming out slowly.

New York—The iron and steel scrap market here reflects less excitement. The yard operators are very optimistic and are inclined to hold for higher prices. However, consumers are not placing business as freely at the present prices as was the case a week or two ago and dealers are less disposed to pick up scrap at premium prices. Less activity features the export market since foreign buyers as a rule are not disposed to pay prices now prevalent in this country.

Philadelphia—Scrap prices are nominally unchanged, although negotiations under way which may apply a test to some of the more important grades shortly. While the movement of scrap is in general freer than a fortnight ago and some of the premium prices paid at that time have disappeared, the market still maintains a good undertone of strength. On more than 3500 tons of new compressed sheets recently offered by the Edward G. Budd Mfg. Co., the leading Coatesville, Pa., consumer was the successful purchaser at a price said to be around \$12.75, Budd plant. This was an increase of almost 75 cents a ton over the opening a month ago.

Buffalo—Sale of several thousand tons of No. 2 heavy melting steel is reported at \$12 to \$12.50. Later purchases were generally at the higher price and buying probably is continuing at this level. Sellers look for early purchases of No. 1 steel at \$13.50 or better and report a strong market in all grades. The No. 2 price is up \$1 to \$1.50 from the quotations of previous contracts. Other materials are commanding top prices of recent quotations in current sales.

Detroit—Prices on many iron and steel scrap classifications moved up 50 cents a ton last week, yet local consumers showed no undue buying interest. Most activity was in broker coverage against automobile lists, some of which brought prices far in excess of the local consumers' price. No. 1 steel here is now quoted \$12 to \$12.50 and hydraulic compressed \$13 to \$13.50 with blast furnace scrap up 50 cents to an \$8 to \$8.50 range.

Cincinnati—A break in the weather brought out more iron and steel

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scrap but failed, as some predicted, to cause a break in price. On the contrary, developments outside this district, especially higher prices paid in the Valley, brought an advance of 50 cents a ton in dealers' buying prices.

St. Louis — Buying of iron and steel scrap is in small volume, but prices are holding recent gains. The movement from adjacent country shipping points has picked up substantially, with considerable tonnages arriving by truck.

Birmingham, Ala. — Continued strength is shown in iron and steel scrap, with all prices firm. Some consumers are still bringing in old material from other sections, buying to a limited extent in the home market. Heavy melting steel holds at above \$10.

Seattle — Political disturbance in Japan has cut off that market although dealers are hopeful that buying will be resumed soon. While the yen has dropped, exporters are holding firm and report prices steady, due largely to continued buying by local mills, which are taking considerable tonnages, particularly of No. 2 heavy steel. No. 1 melting steel is quoted at \$10.25, f.a.s., with rails nominally \$1 higher. Stocks are depleted and any active interest by foreign buyers would advance prices quickly.

Toronto, Ont. — While business is somewhat spotty in iron and steel scrap, sales continue well ahead of the corresponding period of 1935. Shipments of heavy melting steel and turnings are being made to the Hamilton district. New offerings of steel scrap are light. Demand for iron grades is improving.

Warehouse

Warehouse Prices, Page 84

New York — Iron and steel jobbers are disappointed in the volume of business they now are booking. The improvement expected in March has not materialized to any noticeable extent. There is hope that the quantity differentials on sheets and strips which the mills now are discussing will be adopted generally, since it is thought by jobbers that such action would help them. Aside from weakness in galvanized sheets and to a slight extent in blue annealed sheets, the market is generally firm and unchanged.

Philadelphia — Following a brief flurry a week or 10 days ago, jobbing business has tapered off slightly, and so far business has not developed to the rate that jobbers anticipated for this month. However, there is

the possibility of brisker business later. Prices are unchanged.

Chicago — Sales are tending upward slightly, showing gains compared with both a month and a year ago. Demand is widely diversified as to products. Warehouses defer making price changes.

Cincinnati — Moderate seasonal gains are noted in warehouse sales, but demand for building materials has not reacted from extreme weather conditions. Tonnage so far this month has been close to the February average.

St. Louis — New orders and specifications have increased, wire and wire products, galvanized sheets, and machine shop supplies having responded to the more favorable weather. Railroad buying continues in good volume and inquiries for building materials have expanded. Prices are unchanged.

Seattle — While buying has been reared by unfavorable weather, February volume showed an increase over the month last year. Sheets are in best demand. Dealers generally are maintaining price schedules, although in the Portland district, galvanized sheets were reduced 50 cents, blue annealed 40 cents, and black 30 cents, effective March 2.

Semifinished

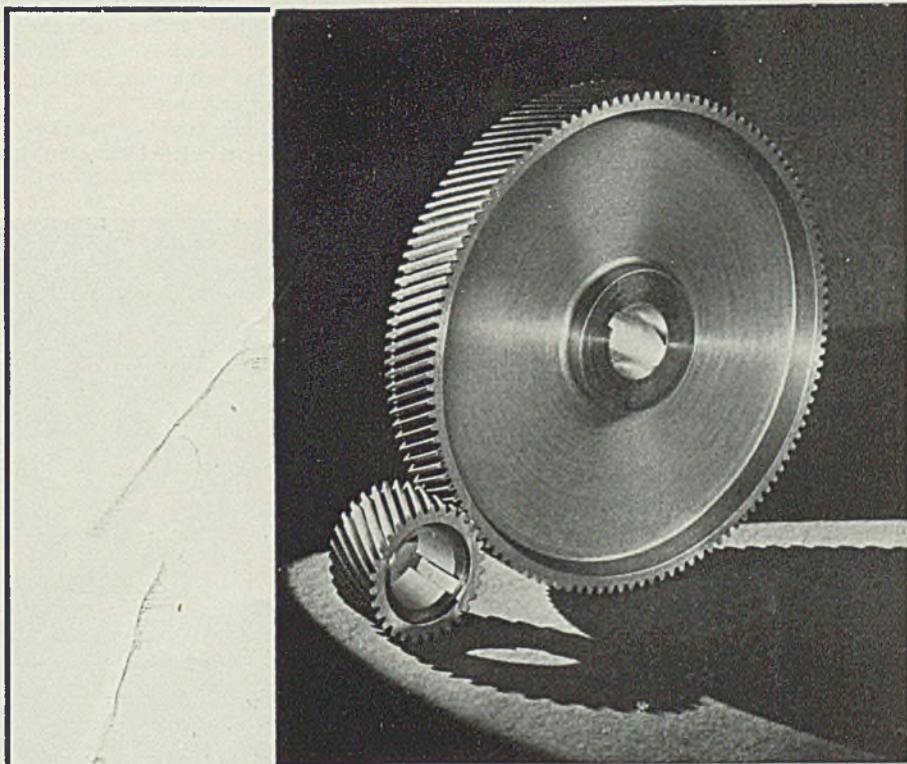
Semifinished Prices, Page 81

Pittsburgh — The market on wire rods has been revised in three size classifications by changing the former "common" classification, which has been quoted \$40 per ton, base, Pittsburgh or Cleveland, for the first quarter, to two size and price classes. These are a base price of \$38, Pittsburgh or Cleveland, for Nos. 4 and 5 rods and the market of \$40 per ton, same basing points, for No. 5 to 15/32 to 47/64-inch will remain unchanged at \$42, base. All over this latter size will be sold on the bar card.

Ferroalloys

Ferroalloy Prices, Page 82

New York — Ferromanganese sellers are expected to open their books momentarily for second quarter. Whether there will be any change in the present \$75 duty paid seaboard price is not known, but in some quarters the belief is that there will be no revision. Specifications are holding up well. Domestic spiegeleisen, 19 to 21 per cent, is unchanged



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at \$26, Palmerton, Pa., on lots up to 50 tons, and \$24 on 50 tons and over.

Contracts involving other ferroalloys carry a provision whereby prices may be made subject to notice. There is no indication as to whether any changes will be made effective for the second quarter but any such changes, if contemplated, will make their appearance by March 15.

Iron Ore

Iron Ore Prices, Page 83

Cleveland—Ford Motor Co. is expected in the market shortly for its season's supply of iron ore, and the tonnage probably will be heavier than last year. In April, 1935 it issued inquiries for 180,000 tons, but the amount which it eventually purchased in the open market was larger, and with receipts from other sources, including the Blueberry mine, which it formerly operated, the total was close to 400,000 tons. Prices for the season have not been determined.

Steel in Europe

Foreign Steel Prices, Page 84

London—(By Radio) — Deliveries of foundry iron in Great Britain are in arrears and many furnaces are unable to take further orders. Most of the increased pig iron production is for steelworks. Hematite stocks

at furnaces are diminishing rapidly.

Demand for semifinished steel exceeds the supply, in spite of enlarged Continental imports. The steel market is active and exports are expanding. Important orders have been received for track material for South African railways.

The Continent reports uneven export activities. China has bought merchant bars, and sales of Dutch pig iron in Belgium are reported.

Nonferrous Metals

Nonferrous Metal Prices, Page 82

New York—Price firmness prevailed in major nonferrous metal markets last week. Lead and zinc were well sustained at the higher levels reached in the preceding period while copper held at two asking levels. Straits tin advanced on scarcity of supplies.

Copper—A feature of the copper market was the steady advances abroad to 9.07½c, c.i.f. European ports. Should this market continue to strengthen it is believed that the domestic market would reflect this added lifting force. All business was done on the basis of 9.25c, Connecticut, for electrolytic but several sellers asked 9.50c. Sales were moderate, averaging slightly over 1000 tons per market day.

Tin—Actual supplies of tin continued tight and prices advanced, closing around 48.62½c on Straits spot. Potential consumer buying is regarded as promising.

Lead—Outlook for the market is considered bright with heavy buying

pending. Producers continued to quote 4.60c, New York, and 4.45c, East St. Louis. The market was supported by active shipments to consumers.

Zinc—Prices held unchanged at 4.90c, East St. Louis, for prime western. Buying was light as previously expected due to recent heavy purchases. The market tone was aided by the active movement of metal to consumers and firmer levies abroad.

Antimony—American antimony prices declined to 12.62½c on spot while Chinese spot held nominally unchanged at 13.25c, duty paid New York. Sales were light.

Coke By-Products

Coke By-Product Prices, Page 81

New York—The recent advance of \$1 in sulphate of ammonia to \$25 per net ton in bulk carloads, f.o.b. Atlantic and Gulf ports has in no way discouraged business. This is the height of the season for this product and a heavy business is being placed. Prices on naphthalene and phenol are firm and unchanged and the supply continues unequal to demand.

Quicksilver

New York—Quicksilver prices continue steady here with demand confined to scattered small lots. Small lots are \$78 to \$79, a virgin flask of 76 pounds each.

Financial

NEW YORK interests have bought 250,000 shares of Interlake Iron Corp., Chicago, operating merchant blast furnaces at South Chicago, Ill., Duluth, Toledo, O., and Erie, Pa., both as an investment and an edge against inflation. Adams Express Co. took 40,000 shares, American International Corp. 30,000, and the remaining 180,000 shares went to ten other investment companies and individuals.

The 250,000 shares originated as follows: 130,000 shares from Pickands, Mather & Co., 100,000 shares from the estate of Samuel Mather, and 20,000 shares in the open market. The total number of outstanding shares of Interlake is 2,000,000, of which Pickands, Mather and the Samuel Mather estate now own about 600,000 and 100,000 shares, respectively.

J. & L. ADJUSTMENT CUTS LOSSES IN PREVIOUS YEARS

Jones & Laughlin Steel Corp., Pittsburgh, in filing with the securities and exchange commission, Washington, an application to issue \$40,-

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000,000 in first mortgage bonds, of which \$31,500,000 will be expended for a continuous wide sheet-strip mill and other improvements, has revised its financial statements for previous years.

Net loss for 1935 was \$398,716, after funded debt interest of \$282,833, and \$5,511,549 for depreciation. The amended report for 1934 places the loss for that year at \$2,751,373, and for 1933 at \$4,471,048. This is a reduction of about \$1,000,000 in deficits for 1934 and 1933. Adjusted surplus account at the close of 1935 was \$48,477,015.

TRUSCON DEFICIT IS STEADY

Truscon Steel Co., Youngstown, O., reports net loss of \$354,781 in 1935, compared with loss of \$358,235 in 1934.

Equipment

Chicago—Work on the new wire mill for Republic Steel Corp. here will start as soon as final plans are drawn. Other prospective business in heavy equipment is involved in the commitment of National Steel Corp. to build a plant on its Indiana lake-front property in the event the government is willing to construct a harbor at that point. A hearing on this question will be held in Washington this month. Machine tool business is steady though in most cases lags behind the January pace. Placing of orders for lathes in some instances has been stimulated by price advances which were announced recently.

Seattle—Improvement is noted in equipment buying here as spring operations open, applying particularly to mining, marine repair jobs and logging work.

Pittsburgh—Two large steel mill expansion programs in this district are occupying the immediate atten-

tion of equipment suppliers. One, the Jones & Laughlin Steel Corp.'s plans to build a continuous strip-sheet mill at its Pittsburgh works, will mature at an early date, whereas the other mentioned as a similar mill for American Sheet & Tin Plate Co. to be built at Clairton, Pa., is likely to come out for inquiry at some near future time (see also p. 22). Makers of rolls, miscellaneous rolling mill parts, heating furnaces, and a wide range of replacement equipment for steel producers in this district report an encouraging rise in orders.

New York—Foreign demand for equipment is a feature of the current market. Amtorg Trading Corp. has placed 35 boring mills with a Cincinnati manufacturer, a number of sheet metal presses, and some gear shapers, for shipment to Russia. A Mexican railroad commission, now in New York, is taking prices on a list of 192 machine tools and allied equipment. Fair-sized orders for machine tools have been placed by British interests with American exporters.

Domestic buying involves much equipment required for the manufacture of sheet metal products. American Car & Foundry Co. has purchased a press brake and some milling machines for its Berwick, Pa., plant. American Locomotive Co. is spending at least \$100,000 in re-equipping its Schenectady, N. Y., plant.

The New York board of transportation is expected to inquire before the end of this week for at least six new tools for the Independent subway system. McIntosh & Seymour Corp., Auburn, N. Y., has awarded a horizontal boring machine and some grinders. General Electric Co., Schenectady, N. Y., continues to buy equipment for its turbine department and one boring mill alone, just placed, involved an outlay of around \$100,000.

tities of meters for the division of water.

COSHOCTON, O.—W. L. Craig mayor, and Fred C. Waring, chief of the sanitary engineering division of state health department, Columbus, O., have recommended construction of a water softening and filtration plant. Council is considering holding a special election to vote on \$164,000 bond issue for proposed project.

DAYTON, O.—Leahill Mfg. Co. has been incorporated by Selma R. Tourkow, J. G. Tourkow and James A. Burkhardt, with J. G. Tourkow, Third National Bank building, correspondent.

DEFIANCE, O. — Hellemn Engine Co. has been incorporated to manufacture a diesel engine developed by Louis F. Hellemn, of Sherwood, O. Glen A. Reyff, Sherwood, O., and M. A. Goller,

Construction and Enterprise

Ohio

CLEVELAND—Decker-Reichert Steel Co., 7201-9 Wentworth avenue, supplier of sheet metal products, will move to headquarters at 4500 Train avenue, after completing alterations about May 1. A. J. Decker is president.

CLEVELAND—Florence-Wehrle Stove Co. has been incorporated by E. M. Beckwith, John W. Bankhurst and David M. Donley. Lederer, Livingston, Kahn & Adler, Chicago, is correspondent.

CLEVELAND — Industrial Rayon Corp., West Ninety-eighth street, Hiram

Rivitz president, will install power substation facilities, conveyors, motors and controls in a new multistory addition to its rayon mill. Cost is estimated at \$1,200,000. (Noted STEEL, Feb. 3.)

CLEVELAND—Republic Steel Corp., Republic building, Cleveland, will spend \$3,000,000 in improvements for 11 of its plants (see p. 14).

CLEVELAND — Division of light and power, room 105, City hall, is taking bids March 13 for 6000 condenser tubes and 12,000 condenser ferrules.

COLUMBUS, O.—Board of purchases, O. H. Swisher secretary, is taking bids March 12 for various sizes and quan-

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Defiance, O., attorney, are the incorporators.

DOVER, O.—Homer Keppler city service director, will receive bids until noon March 17 to furnish all the labor, tools, material and equipment needed for the installation of a pump and construction of a screenhouse. PWA project. Arnold, Tosch & Hartline, New Philadelphia, O., consulting engineer.

LANCASTER, O.—Walter Graf city engineer, contemplates installation of a new pump for city water system.

MONTPELIER, O.—Board of public affairs, C. O. Simon chairman, considers purchase of \$46,000 turbine for the light plant. Light department funds of \$38,000 are available.

SEBRING, O.—Sebring Coal Co., James Palermo manager, is consider-

ing construction of a new tippie and purchase of new equipment in an improvement program to be started soon.

SOUTH CHARLESTON, O.—Village residents are circulating petitions asking for construction of a municipal light plant. Ralph Pancake is city manager.

TOLEDO, O.—Logan Gear Co.'s plant on Westwood avenue was damaged by an explosion, including considerable loss to machinery.

TROY, O.—Braun Bros. Packing Co., meat packer, is contemplating purchase of power and mechanical handling equipment for installation in a 2-story addition to its plant. Total cost will be approximately \$70,000. Lloyd J. Zeller, Tecumseh building, Springfield, O., is architect.

YOUNGSTOWN, O.—Cold Metal Process Co., 1054 Mahoning avenue, suffered considerable damage to its plant by fire last week. It is starting immediately to rebuild.

ZANESVILLE, O.—Wise Foundry & Machine Shop has under consideration construction of a storage and shop building. Cost is estimated at \$37,000.

Pennsylvania

ALLENTOWN CITY, PA.—Fred E. Lewis, mayor, has a grant of \$484,653 to be applied on the cost of a \$1,201,800 water supply system. Morris Knowles Inc., 507 Westinghouse building, Pittsburgh, is consulting engineer. PWA project No. D-1251-R.

BEACH CREEK, PA.—Borough, Thomas F. Kessinger president, has a grant of \$22,500 for the construction of waterworks estimated to cost \$33,000. PWA project. George M. Busch Jr., 112 West Fourth street, Williamsport, Pa., engineer.

OLYPHANT, PA.—Borough, John L. Kelcullen burgess, will construct a municipal power plant on a loan and grant of \$194,545. PWA project. F. F. Kaufman, 909 Pine street, Camden, N. J., civil engineer.

ERIE, PA.—Hammermill Paper Co., E. R. Behrend president, has authorized Stone & Webster, 96 Broad street, New York, consulting engineer, to purchase material and to erect superstructure to house two large high pressure boilers and a modern turbo-electric generating unit. Cost is estimated at \$500,000.

FLEETWOOD, PA.—Borough, Samuel H. Houch secretary, has loan and grant of \$166,272 for the construction of a power plant. PWA project. J. W. Maskell, 947 East Rittenhouse street, Philadelphia, engineer.

PHILADELPHIA—Commanding officer, Frankford arsenal, will receive bids until March 12 for two bench filing machines, March 16 for 520 hard 90/10 gliding metal rotating bands, March 23 for three after-coolers for compressed air system.

GLENFIELD, PA.—Borough, W. L. Kramer president, has loan and grant of \$61,818 for the construction of waterworks and sewerage systems. E. G. Kaltenback, 226 Woodhaven avenue, South Hills post office, Pittsburgh, is consulting engineer. A PWA project.

MEADVILLE, PA.—Viscose Co., 200 Madison avenue, New York, will install power and mechanical handling equipment, including motors and controls, conveyors and regulators in addition to the rayon mill here. Total cost is estimated at \$1,200,000.

NEW HOLLAND, PA.—Borough, M. R. Piarsal burgess, has a loan and grant of \$49,090 for the construction of a water supply system. William H. Dechant & Sons, 632 Washington street,

Reading, Pa., is engineer. PWA project No. D-1213-R.

PHILADELPHIA — Crown Cork & Seal Co. Inc., 142 North Front street, has awarded a contract to the Consolidated Engineering Co., 20 East Franklin street, Baltimore, for the erection of a \$3,000,000 plant in Philadelphia.

PITTSBURGH — Bureau of water, city-county building, plans expenditure of \$135,000 for extension of Ross pumping station facilities, including purchase of new and replacement equipment.

PITTSBURGH — Pittsburgh Rolls Corp., Forty-first and Willow streets, has applied for a permit to construct an all steel extension estimated to cost \$4370.

PITTSBURGH — Forged Hardened Steel Roll Co. has been granted a state charter to deal in iron and steel. Leon Wald and J. M. Orringer are the incorporators, and Mortimer B. Leshner is the correspondent.

PITTSBURGH—Board of public education, room 251, Administration building, Bellefield avenue at Forbes street, will receive bids until March 17 for electric welding machines, a floor buffer, steel shelving, printing press and miscellaneous equipment. Bidding blanks are obtainable from the office of the superintendent of supplies, room 300.

PITTSBURGH — American Sheet & Tin Plate Co., Frick building, Pittsburgh, subsidiary of the United States Steel Corp., is making inquiries for a strip-sheet mill, including continuous hot and cold rolling mills, and equipment for making tin plate. These projects estimated to cost between \$30,000,000 and \$40,000,000 are contemplated for the new Clairton, Pa., plant.

New York

AMSTERDAM, N. Y.—Municipality, N. S. Hill, 112 East Nineteenth street, New York, engineer, has received approval of revised plans for a filtration plant and water system. PWA loan for the \$30,000 proposed project has been approved.

BATH, N. Y.—Village will receive bids until March 14 for construction of a 2,500,000-gallon standpipe, and the purchase of pumps and other waterworks equipment. This PWA project is estimated to cost \$132,000. W. T. Fields, Florence building, Watertown, N. Y., engineer.

BUFFALO—Trico Products Corp., 817 Washington street, manufacturer of automotive products, plans installation of conveyors, electric hoists, motors and controls, etc., in a \$115,000 building and equipment buying program.

BUFFALO—K. R. Wilson Foundry Co., 10 Lock street, is considering rebuilding the plant recently damaged by fire. An engineer and an architect for the contemplated \$150,000 project have not been appointed.

LEROY, N. Y.—Leroy Salt Co. Inc. wants to purchase transmission, conveying and other handling equipment. S. Carr is president.

MARCY, N. Y.—Department of mental hygiene, state office building, Albany, N. Y., is considering construction of a sewage disposal plant and waterworks and other improvements in Marcy. Approximately \$180,000 is to be spent. W. E. Hangood is architect.

NEW YORK—Spring Products Corp., 175 Walnut avenue, Bronx, manufacturer of bed springs, has leased a 3-story building at Skillman avenue and Twenty-seventh street, Long Island City, con-

(Please turn to Page 104)

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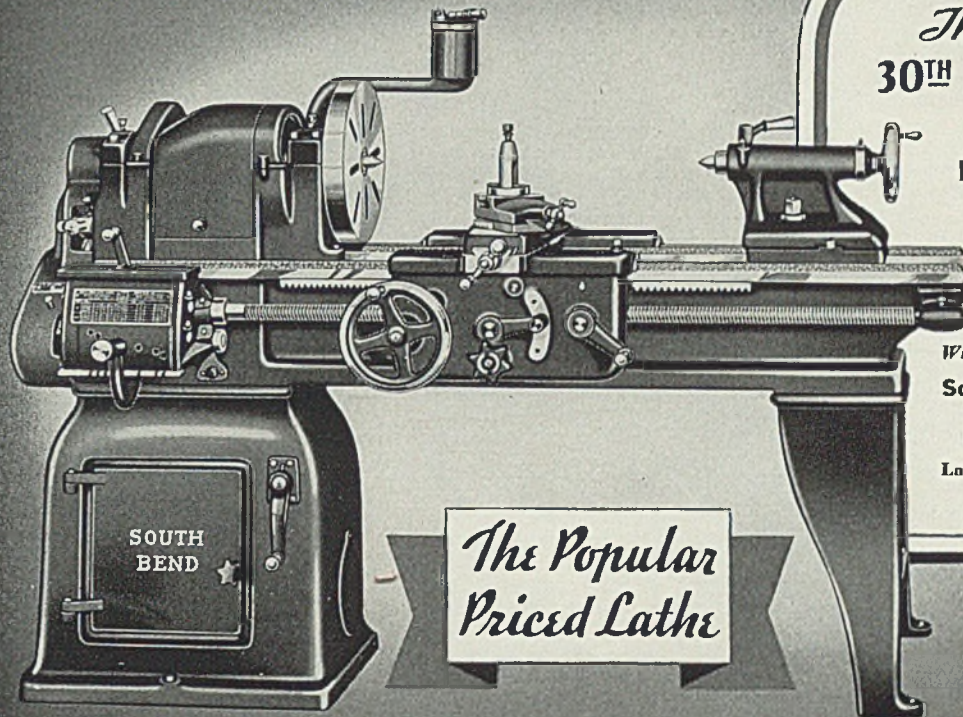
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(Continued from Page 102)

taining 115,000 square feet, doubling its manufacturing space. M. Marcus is president.

ROCHESTER, N. Y. — Rochester Gas & Electric Corp., 89 East avenue, plans construction of a \$1,000,000 power plant.

SODUS POINT N. Y.—Town, L. E. Kohl, 16 State street, Rochester, N. Y., engineer, plans construction of a waterworks system.

SONYEA, N. Y.—Department of mental health, state office building, Albany, N. Y., is considering construction of a \$225,000 water supply system at Craig colony, here. T. F. Farrell, state office building, is engineer.

TROY, N. Y. — Burden Iron Co. has been reorganized and will spend \$250,000 for improvement of its south Troy plant. The company, now headed by Alfred Nusso, East Orange, N. J., metallurgist, plans to manufacture light weight alloy and stainless steels in addition to its regular line of products.

WARWICH, N. Y.—State department of social welfare, state office building, Albany, N. Y., is considering construction of a water supply system at the state training school here. Cost is estimated at \$25,000. T. F. Farrell, state office building, is engineer.

Michigan

DETROIT — Detroit Vincent Steel Products Co., 2434 Bellevue avenue, H. Angell in charge, plans a \$37,000 power plant.

OWOSSO, MICH. — City has laid plans for the completion of a \$14,000 WPA water softening plant project.

ROYAL OAK, MICH.—Chase Tool Co. has under consideration plans for improvements to the plant. Total cost, including equipment, is \$37,000.

WAKEFIELD, MICH.—Board of city commissioners plans the construction of an electric light and power plant at an estimated cost of \$60,000. Federal aid is to be secured.

Indiana

COLUMBUS, IND. — Cummins Engine Co., C. L. Cummins president, manufacturer of diesel engines, will construct a steel building 30 x 85 feet to house the company's experimental laboratory, several offices and a machine shop.

ELWOOD, IND. — City plans work on a \$150,000 disposal plant. Moore & Frazier, Indianapolis, engineers.

INDIANAPOLIS — Chevrolet Body Corp., 1100 West Henry street, is considering installation of electric power equipment in a new plant addition.

KOKOMO, IND.—City is considering the purchase of the local waterworks system from the American Water Co. If plans are consummated, the city is to improve and extend the present system at a cost of \$30,000 or more.

MUNCIE, IND.—Muncie Gear Co. is considering the expenditure of \$37,000 for the erection of a steel plant addition, 75 x 140 feet, and the installation of new equipment.

Illinois

JOLIET, ILL. — Illinois Steel Washer Co., 405 Gardner street, has been incorporated by C. H. Baldwin, Howard Cook and Burr H. Thompson, to deal in metal specialties.

CHICAGO—American Can Co., 230

Park avenue, New York, has under consideration private plans for expending more than \$37,000 in the improvement of the can plant recently acquired from Libby, McNeil & Libby in the Union Stockyards here.

Connecticut

BRIDGEPORT, CONN.—Bridgeport Hydraulic Co., 833 Main street, is considering construction of a \$40,000 waterworks plant here.

BRISTOL, CONN. — E. Ingraham Co., North Main street, is laying plans for purchase of electric power equipment for installation in a 3-story addition. Total cost is estimated at \$50,000.

GREENWICH, CONN. — Greenwich Water Co., 253 Greenwich avenue, plans extension of water mains, installation of additional hydrants and the like in an \$85,000 improvement and expansion program. Engineering is being handled by the company.

HARTFORD, CONN. — Connecticut Light & Power Co., 36 Pearl street, has approved a budget calling for the expenditure of \$3,300,000 for plant expansion.

NEW HAVEN, CONN. — United Illuminating Co., 128 Temple street, has appropriated \$2,000,000 for new equipment. Some contracts have been let in this improvement program.

Massachusetts

CANTON, MASS.—Draper Bros. Co., Draper Lane, is considering construction of an addition and making alterations in the Draper Lane power plant. Cost estimated in excess of \$40,000. A. L. Nelson, 31 St. James avenue, Boston, is engineer.

HARWICH, MASS. — J. W. Crowell, chairman of the board of selectmen, Town hall, will receive bids soon on a proposed \$200,000 water system. Letting of contracts for an elevated water tank, a pumping station and mains is included in the program. Whitman & Howard, 89 Broad street, Boston, is consulting engineer.

MAYNARD, MASS.—Town, F. J. McCarron, chairman of a special committee, is considering construction of an addition to the water supply system. Private plans are being laid for the \$30,000 project.

Alabama

MOBILE, ALA. — Ruberoid Co. 500 Fifth avenue, New York, will spend approximately \$200,000 for the installation of mechanical handling and power equipment, here.

Delaware

SEAFORD, DEL. — George W. Donoho, mayor, will take immediate steps to arrange for a bond issue for the construction of a light plant at a cost of \$150,000 to \$200,000. City may receive a federal grant of \$52,000.

Maryland

WAKEFIELD, MD.—City plans construction of an electric power plant to cost \$60,000. This is a federal project.

BALTIMORE — American Can Co., 2535 Hudson street, will erect an additional unit at its present plant. Cost is estimated at \$20,000.

District of Columbia

WASHINGTON — Navy department,

bureau of supplies and accounts, is taking bids until March 13 for a motor-driven vertical shaper, schedule 7307; and miscellaneous hydraulic motor pump units, schedule 7314; and until March 17 for one pedestal type, motor-driven grinder, delivered Puget Sound, Wash., schedule 7311.

WASHINGTON — Senate bill S 4073, now under consideration, provides for improvements at the Washington navy yard, including \$945,000 for shop building and accessories, and \$425,000 for a steel cleaning shop and accessories.

Kentucky

OWENSBORO, KY. — Rural Electric Co. has been incorporated by A. F. Trimble and B. C. Roe.

PROVIDENCE, KY.—City, J. S. Watkins, 606 Citizens Bank building, engineer, will receive bids until March 12 on contract 2 calling for the completion of the sewage disposal plant.

North Carolina

BURLINGTON, N. C.—Baker Cum-mack Textile Corp. has leased a local building and will remodel it and install motors and controls, and conveyors in a \$100,000 improvement program for the new knitting mill here.

CHARLOTTE, N. C. — Johnson Mfg. Co. will install electric power equipment in a 1-story addition, the total cost of which is estimated at \$65,000. C. W. Johnson is president.

CHARLOTTE, N. C. — Southern Chemical Corp. recently organized, will install mechanical handling and power equipment, including motors, conveyors and the like in a new plant, here. Cost is estimated at \$100,000. John I. Crist, 1042 Arbsley road, Charlotte, is president.

TRYON, N. C. — China Grove Cotton Mill Co., China Grove, N. C., has acquired the Southern Mercerizing Co. New machinery is to be installed and an addition is to be erected at the plant.

WAYNESVILLE, N. C. — J. R. Medford, Clem Mathers, Dutch Cove, N. C., and associates, are considering the establishment of an independent power plant in Haywood county.

West Virginia

CHARLESTON, W. VA. — Chamber of commerce, S. P. Puffer general manager, is negotiating for the establishment of an electric smelting plant here.

EAST HUNTINGTON, W. VA.—Storage building of the Huntington Stove Foundry Co. was damaged by fire recently.

HUNTINGTON, W. VA. — R. Allen Burton, High Point, N. C., and associates have leased a building at Eighth street and Eighth avenue for a wood-working plant. Plant will be known as Burton Upholstering Co. Inc.

Virginia

ABINGDON, VA. — City has had PWA loan and grant for a waterworks system increased from \$428,000 to \$478,000.

ALEXANDRIA, VA.—Smith Mountain Power Co., 522 Mills building, Washington, plans construction of an \$800,000 hydroelectric plant on the Roanoke river near here. G. C. Boyer, 1210 Grey Court, Richmond, Va., is engineer.

GLOUCESTER, VA. — Gloucester

(Please turn to Page 106)

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(Concluded from Page 104)

county sanitary district No. 1 will receive bids until March 16 at the courthouse for a water system. R. Stuart Royer, Builders exchange building, Richmond, is the engineer.

JEWEL RIDGE, VA.—Jewel Ridge Coal Corp., Tazewell, Va., Allen & Garcia Co., 332 North Michigan avenue, Chicago, engineer, is reported to be receiving bids for \$200,000 worth of handling equipment for coal tipples, structural housing and coal preparation equipment.

SUFFOLK, VA. — Warehouse No. 11 of the Farmer Mfg. Co., East Suffolk, was damaged by fire recently.

SUFFOLK, VA. — City, Jack W. Nurney mayor, will erect a sewage pumping station on a site at Factory and James streets.

Missouri

FULTON, MO. — City council has passed an ordinance authorizing the issuance of \$60,000 worth of bonds for a gas distribution system.

JEFFERSON CITY, MO. — State bipartisan advisory board, Capitol building, is considering construction of a new power plant at the state penitentiary, here. Cost estimated at \$100,000. Edgar M. Egan is secretary of the board. Charles A. Haskins, Finance building, Kansas City, Mo., is supervising engineer.

KANSAS CITY, MO. — Charles A. Smith, 800 Finance building, has been named architect for a manual training high school.

NORTH KANSAS CITY, MO. — Clay county district No. 1 has under consideration plans for a suburban water supply system, to cost approximately \$410,000. Henri-Lowrey Engineering Co., 114 West Tenth street, Kansas City, Mo., is consulting engineer. Bonds for the contemplated project have been voted.

THAYER, MO. — City has voted \$40,000 in bonds for construction of a light plant. PWA has approved a \$32,000 loan and grant for the project.

Arkansas

EL DORADO, ARK. — City council has authorized the mayor to seek a PWA loan of \$575,000 for construction of a municipal light plant.

Oklahoma

OKLAHOMA CITY, OKLA.—Phillips Petroleum Co., Bartlesville, Okla., A. H. Riney, Bartlesville, engineer, has completed final plans for the erection of a 1500-horsepower gas compressor station at Twenty-eighth and Prospect streets, here. Project will cost approximately \$35,000.

Texas

DALLAS, TEX. — Independent Light & Power Co. has been incorporated by J. B. Gieb and G. B. Rogers, 5706 Monticello street.

DALLAS, TEX. — A. A. A. Sheet Metal works, 411½ North Tyler street, has been incorporated by Walter Cook. C. W. Lawrence is correspondent.

HOUSTON, TEX.—7-Up Bottling Co., A. L. Randle manager, plans expenditure of \$15,000 for automatic bottling equipment for a 3-story brick building at 2202-2206 Leeland street, which the company has leased.

NEDERLAND, TEX. — Pure Oil Co., Pure Oil building, Chicago, plans replacement of equipment at Smith's Bluff

plant near here. D. E. Sullivan is the chemical engineer.

YORKTOWN, TEX. — City, having received a federal appropriation of \$45,000, will take bids soon for a municipal electric power plant, distributing lines and power substation facilities. Mayor William Westhoff announces that an election will be held soon to pass on a proposal to issue \$55,000 in bonds for the proposed plant. Garrett Engineering Co., Houston, Tex., is consulting engineer.

Wisconsin

CUDAHY, WIS. — Rhodes Metallic Packing Co., Allis avenue, Chicago, has been sold to K. E. Fredericks, 820 East Mason street, Milwaukee, who is relocating the business at 806 Packard avenue, here. R. A. Potts is the new general manager.

Minnesota

BEMIDJI, MINN. — City council has under consideration construction of a light and power plant, including a steam division. Total cost is estimated at \$620,000. The proposed project will be up for approval at a special election. Burlingame & Hitchcock, Sexton building, Minneapolis, consulting engineers.

ROCHESTER, MINN. — City will receive bids in April for complete auxiliary equipment for electric power plant to go with a new 7500-kilowatt turbo-generator unit. Alternate bids on a 10,000-kilowatt unit also will be asked. Equipment purchases, together with plant improvements, will cost \$200,000.

Kansas

MARQUETTE, KANS.—City officials are investigating the feasibility of building a municipal electric light plant.

North Dakota

GRAND FORKS, N. DAK. — Grand Forks Terminal Elevator Co. will install power and mechanical handling equipment, including hoists, motors and conveyors in a new elevator, which together with equipment will cost approximately \$125,000. Thomas Berge, 729 Reeves street, is president.

Iowa

DAYTON, IOWA — City will vote March 14 on a proposed \$25,000 bond issue to finance contemplated extension of water system.

ROCK RAPIDS, IOWA — Common council is to call a special election for a vote on the issuance of \$200,000 in bonds for construction of an electric light and power plant. Black & Veatch, 4706 Broadway, Kansas City, Mo., is consulting engineer.

Nebraska

COLUMBUS, NEBR.—Loup river public power district has sanctioned a revised plan providing for a rural electrification program in Platte county. Cost is estimated at \$398,000.

Colorado

DENVER — City will advertise soon for bids for construction of three buildings and purchase of equipment for a sewage disposal plant. Plans call for pumping, chemical and office buildings. George E. Cranmer is manager of improvements, and Burnham Hoyt is city architectural adviser.

DENVER—Bureau of reclamation, R. F. Walter chief engineer, is seeking bids for a vertical-shaft 11,500-horsepower,

214 revolution per minute hydraulic turbine. Bureau also is asking bids on a new steel plate scroll case, speed ring and draft tube liner for 11,500-horsepower Morgan Smith Co. vertical-shaft hydraulic turbine.

Pacific Coast

LOS ANGELES — Consolidated Steel Corp. Ltd., 1200 North Main street, Reese H. Taylor president, has begun work on an addition to its plant.

LOS ANGELES — Federated Metals Corp., 2425 Hunter street, has awarded a contract to the Austin Co. of California, 777 East Washington street, for construction of two reinforced concrete warehouses on a five-acre tract at Twenty-sixth street and Indiana avenue. Victor B. Seidel, engineer for the metal company, will supervise work on the \$100,000 contract.

SANTA MONICA, CALIF. — Douglas Aircraft Co., Edward C. and Ellis W. Taylor, 803 West Third street, Los Angeles, architects, is considering installation of power and mechanical handling equipment, including motors, conveyors, electric hoists and the like, in its new 300 x 300 feet plant addition. Cost is estimated at \$250,000.

PORTLAND, OREG. — United States engineer's office, Second district, will ask bids until March 13, circular 264, for a 2400-volt metal clad switchgear for power station at Bonneville, Oreg.

SEATTLE — Signal Oil Co. plans construction of marine terminals, including tanks and other facilities, on a waterfront site leased from the port of Seattle.

SEATTLE—Continental Can Co., 615 Orchard street here, and 100 East Forty-second street, New York, plans the installation of hoists, loaders, conveyors, motors, etc., in a \$120,000 plant addition and improvement program in Seattle.

SEATTLE — North Coast Electric Co., 206 Third street, has leased quarters at Second avenue and Jackson street, doubling the space of its present plant.

WAPATO, WASH.—City, through the PWA, plans construction of a sewage disposal plant at a cost of \$23,000.

Canada

CORNER BROOK, N. F.—International Power & Paper Co. of Newfoundland Ltd., 220 Forty-second street, New York, is planning rebuilding at an early date a portion of the hydroelectric generating plant here, which was recently damaged by fire. R. J. Cullen is president.

HAMILTON, ONT.—Fanner Mfg. Co., Brookside park, Cleveland, has leased the factory building formerly occupied by the Monarch Metal Co., here. The property includes 20,000 feet of floor space.

KITCHENER, ONT. — City, M. Pequegnat, water commission superintendent, city hall, has under consideration plans for the purchase of a pumping unit capable of handling 1,200,000 gallons daily for the Shoemaker avenue station. Purchase of a venturi meter also is planned.

CHATEAU RICHER, QUE.—Chateau Richer Waterworks Co. Ltd. has been incorporated, and will construct a waterworks system for the city. New equipment is to be purchased.

ISLE MALIGNE, QUE.—Municipality will receive bids this month for a water supply system and sewage disposal plant, estimated to cost \$125,000. B. A. Walton is secretary.