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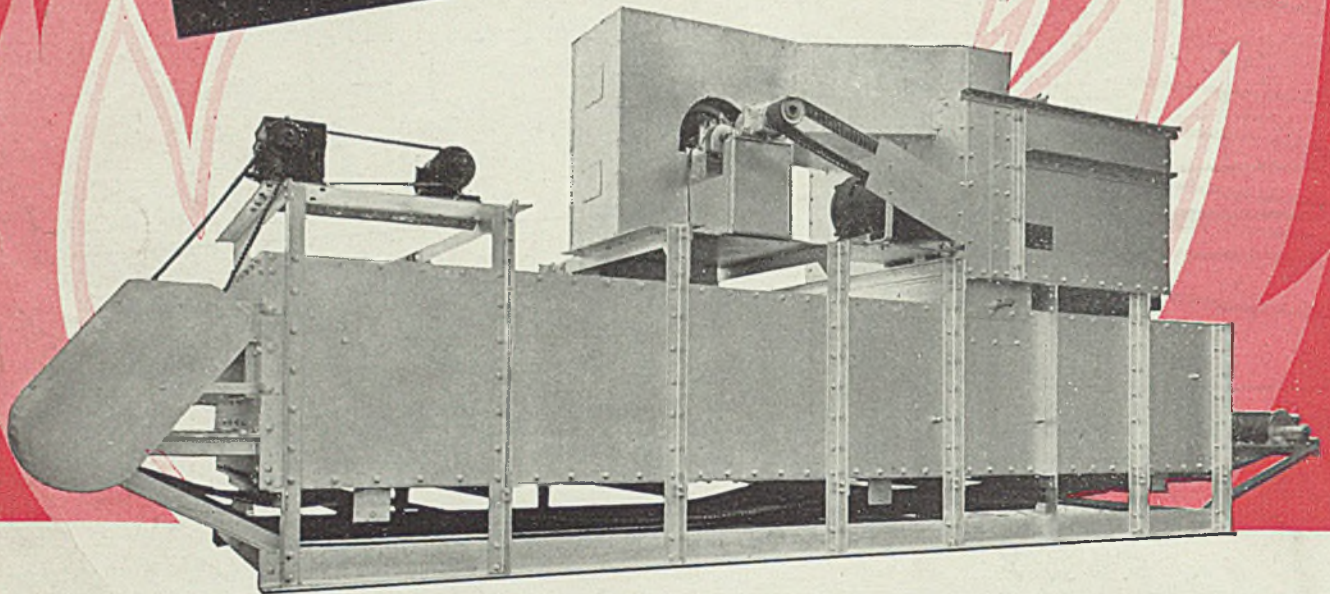


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STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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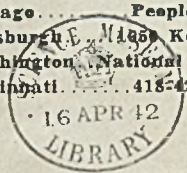


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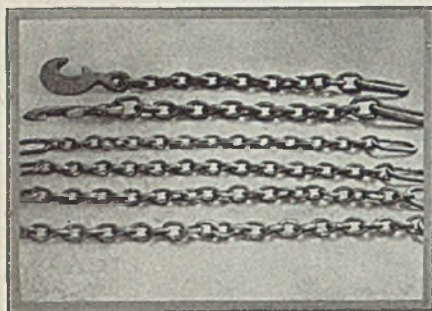
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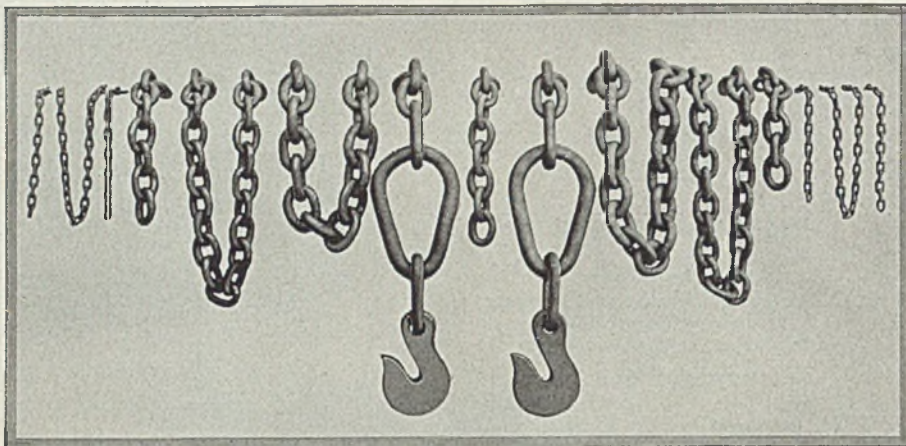
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Monel Metal Pickling Chain LINKS UP STRENGTH to LIGHT WEIGHT



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• Strong, corrosion-resisting, welded Monel Metal chain is available in all sizes for use in connection with various pickling operations, from light metal parts to heavy blooms and billets. The above are products of the Youngstown Welding & Engineering Co., Youngstown, Ohio.

PICKLING CHAINS have to be acid-resistant, of course, and they must be *strong*, but they needn't be excessively *HEAVY*.

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In comparing a $\frac{3}{4}$ " rolled and forged Monel Metal chain, in serv-

ice six years, with a $1\frac{1}{4}$ " cast acid-resisting chain, a steel mill pickling superintendent said:

"... the cast chain began to need repairs after 9 months of service, and in spite of the great difference in size, whenever we have particularly severe loads, we always use the Monel Metal chain because we find it absolutely reliable and not subject to sudden breaks, as is the case with heavy cast acid-resisting chains."

Our booklet "Equipment Designs for the Pickle House" is full of

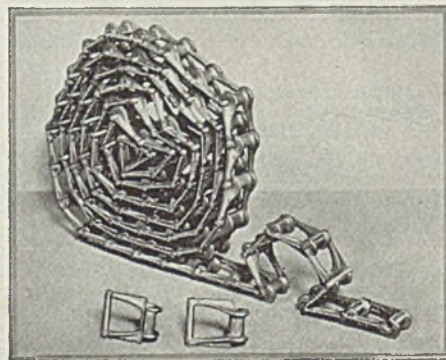
Weight of Welded MONEL METAL Chain	SIZE	PROX. WT. PER FT.
	1"	11.5 lb.
	$\frac{7}{8}$ "	8.0 "
	$\frac{3}{4}$ "	7.2 "
	$\frac{5}{8}$ "	6.3 "
	$\frac{1}{2}$ "	4.0 "
	$\frac{3}{8}$ "	2.6 "
	$\frac{3}{8}$ "	1.5 "

workable suggestions drawn from our wide experience in pickling applications. It is free; write for it to-day.

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67 Wall Street, New York, N. Y.

Description of Joint	Nominal Dia. of Hot-Rolled Rod	Ult. Tensile Strength lbs./psi	Yield Point lbs./psi	Elongation % in 2"	Point of Fracture
Reinforced Weld	1"	78,320	28	Parent Metal
Reinforced Weld	1"	74,840	35,300	39	Parent Metal
Reinforced Weld	1"	76,240	37,240	31	Parent Metal
Welded Flush.....	1"	70,420	33,830	26	At weld
Welded Flush.....	$\frac{3}{4}$ "	71,000	22	At weld
Reinforced Weld (ground flush)	1"	58,600	38,690	16	At weld

• This forged Monel Metal conveyor chain for continuous pickling and plating equipment supplies the missing link where strength, dependability and excellent resistance to the corrosive effects of pickling and plating solutions and fumes are required. Costly shut-downs for repair of conveyor chains are not a hazard where this dependable drop-forged Monel Metal chain is used. Manufactured by The Steel Improvement & Forge Company, Cleveland, Ohio.



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Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.



STEEL

As the Editor Views the News

GOVERNMENT now appears to be taking more money from leading steelmakers than is available for stockholders. Practically all the financial statements recently examined emphasized the trend. For example, compared with U. S. Steel's \$50,583,356 net income last year (p. 17) its taxes amounted to \$52,895,412. Its finished steel output, by the way, was 10,784,273 tons. For National Steel, taxes were equal to \$270 per employe; for Westinghouse Electric & Mfg. Co., \$215. J & L's tax was equivalent to \$6.72 per share on 587,139 shares of 7 per cent cumulative preferred stock outstanding. Important to employes as well as to shareholders.

The Steel institute sums up the cost of recent advances in steel wages and raw materials (p. 17), finds it totals \$215,000,000, while steel price increases amount to only \$200,000,000, on the basis of 1936 tonnage. This seems to be a timely and effective answer to the President's statement (p. 19) that the price rise far exceeds that of wages, that the government will reduce its steel purchases this year, and also seek to divert buying from durable to consumer goods.

The month of March went out much like a lamb so far as steel labor was concerned, but with more than 500,000 idle (p. 19) in the bituminous coal and automobile industries. First repercussion from the miners' strike was pressure for coke, heavy consumption having made it difficult for consumers to build up stocks. Strange, but true, that since General Motors signed up with the UAW there have been 30 sit-downs in its plants, and 100,000 employes still sit, apparently in violation of GM's understanding

with the UAW. . . A rise of 3 per cent in pig iron output in March (p. 18) was accompanied by a gain of six active blast furnaces. Within the past year 14 stacks have been rebuilt, and investigation (p. 63) discloses that at least 34 more are scheduled for rehabilitation in the near future. A far greater number must be rebuilt if it is decided to continue as productive units certain stacks now in "emergency operation" after being long considered obsolete.

Welding is a pliant and virile science, quick to be adapted to the needs of the times and still boasting many unexplored possibilities. A recent innovation in the resistance welding field (p. 36), one which should have an interesting future in the assembly of sheet metal, is a twin-electrode system for spot welding. Separate cables supply current from a new type of transformer, one electrode being merely a ground connection, while the other has a pointed tip and control switch. On 16-gage and lighter steel, correctly timed spot welds may be made anywhere within a 6-foot radius from the ground electrode, without requiring excessive pressure by the operator.

Use of portable X-ray equipment to inspect welds in bridges in Germany (p. 54) is another example of unceasing efforts to learn more about the soundness of welds in service. But, as STEEL's welding expert points out, the X-ray alone will not measure a weld's performance. . . . As an example of progress in steelmaking, consider the fact fuel consumption in the open hearth has been progressively reduced (p. 39) from a former 6,000,000 B.t.u. per ton of steel to, in the case of completely insulated furnaces today, 3,500,000 B.t.u. per ton. . . . Pipefitters probably will hail a new line of fittings (p. 66) which obviate the necessity of threading pipe ends.

A. J. Hain
Managing Editor

Inland Hi-Steel in process at the plant of the Union Metal Products Co., Hammond, Ind.



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Scrap Consumers Organize To Limit Exports; Plan Regional Meetings

A SHIFT in the struggle "from a legislative to a legal front" is the characterization by scrap exporters of latest developments aimed at restriction of scrap exports. This, it appears, hinges principally on a section of a statement made last Thursday by a group of consumers, organized at a meeting in New York as the Independent Iron and Steel Producers Committee on Scrap, to consider means of curbing foreign shipment of the material.

The section that drew a quick response referred to various possibilities of dealing with the situation, including the setting up of centralized scrap buying, and to calling regional meetings throughout the country shortly to discuss measures.

Some leading scrap exporters believe that any effort to set up a central bureau for the purchase of scrap, or organized effort to that end, would raise serious question of restraint of trade. Farmers and laborers, in their co-operatives or central buying bureaus, it is pointed out, are exempt from such regulation, but not commerce. Centralized scrap buying would, in the opinion of these interests, restrain the free and open market in scrap, and hence would be subject to legal action and scrutiny of the federal government.

Situation Regarded Serious

However, the committee's brief statement indicated clearly that various other plans for dealing with the problem of scrap exportations were considered. It was the consensus of opinion of those attending the organization meeting that a serious situation confronted consumers of scrap, particularly the smaller consumers, as a result of the increasing movement of scrap abroad.

"While this situation is not so

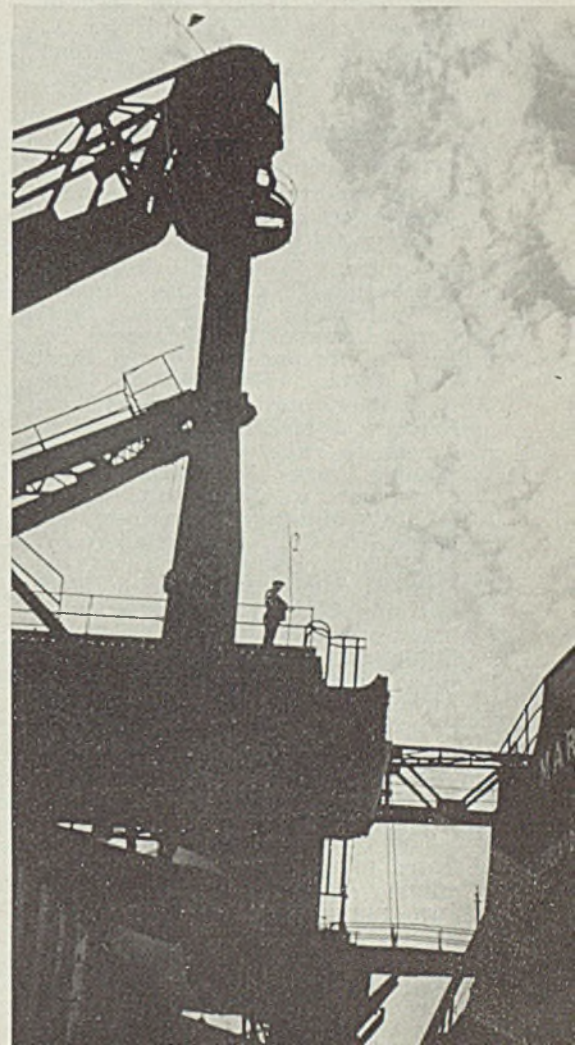
serious for the large steel companies, which have their own resources," the statement said, "it is a very vital concern to the small producers of iron and steel, who must purchase their raw materials in the open market."

A survey said to have been considered at the organization meeting indicated exports of iron and steel scrap this year will reach about 3,000,000 tons, or a rate almost equal to the exports of this material for

the 11 years from 1923 to 1933. Discussing the effect on prices, the statement said: "It is generally recognized that the tremendous export demand for scrap has seriously dislocated the normal relationship between the price of scrap, pig iron and finished steel. The increase in price of scrap is undoubtedly due in major part to the rearmament program of foreign nations with the result that the American public is in effect being forced

American Industry's Accelerated Tempo

IT REQUIRED 66 years for the American steel industry to absorb the first billion tons of iron ore from the Lake Superior district. From present indications it will take about 21 years to use the second billion. The first billion was reached in 1920. Since then—in 16 years—663,314,000 tons have been shipped. Lake shipments are scheduled to start in two weeks. Great as is the demand for ore this season, however, leading interests do not expect to see—as some enthusiasts have envisioned—hauling of ore all-rail from mines to Pittsburgh



to pay part of the cost of world re-
armament."

Meanwhile, a different attack on scrap exports is being directed by Senator Schwellenbach, Washington, who introduced a bill in the Senate last week proposing the licensing of scrap, with the bill patterned after the tin export measure and providing that licenses shall be issued under regulations provided by the President. The act would be effective 60 days after passage. No date has been set for hearing.

No statement was issued up to last Saturday by either the Institute of Scrap Iron and Steel or the American Iron and Steel institute. Benjamin Schwartz, director general of the scrap institute was in Washington to confer with Schwellenbach.

Mr. Schwartz, in Washington, stated that while the Scrap institute has not taken an official stand on the Schwellenbach measure its board of directors will meet in Canton, O., April 14 to consider it.

The director general also conferred with the federal trade commission relative to the committee's suggestion for centralized scrap buying organizations. It is understood that he discussed the whole scrap situation with the commission, but he would not comment.

Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa., heads the Iron and Steel Producers committee on scrap, as chairman, with George Thomas 3rd, also of Lukens, treasurer, and Roger L. Wensley, 60 East Forty-second street, New York, executive secretary.

Personnel of Committee

The following, representing most of the important industrial centers, constituted the committee:

Mr. Wolcott; A. Bindley, purchasing agent, Pittsburgh Steel Co., Pittsburgh; G. L. Rathel, director of purchases, Continental Steel Corp., Kokomo, Ind.; Clarence Tolan Jr., vice president, Dodge Steel Co., Tacony, Philadelphia; Peter Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O.; H. E. Pape, purchasing agent, Stanley Works, American Tube & Stamping Co., Bridgeport, Conn.; Paul W. Miller, vice president, Atlantic Steel Co., Atlanta, Ga.; W. W. MacMillan, general purchasing agent, National Malleable & Steel Castings Co., Cleveland; Carlos J. Maas, president, Judson Steel Corp., Oakland, Calif.; Charles H. McGrath, general purchasing agent, American Brake Shoe & Foundry Co., New York; Paul M. Macklin, vice president, Wickwire-Spencer Steel Co., New York; Albert H. Baker, vice president, Simmons Co., San Francisco.

The Schwellenbach bill was referred to the senate committee on military affairs.

The bill is in all ways a duplicate

Steel Houses Against Air Raids in Germany

WHILE Americans are interested in steel homes for permanence and economy, their use in Germany is advocated as protection from air raids.

Hangars, factories and subterranean passageways of "scientific steel construction" also are being planned.

An elaborate booklet on air raid protection through use of steel has been published in Germany by Dr. Hans Schoszberger for German steelmakers. This describes buildings designed to withstand shock of explosive bombs. Ventilation to lessen gas menace and equipment to combat fires started by incendiary bombs also are described.

of the present tin scrap act, providing that iron and steel scrap shall be exported only under license issued by the President, under regulations promulgated by him.

It is understood that the bill was instigated by complaints received by the senator from his home state from foundrymen who are complaining that they cannot get the necessary scrap to carry on their business.

In January of this year 73,000 tons of scrap were exported from the United States, while figures that are just available at the department of commerce, show that during February 151,000 tons were exported.

Predicts Slight Decline in Mid-West Freight Loadings

Freight loadings during second quarter in Illinois, Indiana, Wisconsin and Iowa will be about 3 per cent less than in the corresponding 1936 period, due to a lighter movement of coal, grain and livestock, according to the Mid-West Shippers Advisory board's estimate.

Traffic losses in these commodities will more than offset anticipated gains of 30 per cent in iron ore, and 23 per cent in iron and steel.

Woodward Tells Story Of Southern Pig Iron

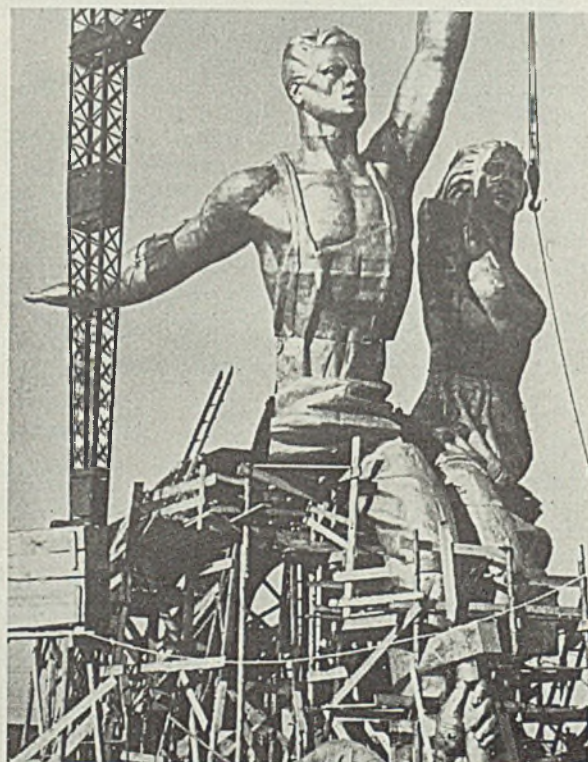
Woodward Iron Co., Woodward, Ala., pig iron producer since 1883, has published an attractive booklet as a panorama of its accomplishments and its present plant and personnel.

It is illustrated with scenes from its coal and ore mines, blast furnace and coke plant, with details of each. Views are also presented of living quarters for employes. Through the entire booklet runs the theme of service to industry, manufacture of pig iron by an independent company intent on doing the best possible in a single product.

The booklet presents an interesting picture of the development of the iron industry in the Birmingham district from its beginning more than half a century ago.

Stainless Steel Soviet Statue Is 84 Feet High

A STATUE 84 feet high made of stainless steel sheets is to be the Soviet's contribution to the world's exposition in Paris. The statue will surmount a steel tower 110 feet high. It is now nearing completion in Moscow, will be taken down, shipped and reassembled. In it the designer has portrayed with striking effect the figures of a young worker and a collective farm girl, holding the hammer and sickle, emblem of the Soviet union. Sovfoto



Heavy Taxes Offset Net Profits for Steelmakers

A NNUAL pamphlet financial statements of iron and steel manufacturers recently have shown more clearly than ever before how the steadily increasing tax burden has diverted money from employes and stockholders.

Compared with net income of \$50,583,356, the United States Steel Corp. paid taxes of \$52,895,412 last year. In 1935 its taxes were \$38,575,010. Its shipments of finished steel in 1936 totaled 10,784,273 tons.

Stockholders of the Jones & Laughlin Steel Corp., Pittsburgh, were advised that the tax burden of their corporation, amounting to \$3,945,258 last year compared with \$2,800,493 in 1935, "is equivalent to \$6.72 per share on the 587,139 shares of 7 per cent cumulative preferred stock outstanding."

Stockholders of National Steel Corp., Pittsburgh, were told: "There is a constant increase in the burden of taxes that the corporation is compelled to pay. It is significant to note that charges for all classes of taxes amounted to \$5,399,505, which constitutes a prior charge on earnings equal to \$2.49 on each share of capital stock. These taxes also represent \$270 for each and every one of the 19,936 employes of the corporation."

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., said "federal and state taxes enacted in 1936 have added materially to the tax burden. For the year 1935 taxes amounted to \$1.85 per share of capital stock. For the year 1936 they amounted to \$3.35 per share of capital stock or \$215 per employe, average number."

United Engineering & Foundry Co., Pittsburgh, reported that although its profit was the highest on record, its tax payments were equivalent to \$1 a share.

RISE IN PRODUCTION COSTS EXCEEDS INCREASED REVENUE

Steel manufacturing costs have been increased nearly \$215,000,000 a year by recent wage advances and soaring prices for many raw materials, the American Iron and Steel institute estimates.

Higher costs exceed by almost \$15,000,000 the estimated increase in annual gross revenues of \$200,000,000 expected from recent steel price advances.

The additional revenues and additional costs are estimated on basis of finished steel shipments in 1936, on quantities of various materials consumed and on difference between

price of each as of March 15 and the average price in January and February.

Largest factor in higher cost of making steel is the recent general wage increase estimated to have increased steel payrolls by \$130,000,000 a year.

Increases in cost of steel scrap, iron ore, tin and zinc have added \$85,000,000 to annual costs.

During 1936 the steel industry purchased about 13,600,000 tons of scrap. On this basis the more recent increase of \$3 per ton will add about \$41,000,000 to the industry's annual expenditures.

Since 1932 the composite price of finished steel products has increased 33 per cent, which compares with an 180 per cent increase in the composite price of scrap, 200 per cent increase in the price of tin, 160 per cent increase for zinc, 31 per cent for ferromanganese and 16 per cent for spiegeleisen. Average hourly earnings of wage earners in the steel industry have increased by 57 per cent during the same period.

ARMCO FEARS RISE IN COSTS MAY CHECK BUYING

Indications are that industrial activity in the United States may extend beyond all present levels before there is another marked recession," the American Rolling Mill Co., Middletown, O., states in summarizing its annual financial report.

George M. Verity, chairman, and Charles R. Hook, president, warned that "there are major obstacles to continued sound improvement, among them mounting taxes and increased costs, brought about largely by government activities.

"The danger is," they said, "that taxes and prices may mount to the point where it will not be possible for the great mass of consumers to pay them."

The continuous sheet rolling method has extended markets "that were undreamed of a few years ago."

Sales of \$101,463,383, the largest of any year in its history, and net profit, after all charges, of \$6,441,676, the largest for any year since 1928, are reported for 1936.

The earnings are equal to approximately \$2.73 a share on the average number of shares outstanding and compare with the 1935 profit of \$4,310,127, equal to \$2.41 a share. Earnings for 1936 include \$420,000, representing the minimum royalty received for the years 1937-40 on a

license issued to an English company for use of the continuous sheet rolling process.

Sales of \$101,463,383 last year compare with \$76,799,385 in 1935 and with the depression low of \$27,294,322 in 1932. Sales in 1929 were \$70,434,232.

Current assets increased about \$2,000,000 to a total of \$44,512,822. Current liabilities increased approximately \$5,500,000 to a total of \$17,558,163.

The company's long-term debt was reduced from \$45,262,559 to \$24,940,493. Conversion and redemption of the 4¼ per cent convertible debentures accounted for a reduction of \$23,173,000 while a new long-term debt of \$3,600,000 was created in the acquisition of complete ownership of the Hamilton Coke & Iron Co., Hamilton, O., in which Armco had owned a 50 per cent interest.

INTERLAKE STEAMSHIP CO. REPORTS \$1,514,181 NET

Net profit of Interlake Steamship Co., Cleveland, for the year ended Dec. 31, 1936, was \$1,514,181, equal to \$3.25 a share on 464,682 shares, highest since 1930 when net totaled \$1,702,907.

Practically all earnings were paid out in dividends. Statement shows dividends of \$3.25 aggregated \$1,514,926. Interest on mortgages, previously deferred, brought total income to \$1,539,181. Profit and loss surplus Dec. 31 totaled \$2,156,604.

Working capital at year end was \$3,024,966. Current assets were \$3,499,909 and included \$948,366 cash, \$1,255,307 United States government securities, and \$711,312 HOLC securities. Current liabilities were \$474,943.

INLAND STEEL EARNINGS, SALES AT ALL-TIME HIGH

Net earnings of Inland Steel Co. for 1936 were \$12,800,545, equal to \$8.54 per common share. This compares with \$9,417,818, or \$6.54 on a smaller number of shares in 1935. Net sales last year totaled \$98,903,896, against \$62,544,872 in preceding year. Last year's earnings and sales established all-time records for the company.

Operations were at 92.5 per cent of rated capacity, 2,340,000 gross tons; in 1935 company operated at 72.6 per cent of 2,000,000 tons rated capacity.

GENERAL ELECTRIC RAISES ANNUAL PAYROLL \$7,000,000

Wage and salary increases amounting to \$7,000,000 became effective last week in all General Electric Co. plants, according to announcement by Gerard Swope, president. Adjustments on a selective basis for day and piece workers are being made.

March Iron Output Up 3.1%

Six More Furnaces Resume

MAKING another moderate increase in March, production of coke pig iron in the United States reached a level which compares favorably with output during the first ten months of 1929, a year which established the all-time record. The rise in output during the month was accompanied by a gain of six active blast furnaces.

Average daily production in March was 111,233 gross tons, this being the largest for any month since October, 1929, with 115,747 tons. Compared with the February figure of 107,857 tons per day, this was a gain of 3376 tons, or 3.1 per cent. The daily rate in March, one year ago, was 66,004 tons.

Total output during March was 3,448,228 tons, an improvement of 428,222 tons, or 14.2 per cent, over

close of March, 1936. During the month, five nonmerchant or steel-works furnaces were made active and one merchant unit resumed. No furnaces were blown out.

Furnaces resuming in March were: In Ohio: Brier Hill No. 1, Youngs-

AVERAGE DAILY PRODUCTION

	Gross Tons			
	1937	1936	1935	1934
Jan.	103,863	65,461	47,692	39,537
Feb.	107,857	63,411	57,675	45,385
March ...	111,233	66,004	57,120	52,438
April	80,316	55,719	57,873	
May	85,795	55,986	66,370	
June	86,551	51,949	64,563	
July	83,735	49,043	39,630	
Aug.	87,475	56,767	34,199	
Sept.	90,942	59,009	29,969	
Oct.	96,509	63,818	30,689	
Nov.	98,331	68,876	31,930	
Dec.	100,813	68,242	33,161	
Ave.	107,644	83,832	57,694	43,774

MONTHLY IRON PRODUCTION

	Gross Tons		
	1937	1936	1935
Jan.	3,219,741	2,029,304	1,478,443
Feb.	3,020,006	1,838,932	1,614,905
March ...	3,448,228	2,046,121	1,770,990
Tot. 3 mo. 9,687,975	5,914,357	4,864,338	
April	2,409,474	1,671,556	
May	2,659,643	1,735,577	
June	2,596,528	1,558,463	
July	2,595,791	1,520,340	
Aug.	2,711,726	1,759,782	
Sept.	2,728,257	1,770,259	
Oct.	2,991,794	1,978,379	
Nov.	2,949,942	2,066,293	
Dec.	3,125,192	2,115,496	
Total	30,682,704	21,040,483	

the 3,020,006 tons in February. However, March had 31 days, against 28 in February. The March production was the best since October, 1929, with 3,588,146 tons. Output in March, 1936, was 2,046,121 tons.

For the first quarter of the current year, production has aggregated 9,687,975 gross tons, an increase of 64 per cent, or 3,773,618 tons, over the 5,914,357 tons made in the first three months of 1936. Output in the first quarter of 1935 was 4,864,338 tons.

Relating production to capacity, operations in March were at the rate of 82.0 per cent, as compared with 79.5 per cent in February, 76.6 per cent in January, and 48.5 per cent in March last year.

Active blast furnaces on March 31 numbered 182, the largest total since April, 1930, when 182 also were making iron. This was a gain of six over the 176 on Feb. 28. Only 126 stacks were operating at the

town Sheet & Tube Co. In Pennsylvania: Bethlehem B and Cambria J, Bethlehem Steel Co.; Duquesne No. 6, Carnegie-Illinois Steel Corp. In Alabama: North Birmingham No. 4, Sloss-Sheffield Steel & Iron Co. In Kentucky: Norton, American Rolling Mill Co.

World Tin Consumption Up; America Uses 19.5% More

World tin consumption in January increased 18.4 per cent to 15,668 tons, against 13,237 tons in January, 1936, according to the International Tin Research & Development

MARCH IRON PRODUCTION

	No. in blast last day of Mar. Feb.		Total tonnage	
			Mer- chant	Non- merchant
Ohio	39	38	118,399	665,208
Penna.	63	60	147,101*	1,005,736*
Alabama ..	16	15	112,796	119,346
Illinois ...	15	15	106,400	214,595
New York ...	13	13	72,889	174,993
Colorado ...	2	2		
Indiana ...	15	15	4,950*	528,842
Maryland ...	5	5		
Virginia ...	1	1		
Kentucky ..	2	1		
Mass.	0	0		
Tenn.	1	1		
Utah	1	1	10,343*	166,630
West Va. ...	3	3		
Michigan ...	4	4		
Minnesota ..	2	2		
Missouri ...	0	0		
Total ...	182	176	572,878*	2,875,350*

*Includes ferro and spiegeleisen.

council statistics. Principal tin consuming industries are considerably more active than a year ago, world tin plate production in January having been 311,000 tons compared with 275,000 tons in January, last year.

World tin production in January at 13,660 tons was at practically the same level as in January, 1936.

The United States used 77,582 tons in the year ended January, 1937, an increase of 19.5 per cent over 64,910 tons in the preceding year. Consumption in United Kingdom increased 1.8 per cent; Russia, 30.6 per cent; France, 21.9 per cent. Germany showed a decrease of 18.5 per cent and other countries including Italy and Spain, 5.7 per cent less.

Mellon Institute Plans Dedication of New Home

Dedication of Mellon institute's new building in Pittsburgh, May 5-9, will reveal an unusual structure, in many respects. In its construction 4329 tons of structural steel was used, more than half the ton-

RATE OF OPERATION (Relation of Production to Capacity)

	1937 ¹	1936 ²	1935 ³	1934 ⁴
Jan.	76.6	48.2	34.2	28.3
Feb.	79.5	46.6	41.4	32.5
March	82.0	48.5	41.0	37.5
April		59.1	40.0	41.4
May		63.1	40.2	47.5
June		63.6	37.2	46.3
July		61.5	35.2	28.4
Aug.		64.3	40.7	24.5
Sept.		66.9	42.5	21.5
Oct.		71.0	45.8	22.1
Nov.		72.3	49.5	22.8
Dec.		74.2	49.0	23.7

¹Based on capacity of 49,512,737 gross tons, Dec. 31, 1936; ²capacity of 49,777,893 tons, Dec. 31, 1935; ³capacity of 50,845,741 tons, Dec. 31, 1934; ⁴capacity of 50,975,561 tons, Dec. 31, 1933. Capacities by American Iron and Steel Institute.

nage in the 32-story Koppers building in Pittsburgh. There was also used 932 tons of reinforcing steel, 169 carloads of limestone, 45 carloads of marble and more than 4000 tons of terra cotta, sufficient to pave a 40-foot roadway for 1½ miles.

The structure is 306 feet wide at the front, 227 feet at the rear and has a depth of 334 feet. It rises 80 feet above the Fifth avenue level but because of three floors below the street level it is 112 feet from the floor of the court to the roof. The impression is of a low building, of classic design with Ionic pillars.

The new building replaces one which has been in use for 22 years. It will be dedicated in the presence of a group of scientists, in honor of Andrew W. and the late Richard B. Mellon, founders in 1913.

Coke Scarce as Coal Strike Begins

OPERATIONS in hundreds of bituminous coal mines were halted last week by the strike of United Mine Workers. Shutdown of the industry, in which 462,000 men are employed, followed failure of protracted negotiations for a new wage agreement.

Shortly after it became apparent that many coke consumers were faced with a dangerously tight situation. Sellers reported receiving appeals from some independent blast furnaces and other users which had been unable to stock because of the recent high rate of activity.

By-product plants generally are fairly well covered. Strikers are reported to be refusing to allow operators to draw or recharge ovens or ship coke now on track. It was generally assumed the strike would be short lived and that coke prices would advance 25 to 50 cents as a result of higher costs.

New GM Sitdowns Raise Auto Jobless to 100,000

Recurrence of sitdown strikes in General Motors plants in Flint,

Mich., and Pontiac, Mich., late last week put an estimated 23,400 more workers out of jobs and brought the total idle automobile workers to about 100,000. Nine GM plants in Flint and two in Pontiac were down over the weekend.

Union officials, summoned to conference with GM executives, maintained the disturbances were unauthorized and arose out of disagreements over the shop steward system of handling grievances. William F. Knudsen told union leaders 30 sitdowns had occurred since the March 12 agreement, all in violation of the agreement.

Accurate Machinery Classification Sought

Necessity for correct classification of machine tools and equipment for export, in shippers' declarations to the commerce department, is emphasized by the National Machine Tool Builders association, Cleveland.

Export statistics supplied by the commerce department are the best indicators of foreign trade trends in machine tools available, it states in a letter to members, but points out that numerous errors in classification of types of machinery have occurred. These errors, mainly traceable to shippers' inaccuracies, detract from the value of the department's report.

Government Slows Down Steel Buying

AS A RESULT of the present up-trend in commodity prices the government will try to switch its buying from durable to consumer goods, President Roosevelt said in a press conference last week.

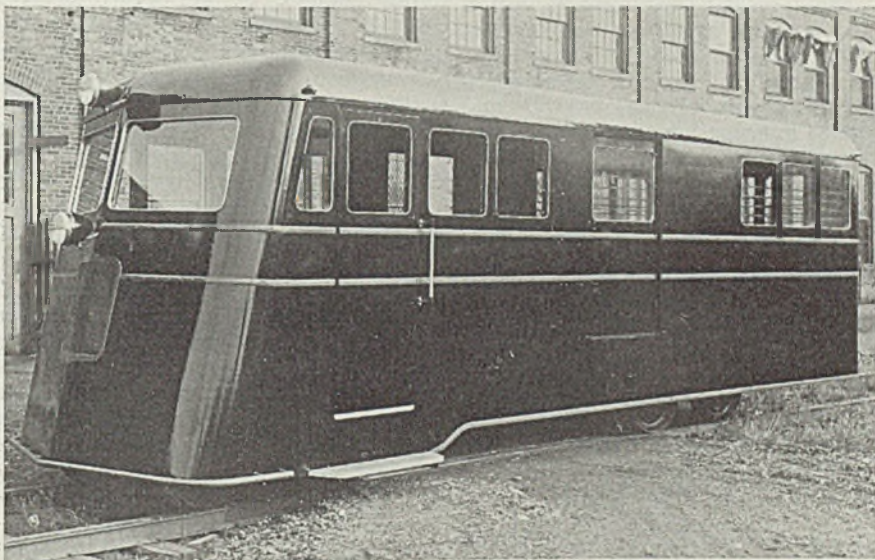
Singling out steel and copper to illustrate price advances, he said the "six dollar per ton steel price increase was two or three times more than justified by the wage increase." This, he added, was based on information furnished him by the central statistical board.

Instead of constructing steel bridges, public buildings and dams, the government will attempt to direct recovery expenditures and relief work to dredging and other projects that will not draw upon durable goods industries, the President indicated. This will be "an effort to spread national income evenly and halt rising prices of steel and other heavy industries."

"Past history shows that when durable goods production goes up faster than consumer goods, as at present, there is danger of slump of both types," he stated.

During the past year the government has bought \$250,000,000 worth of steel, exclusive of army and navy purchases.

Gasoline-Powered Car Built for Short Hauls



DEVELOPED to carry passengers, mail and baggage on short line railroads, this car is powered with a standard Ford V-8 engine. Its frame is steel channel welded and riveted at all joints, and the body steel panels. Rubber insulation between forged steel tires and cast steel wheel centers absorbs shock. Capable of hauling five tons of mail and baggage and ten passengers, the vehicle attains a maximum speed of 60 miles an hour. It is produced by Kalamazoo Railway Supply Co., Kalamazoo, Mich., which also makes a lighter model railroad inspection car

Protest Rate Advances On Raw Materials

Protests were made last week before the interstate commerce commission against any increase in freight rates on raw materials for steel manufacture. The hearing was on proposed general freight rate advance.

Lauson S. Stone, assistant to the president, Jones & Laughlin Steel Corp., argued against increases on various raw materials. Mr. Stone, speaking especially of proposed iron ore rates from the upper lake region estimated that the increase would, if approved, add \$1,000,000 a year to his company's costs.

H. E. Graham, general traffic manager of the corporation, testified against proposals on other raw materials including coal, coke, limestone. He estimated increases in rates on this year's production would amount to about \$695,000, including iron ore.

M. D. Harbaugh, vice president, the Lake Superior Iron Ore association, objected to increases in rates on iron ore from mines to upper lake ports.

Mesta Refuses To Sign with SWOC

THE Steel Workers Organizing committee struck a snag last week in its drive to obtain widespread recognition for bargaining purposes. Mesta Machine Co., Pittsburgh, after several meetings with SWOC officials, announced that "the company is not prepared to enter into any signed contracts."

The company's statement said:

"Mesta Machine Co. agrees to recognize the SWOC as a joint bargaining agency for its members who are employees of Mesta Machine Co. to the extent that it will take action on any written requests made to the company in relation to wages, working conditions, or any other question pertaining to their employment here, and if necessary, will appoint the proper party to meet with their representatives for discussion of any suggestions not readily disposed of."

"Any requests, action taken thereon or agreements reached at meetings to be posted on the bulletin boards."

"The company is not prepared to enter into any signed contracts."

"Any requests for future conferences must be in writing, specifying the purpose of the conference, and the proper party will be appointed to attend such conference."

"Representatives of the organization request a future meeting for the purpose of effectuating a written agreement on working conditions, application of wage rates, hours, rules and a method for adjudication of disputes arising under the terms of the agreement."

"The answer to this is—there is no use for any further meetings as long as a signed contract is the question to be discussed. On all other items we shall be glad to meet."

Claim 200,000 Membership

At Jones & Laughlin's Pittsburgh plant the general committee of employe representatives voted 28 to 1 to "stand solidly behind the employe representatives as the bargaining agency for its employes." Several employe representatives announced they had resigned from the CIO. Meanwhile, Jones & Laughlin officials said they had not received from Aliquippa a resolution calling for a minimum wage scale of \$6 per day.

SWOC claimed a membership of more than 200,000. It announced that contracts similar to those signed with Corporation subsidiaries had been secured with Columbia Steel & Shafting Co., Carnegie, Pa.; Fort Pitt Steel Casting Co., McKeesport, Pa.; Penn Iron & Steel Co., Creighton, Pa.; Pittsburgh Steel Foundry Co., Glassport, Pa.; Reliance Steel Casting Co., Pitts-

District Steel Rate

	Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts		Week ended	
	Week ended	Change	1936	1935
Pittsburgh ..	95	+ 2	52	34
Chicago	84	+ ½	67 ½	50
Eastern Pa. . .	59 ½	+ 1 ½	40 ½	29 ½
Youngstown . .	86	+ 1	74	50
Wheeling	96	- 1	76	76
Cleveland	79 ½	- 1	81	69
Buffalo	89	- 1	62	32
Birmingham . .	80	None	69	55 ½
New England . .	85	None	72	53
Detroit	100	None	100	88
Cincinnati . . .	90	+10	55	†
St. Louis	82	None	†	†
Average	91 ½	+ 1 ½	63 ½	44

†Not reported.

burgh; Homestead Valve Mfg. Co., near Coraopolis, Pa.; Pittsburgh Bridge & Iron Works, Rochester, Pa.; and that negotiations were being conducted with numerous other companies.

STEEL PAYROLLS REACH NEW PEAK AT \$1,055,000,000

Total steel payrolls are now at a rate of more than \$1,055,000,000 a year, highest level in the history, according to the American Iron and Steel institute. Payments to wage earners are currently at the rate of \$396,000,000 per year, and salaries \$159,000,000.

Average hourly wages are 83 ½ cents per hour, equivalent to nearly \$7 per eight-hour day. Minimum wage in Pittsburgh and Chicago steel districts is 62 ½ cents per hour, or \$5 per day of eight hours.

Two general pay increases within five months, the first on Nov. 16, 1936, and the second taking effect on March 16 this year, added \$205,000,000 a year to total payrolls and raised average hourly wages almost 26 per cent.

In 1929, the best previous year, the industry paid out a total of \$841,000,000 in wages to 458,000 employes.

Although current level of payrolls is 25 per cent above the 1929 figure, the composite price of finished steel is only 13 per cent above 1929.

Canada's Steel Imports Increase 42 Per Cent

Canada's steel imports in February totaled \$12,298,000, 42 per cent over \$8,666,000 in February, 1936. Imports from the United States rose from \$7,524,000 to \$10,903,000. Automobile parts with total value of \$2,702,000 and machinery with \$2,169,000 led in imports from the United States. Steel exports totaled \$3,935,000 of which \$346,000 were to the United States.

Production

STEEL ingot production advanced 1 ½ points last week to 91 ½ per cent, as a result of heavier operating schedules at Pittsburgh, Chicago, eastern Pennsylvania, Youngstown and Cincinnati. This is the highest level since the third week of August, 1929, when steelworks were engaged 94 per cent.

Youngstown—Up 1 point to 86 per cent, as Sharon Steel Corp. added one open hearth at its Low-ellville works.

Detroit—Held at 100 per cent, with all 21 units active.

Cleveland-Lorain—Down 1 point to 79 ½ per cent, as National Tube Co. at Lorain took off one furnace to operate 10. Otis Steel Co. and Corrigan, McKinney division of Republic Steel Corp. continued with 8 and 13 units on, respectively.

Birmingham—Unchanged at 80 per cent for the third consecutive week.

Cincinnati—Gained 10 points to 90 per cent, with 21 of the district's 24 open hearths lighted.

Chicago—Increased ½ point to 84 per cent. March shipments for some mills were the heaviest for any month in history and substantial backlogs assure an extension of recent activity through the new quarter. Thirty of 39 blast furnace stacks continue active.

New England—Held at 85 per cent with three units down, two for repairs. This week production will approximate 97 per cent, as two units are resumed.

Pittsburgh—Up 2 points to 95 per cent, equaling the 1929 high mark. The leading interest at times operated as high as 99 per cent. Most independents were operating at 90 to 100 per cent. Forty-six blast furnace stacks are active.

Wheeling—Down 1 point to 96 per cent.

Central eastern seaboard—Advanced to 59 ½ per cent, an increase of 1 ½ points. Processing facilities continue to handicap raw steel production, with the result that little further increase is expected at this time, despite heavy buying of finished steel.

Buffalo—Off 1 point to 89 per cent, as one producer operated one less open hearth, making a total of 38 in the district melting. This week 39 furnaces will again be in production and all are scheduled to run for at least ten days.

St. Louis—Unchanged at 82 per cent for the eighth consecutive week. This rate is likely to be increased soon by putting in two additional open hearths.

Pig Iron Exports Reach High Level

EXPORTS of steel and iron products in February, excluding scrap, totaled 139,816 gross tons, valued at \$9,835,664, compared with 128,843 tons valued at \$9,327,749 in January and 68,800 tons valued at \$5,166,779 tons in February, 1936, according to the metals and minerals division of the department of commerce.

For two months exports other than scrap were 268,559 tons, valued at \$19,163,413, compared with 151,402 tons, valued at \$11,356,345 in the first two months of 1936, a gain of 77 per cent in quantity and 69 per cent in value.

A feature of the 1937 exports is the large tonnage of pig iron. In January pig iron exports were 13,329 tons and in February 17,118 tons. The two months total of 30,447 tons compares with only 237 tons in the first two months of 1936. Total pig iron shipments in two months this year have exceeded the aggregate shipments, 25,312 tons, for the six-year period 1931-1936. At this rate an estimated 180,000 tons would be exported in 1937, compared with 195,702 tons for the four-year period, 1927-1930.

February Shipments Top January

Scrap shipments in February were 151,271 tons, valued at \$2,601,040, compared with 72,849 tons valued at \$1,148,093 in January and 145,002 tons valued at \$1,636,214 in February, 1936. For two months of 1937 aggregate scrap exports were 224,120 tons compared with 303,964 tons in two months of 1936, a decline of 26.4 per cent. From the value standpoint two months exports in 1937 were worth \$3,749,133 compared with \$3,533,976 for two months of 1936, a gain of 6.9 per cent.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Articles	Gross Tons		
	Feb. 1937	Jan. 1937	Jan. thru Feb. '37
Pig iron	17,118	13,329	30,447
Ferromanganese and spiegeleisen	16	75	91
Other ferroalloys	335	93	428
*Ingots, blooms, etc.:			
Not cont'g alloy	6,808	1,790	8,598
Alloy, incl. stnls.	63	44	107
Bars, iron	79	90	169
Bars, concrete	812	891	1,703
*Other steel bars:			
Not alloy	5,824	4,385	10,209
Stainless steel	8	47	55
Alloy, not stnls.	572	335	907
Wire rods	1,680	3,279	4,959
Boiler plate	109	217	326
*Other pl. not fab.:			
Not alloy	11,315	7,074	18,389
Stainless steel	3	2	5
Alloy, not stnls.	98	13	111

Articles	Feb. 1937	Jan. 1937	Jan. thru Feb. '37
Skelp	2,777	1,531	4,308
Sheets, galv. iron	116	994	1,110
Sheets, galv. steel	3,734	5,496	9,230
*Sheets, blk. steel:			
Not alloy	13,123	13,296	26,419
Stainless steel	46	46	92
Alloy, not stnls.	49	14	63
Sheets, black iron	270	704	974
*Strip, cold-rolled:			
Not alloy	2,586	2,276	4,862
Stainless steel	32	39	71
Alloy, not stnls.	117	29	146
*Strip hot-rolled:			
Not alloy	4,058	5,934	9,992
Stainless steel	2	25	27
Alloy, not stnls.	43	107	150
Tin plate and taggers' tin	19,032	25,232	44,264
Terne plate	427	641	1,068
Tanks, lined	957	553	1,510
Shapes, not fab.	6,544	4,512	11,056
Shapes, fab.	3,244	1,530	4,774
Plates, fabricated	3,365	127	3,492
Metal lath	169	103	272
Frames and sashes	85	73	158
Sheet piling	234	847	1,081
Rails, 60 lb.	705	3,835	4,540
†Rails, relaying	695	1,518	2,213
Rail fastenings	499	286	785
Switches, frgs., etc.	98	118	216
Railroad spikes	198	234	432
R. R. bolts, nuts	79	58	137
Boiler tubes, smls.	904	734	1,638
Do., welded	80	24	104
Pipe:			
Casing and oil-line seamless	6,586	3,151	9,737
Do., welded	800	786	1,586
Do., smls. black, except casing	1,272	1,263	2,535
Pipe fittings:			
Mall. iron scrwd.	307	283	590
Cast iron scrwd.	276	157	433
Pipe, fittings for:			
Cast iron pres.	2,867	1,801	4,668
Cast iron soll.	494	613	1,107
Pipe:			
Welded blk. steel	1,480	1,419	2,899
Welded black wrt. iron	224	160	384
Wldd. galv. steel	841	2,953	3,794
Welded galv. wrought iron	302	11	313
Pipe and fittings:			
Riv. iron or steel	31	47	78
Wire:			
Plain iron, steel	2,265	2,547	4,812
Galvanized	1,489	1,653	3,142
Barbed	2,570	3,344	5,914
Wov. wire fencing	386	170	565
*Woven wire screen:			
Insect	30	23	53
Other	122	103	225
†Wire rope	477	215	692
†Wire strand	68	36	104
†Card clothing	3	1	4
Other wire, mfrs.	524	539	1,063
Wire nails	1,432	1,087	2,519
Horseshoe nails	91	73	164
Tacks	33	23	56
Other nails, staples	293	203	496
Bolts, etc.	895	698	1,593
Castings:			
*Gray iron, semi-steel	608	508	1,116
Malleable iron	400	315	715
*Steel, not alloy	212	112	324
Alloy, incl. stnls.	106	137	243
Car wheels, tires and axles	1,064	628	1,692
Horseshoes, calks	54	2	56
*Forgings, n. e. s.:			
Not alloy	557	338	895
Alloy, incl. stnls.	21	134	155
Total I & S prod.	139,716	128,843	268,559
Scrap, iron, steel	143,197	68,884	212,081
Scrap, tin plate	1,610	437	2,047
†Tin plate circles, strips, cbles, etc.	1,443	852	2,295
Waste-waste, tin pl.	5,021	2,676	7,697
Total scrap	151,271	72,849	224,120
GRAND TOTAL	290,987	201,692	492,679
Iron ore (tons)	179	80	259

*No comparable breakdown for previous year.
†New class. No comparable figures available for previous year.
‡Previously carried under one heading: "Wire Rope."

Exporters Predict Foreign Trade Boom

BOOM conditions in this country's foreign trade are rapidly developing, according to opinion expressed at the annual meeting of the Export Managers' Club Inc., New York, last week. General improvement in economic conditions abroad, combined with world rearmament, are principal factors. Predictions were made that 1929 levels would be reached this year.

Dr. Alexander V. Dye, director of the bureau of foreign and domestic commerce, Washington, said United States exports to Latin-American countries were increasing more rapidly than to other markets. This was because Latin-America importers had been unable to get quick deliveries from European shippers and because exports of raw materials had enriched South American buyers.

He added, however, that Latin-America will not replace more industrialized nations as markets for American goods until individual buying power in Central and South America is raised.

Canadian Purchases Heavy

This point he illustrated by citing that Latin America, with 130,000,000 population, bought from this country \$376,000,000 of goods in 1936, only slightly more than the \$323,000,000 of goods purchased by Canada with only 10,000,000 population. Hence per capita purchases of American goods by Latin America were \$3, against \$31 by Canada.

Export sales activity as a form of insurance was urged by Franklin Johnston, publisher, the *American Exporter*.

D. J. Elmore, Studebaker Export Corp., pointed out that 92 per cent of the world's population lives outside the United States, and that business men should not limit sales efforts to the 8 per cent here.

European Pressure Puts Off Steel Congress

Arrangements for the sixth international congress for steel development in June in New York, have been canceled, at request of European industrialists, owing to extreme pressure of business, combined with emergency work at home.

The fifth congress met in Berlin last October. The American Institute of Steel Construction was to be host at the sixth assembly. Place and date of the postponed meeting will depend largely on outcome of the European situation.

Men of Industry

CR. BOTTENFIELD, recently superintendent of the 80-inch and 42-inch mills at the Gary Sheet and tin mills of Carnegie-Illinois Steel Corp., has been appointed general superintendent of the new tin mill of Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. He had been located at Gary since 1919.

L. S. Dahl, formerly superintendent of the cold reduction and annealing departments, has succeeded Mr. Bottenfield at Gary. Harry Gude, assistant superintendent of cold reduction, has assumed Mr.



C. R. Bottenfield

Dahl's former position, and has been succeeded by A. L. Billeter. The latter, recently assistant superintendent in charge of annealing, has been replaced by Ross O. Laub.

H. F. Brown has been appointed by Link-Belt Co., Chicago, to manage the sale of its electronic radio-stat control system, for eliminating overheating and underheating.

Dr. William Monroe White, manager of the hydraulic department, Allis-Chalmers Mfg. Co., will return April 6 from a cruise around the world.

Ed. Bumke, formerly foundry engineer, has been appointed superintendent of the malleable division, Oliver Farm Equipment Co., South Bend, Ind.

Dr. George B. Waterhouse, head of the metallurgical division, Massachusetts Institute of Technology, has been elected to the board of directors, Dominion Steel & Coal Corp., Montreal, Que.

W. M. Albaugh, secretary-treasurer of Thompson Products Inc.,

Cleveland, will continue as treasurer and a director of the company. J. D. Wright has been made secretary.

L. A. VerBryck has been made manager, welded wire products division, Wheeling Corrugating Co., Wheeling, W. Va. Mr. VerBryck was for a number of years associated with the Pittsburgh Steel Co.

Edward T. Butler, associated with the American Iron and Steel institute, New York, since 1933, has resigned to become assistant manager of the Coal & Ore Exchange, Terminal Tower, Cleveland.

Howard Creps has been made a member of the sales department, Frank Foundries Corp., Moline, Ill., and Davenport, Iowa. Mr. Creps previously was connected with the Gale Mfg. Co., Albion, Mich., since 1927.

A. J. McGarland, first vice president, has been elected executive vice president, Wheeling Steel Corp., Wheeling, W. Va. L. W. Franzheim, previously treasurer, has been made vice president and treasurer, and Henry D. Scott has also been elected a vice president.

Hugo Marquette has been appointed production manager, Smith Steel Foundry Co., Milwaukee, successor to George H. Smith Steel Casting Co. The position is a new one. He formerly was in the sales department. Adolph Peters, with the laboratory staff for some years, has been promoted to metallurgist.

Roland W. Burt has been named eastern manager of railroad sales, Joseph T. Ryerson & Son Inc., with



Victor Brook

headquarters at the company's Jersey City, N. J., office. He has been associated with Ryerson for 14 years, advancing through the various sales divisions to sales representative in Indiana, and later taking charge of railroad sales at St. Louis.

Garrett A. Connors has been appointed vice president in charge of industrial relations, Sharon Steel Corp., Sharon, Pa. This is the third advancement for Mr. Connors since he was named in 1935 to be general manager of the Youngstown Pressed Steel Co., Warren, O. A few months later the title of vice president was added to general manager.

P. H. Staerk has been appointed manager of the industrial division in charge of distributor and production



P. H. Staerk

sales of mounted bearings for the Ahlberg Bearing Co., Chicago. Joining the company in 1920, Mr. Staerk has been successively branch manager at St. Louis and Detroit. The past several years he has specialized in the sale of bearings for power transmission equipment.

John Gaillard, industrial and mechanical engineer, on the staff of American Standard association, New York, has been elected vice president in charge of standardization. He has been empowered to appoint a committee to launch an active campaign in promoting the knowledge and application of standardization as a major function of industrial management.

Victor Brook, for more than 21 years with *Machinery* as associate editor, field service manager and district advertising manager, resigned to join the High Speed Hammer Co. Inc., Rochester, N. Y., April 1, as executive vice president. Other officers recently elected are: President, F. W. Marcellus; vice president in charge of eastern sales, H. M. Starke; secretary-treasurer, Charles Harle. Directors are: W.

P. Andrus, chairman of the board, and Messrs. Marcellus, Brook and Harle.

E. P. Crawford has been appointed factory representative in the Pennsylvania territory for Billings & Spencer Co., Hartford, Conn., manufacturer of forged tools, commercial drop forgings, drop forging hammers and die making machinery. Mr. Crawford who, for the past 15 years has traveled the Pennsylvania territory in the mill supply and hardware field, will make his headquarters in Philadelphia.

H. A. Winne, manager of sales, mining and steel section of the industrial department, General Electric Co., Schenectady, N. Y., has joined the engineering department as general assistant to R. C. Muir, vice president in charge of engineering. He has been succeeded by J. J. Huether, heretofore manager of sales machinery manufacturers' section, and S. W. Corbin has been promoted to take Mr. Huether's former position.

O. A. Van Denburg Jr., former manager of Burden Iron Co. Inc., Troy, N. Y., has been returned to his former position as manager, following a change in the organization set-up of the company. George McM. Godley, who was president of the company 1935-36, has been elected president to fill the unexpired term of Alfred Musso, resigned. Arthur S. Swan, vice president, and Frank Hodson, assistant to the president, also have resigned.

E. S. Harman has been appointed superintendent of the rail mill, Gary works, Carnegie-Illinois Steel Corp. Since last year he had been assistant division superintendent of rolling at the South works. A graduate of Armour institute, Chicago, Mr. Harman gained experience as an assistant to master mechanic, assistant to chief engineer, steam engineer and superintendent of steam power. From 1924 to 1933 he head-



E. S. Harman

ed his own business as consulting engineer and construction engineer. Mr. Harman went to the South works of Carnegie-Illinois in 1935 as a fuel engineer.

Roy L. Warren, for the past six years purchasing agent for Briggs Mfg. Co., Detroit, has become director of purchases for the Covered Wagon Co., Mt. Clemens, Mich., trailer coach manufacturer. He has been affiliated with the automotive body industry for 29 years, 18 of which he served in purchasing capacities. R. G. Bentley, formerly in charge of buying, continues as Mr. Warren's assistant.

Ernest T. Weir was re-elected chairman of the board, National Steel Corp., Pittsburgh, at the annual directors' meeting, March 29. Other officers re-elected include George R. Fink, president; Edmund W. Mudge, vice president and assistant treasurer; Frank M. Hesse, secretary-treasurer; H. Kline Weir, assistant secretary and assistant treasurer; Paul E. Shroads, assistant treasurer; Martin E. Arden, assistant secretary, and Wilbur H. Peter, assistant secretary. Directors re-elected include: Messrs. Weir, Fink and Mudge, Frank W. Blair, Maurice Falk, H. M. Hanna, George M. Humphrey, Carl N. Osborne and Charles M. Thorpe.

Died:

FRANCIS F. PRENTISS, 78, prominent industrialist and philanthropist of Cleveland, in Pasadena, Calif., April 1. In 1880, in company with the late J. D. Cox, he organized the firm of Cox & Prentiss, predecessor to Cleveland Twist Drill Co. He held many positions in the company, including those of vice president, president and general manager, and at the time of his death was chairman of the board. He was a director of Cleveland Graphite Bronze Co., Osborn Mfg. Co., and other industrial companies.

W. C. Chancellor, assistant general superintendent, Lorain works, National Tube Co., in Lorain, O., March 28. He formerly was superintendent of metallurgy, at Ellwood City, Pa., for National Tube.

William H. Miller, 67, for the past three years manager of the agency sales department of Pratt & Whitney, division of Niles-Bement-Pond Co., Hartford, Conn., of heart attack in Unionville, Conn., March 27. He entered the employ of Pratt & Whitney in 1890 as an



William H. Miller

apprentice and for a number of years was in the engineering department. He then was made manager of foreign sales, and later became sales manager for the entire company, occupying this position for a great many years.

Thomas J. Gallagher, 69, night superintendent of the lap and butt-weld tube departments, Youngstown Sheet & Tube Co., Youngstown, O., in that city, March 28. He was employed by Sheet & Tube 28 years.

Raymond H. Cherry, 44, sales manager, wire rope division, Wickwire Spencer Steel Co., New York, in Westfield, N. J., March 20. Previous to joining Wickwire Spencer in 1930, he was in charge of wire rope sales in New York for American Steel & Wire Co.

James D. Andrews, 62, manager, American Boiler Manufacturers Association and Affiliated Industries, New York, in that city, March 22. He was one time president, Standard Tank Car Co., Sharon, Pa., and was vice president, Stevens & Wood Inc., New York. He was a member, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and a number of other associations.

James William Brainard, 73, founder, Brainard Steel Corp., maker of cold rolled strip steel, Warren, O., in Cleveland, March 28. He began his career at the age of 20 with P. L. Kimberley Co., steel manufacturer in Sharon, Pa. In 1898 he became superintendent, American Steel Hoop Co., which two years later was merged with the former Carnegie Steel Co. Resigning from Carnegie in 1919, Mr. Brainard founded his own company and served as president until he retired in 1930.

"Birmingham Plus" In Soil Pipe Case

REMINISCENT of the famous Pittsburgh plus case of about 15 years ago the federal trade commission has issued a complaint alleging that 35 companies, producing and selling 90 per cent of the output of cast iron soil pipe in the United States, have, through use of the Birmingham plus pricing system, substantially lessened price competition within their industry and discriminated in price among certain buyers. The complaint charges violation of the federal trade commission act and the Robinson-Patman anti-price discrimination act.

The Cast Iron Soil Pipe association, Birmingham, and its officers, also are named respondents.

For more than ten years, according to count one, "the respondents have combined and agreed to lessen and restrain competition, and to that end have used the Birmingham plus pricing system, under which, to the extent that the system is followed, all cast iron soil pipe, wherever produced, is sold at delivered prices, equivalent to the base price fixed at Birmingham, plus the freight rate from Birmingham to the buyer's freight station."

Discounts Are Involved

From the delivered prices there are deducted, it is said, trade discounts which vary for buyers of different classes, but which are uniform to buyers of the same class of soil pipe.

The respondents' use of the Birmingham plus system, according to the commission, produces the following effect upon the buying public:

"(1) They are compelled to pay artificially enhanced prices; (2) they pay delivered prices as though all cast iron soil pipe produced in the United States were produced at and shipped from Birmingham; (3) they pay the same delivered prices as though there were no natural advantages for the production of the pipe elsewhere than at Birmingham and no means for transporting it more cheaply than from Birmingham; (4) the prices charged by the respondent producers are made without regard to varying local conditions of demand and supply through a concert of action formulated and expressed in terms of the Birmingham plus system, which applies throughout most, if not all, of the country, and (5) inasmuch as producers do not avail themselves of the competitive advantages the buying public loses the advantages of efficiency and economy in production and transportation which

would result from price competition."

The respondents also are said to have adopted uniform terms of sale, a standardized form of contract, and a uniform system of classification of buyers and of preferential discounts to certain classes of buyers.

Mullins To Vote on 200,000 Shares to Sharon

Stockholders of Mullins Mfg. Corp., Salem, O., will be asked to approve transfer of 200,000 shares of stock to Sharon Steel Corp. in return for acquisition of Youngstown Pressed Steel Co., Warren, O., a Sharon subsidiary. Mullins directors already have approved acquisition of the Youngstown concern.

Adoption of the proposal by stockholders would give Sharon a 35 per cent stock interest in Mullins.

To make possible transfer of 200,000 Mullins shares, it will be necessary to authorize more stock. Only 172,550 class B common shares are now authorized. At the annual meeting April 27 stockholders will be asked to approve an increase in authorized common to 560,000 shares. Out of this it is proposed to pay a 100 per cent stock dividend to class B shareholders.

Mullins net profit in 1936 was \$525,225, equal after preferred dividends to \$1.96 a common share.

Girdler Views Monopolies As Peril to Democracy

Monopolies, whether organized by business men or by government, destroy competition and therefore freedom, T. M. Girdler, chairman and president, Republic Steel Corp., said in a radio address last week at Cleveland. The broadcast was one of a series sponsored by the Adult Education association of Cleveland on "What I Would Do to Maintain Democracy."

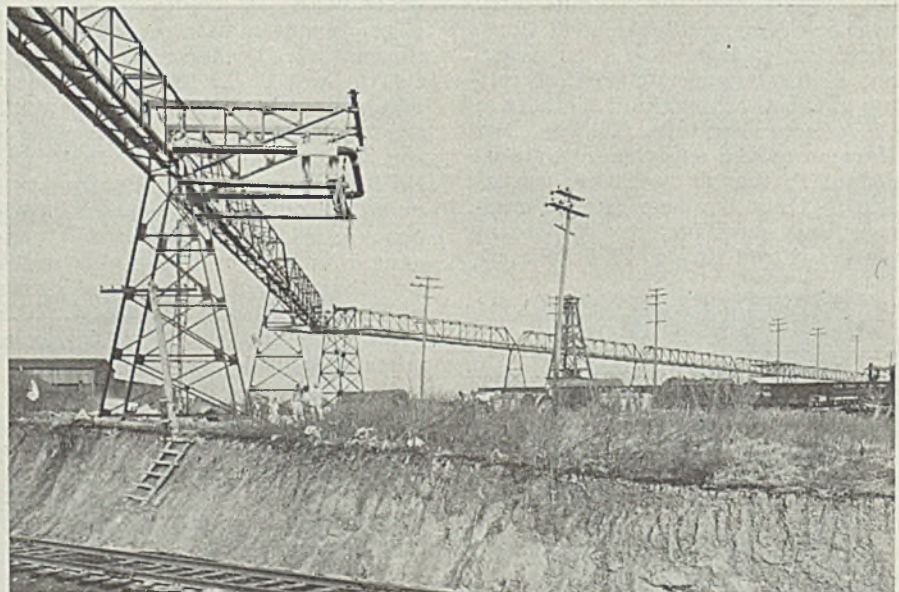
Girdler declared dictatorships exist in Germany and Italy because those countries have stifled not only freedom of the individual but also freedom of competition in industry and commerce.

"Both go together," Girdler said. "Human freedom and economic freedom are suppressed simultaneously."

"In this country today various influences are openly seeking to limit, by law, the right of free action and free competition hitherto guaranteed all citizens and all businesses under the constitution."

"These groups and their activities constitute a threat to the American system of living . . . Just as we insist upon measured judgments, sound tests, and orderly procedure in effecting changes in our business, so we should call for orderliness, safety, and soundness in changes in society if we are to maintain democracy."

All-Welded Overhead Pipe Carries Steam Nearly Two Miles



STEAM to power United States Industrial Chemical Co. plants travels 8400 feet through an all-welded 12-inch pipeline entirely above ground, a considerable portion elevated on steel trestles 30 to 60 feet high, to span railroads and buildings. The steam is transported from United States Industrial Alcohol Co.'s powerhouse, near Baltimore. The companies are operated under the same management. Photo, courtesy, Phillip Carey Co., Lockland, O.

Meetings

ANCIENT CHINESE CASTINGS FOR FOUNDRY CONVENTION

A SPECIAL exhibit of ancient Chinese castings will be shown at the annual convention of the in Milwaukee, May 3-7, through American Foundrymen's association in Milwaukee, May 3-7, through courtesy of Thomas T. Read, school of mines, Columbia university, New York. These castings, the largest of which is about 30 inches high, are authentic iron castings made in China in various years from 458 to 1093 A.D. Having arrived in the United States only recently, they will be displayed for the first time in Milwaukee.

TO CONFER ON HEALTH AND DISEASE IN INDUSTRY

Physicians and engineers will meet in Detroit May 3-7 for a conference on occupational diseases and industrial hygiene. The last two days of the program will be taken over by the American Association of Industrial Physicians and Surgeons and the Michigan Industrial Association of Physicians and Surgeons.

TRAILER EXHIBIT A FEATURE OF S.A.E. SUMMER MEETING

Summer meeting of the Society of Automotive Engineers will be held May 4-9 at the Greenbrier, White Sulphur Springs, W. Va. Among subjects scheduled for discussion are: Aircraft engines; diesel engines, transportation and maintenance; truck, bus and railcar performance; passenger cars; fuels and lubricants; and body design. J. H. Booth, Buick Motor Co., Flint, Mich., will present a paper on trailers and their effect on passenger car design. A trailer exhibit will be a feature.

TOOL BUILDERS TO ATTEND FORUM ON ELECTRIFICATION

More than 20 of the leading builders of machine tools will send representatives to the machine tool electrification forum which Westinghouse Electric & Mfg. Co., will hold at its East Pittsburgh, Pa., plant, April 19-22. Program includes sessions on motors, controls, wiring, and auxiliary equipment; also several inspection visits.

ELECTRICAL MANUFACTURERS ARRANGE SPRING MEETING

National Electrical Manufacturers association is to conduct its spring conference at the Homestead, Hot Springs, Va., May 16-21. The annual convention is to be held Oct. 24-29 at the Palmer House, Chicago. The association and its predecessors have held their spring meetings at



Albert L. Galusha

Wellman Acquires Rights To Galusha Gas Generator

Wellman Engineering Co., Cleveland, has acquired exclusive right and license under United States patents of Albert L. Galusha to manufacture and sell in the United States and possessions the Galusha gas generator, producing clean, high-grade gas from small anthracite coal or coke breeze at a cost considerably below figures hitherto considered as minimum. The gas is clean because the fuels do not yield tar, adapting it to industrial heating operations in which quality of product requires

Additional news of the steel and metalworking industries will be found on pages 101, 102 and 103.

care to avoid discoloration, scaling, pitting or spotting.

The generator will be marketed as the Wellman-Galusha clean gas generator, in standard units with diameters of 18 inches to 10 feet.

Albert L. Galusha, inventor of the generator, will be associated with the Wellman company as chief engineer for this equipment, and will be located at the company's eastern office, 30 Church street, New York. He was graduated from Dartmouth college in 1899 with degree of B.S., and took postgraduate work in mechanical engineering at Massachusetts Institute of Technology. Since then he has served as designer, mechanical and consulting engineer, specializing on gas engines, gas producers and equipment.

Hot Springs since 1908. W. J. Donald, 155 East Forty-fourth street, New York, is managing director.

Activities of Steel Users and Makers

JACKSON GEAR CO., Thirty-first street and Liberty avenue, Pittsburgh, has been organized to manufacture a complete line of all types of gears for general industrial use. Executives are: John J. Jackson, J. Harper Jackson, and Stanley J. Jackson.

John J. Jackson was one of the founders, Pittsburgh Gear & Machine Co. and served for 21 years as vice president. J. Harper Jackson had been with the same company since 1919, and during the past five years has been treasurer, American Gear Manufacturers' association. Stanley J. Jackson, who will be production manager for the new company, formerly was in charge of production for Pittsburgh Gear & Machine Co. since 1923.

♦ ♦ ♦
Monarch Machine Tool Co., Sidney, O., will move its New York office to 1060 Broad street, Newark, N. J., May 1.

♦ ♦ ♦
Reliance Steel Corp., Cleveland, recently incorporated with capital stock of \$1,612,500, is reported backed by interests identified with a Cleveland iron and steel scrap company with warehouse branches in Detroit, Chicago and Boston.

♦ ♦ ♦
Allis-Chalmers Mfg. Co., Milwaukee, has received an order from Springfield, Ill., for a 15,000-kilowatt turbine, the third contract for similar equipment for the city's power plant. The turbine, including condenser will cost about \$400,000.

♦ ♦ ♦
Busch-Lawrence Inc., Cincinnati, has recently been organized by Ralph B. Busch and George M. Lawrence to sell material handling equipment, such as wheel barrows, two-wheeled trucks, platform trucks, trailer trucks, casters, and conveyors.

♦ ♦ ♦
Mississippi Valley Equipment Co., St. Louis, has made arrangements to represent Caterpillar Tractor Co., Peoria, Ill., in the sale of diesel power units. The former company specializes in such plant equipment as diesel engines, compressors, motors, generators, cars, locomotives, cranes and all kinds of industrial, electrical and railway equipment, as well as steel piling, structural steel, rails and accessories. The company is successor to the former Zelnicker Supply Co., St. Louis, and is conducted by R. H. Whisler, A. R. Topping and C. H. Wehner, all department managers in the former Zelnicker organization.



SELF-SEALED

SELF-SEALED bearings — a New Departure invention of *9 years ago* — are perhaps the most important development of recent years. That *7 million* N-D-Seals have been used proves their acceptance — and their value to all industry.

N-D-Seals have saved money for thousands of companies. Find out what they will do for you. Come to Sealed Bearing headquarters — New Departure Division General Motors Corporation, Bristol, Connecticut. Branches at Detroit, Chicago and San Francisco.

NEW DEPARTURE

PIONEER OF SELF-SEALED BEARINGS . . .

N-D-Seals

PHOTOGRAPH COURTESY FANGBORN CORP.

2514



MIRRORS OF MOTORDOM

ENGINEERING and design departments of most all car producers currently are scenes of intense activity as model creations for 1938 are whipped into shape for approval. Last minute changes are being hurried through, although in some cases the final O.K. has been given and tool and die work is proceeding.

This is true in the case of Chevrolet and Buick, for example, where the executive "go-ahead" has been placed on drawings for new lines. Surprisingly enough, a number of changes have been made in external appearance. It has been the feeling that the production delays caused by the strikes would mitigate against any sweeping changes in bodies, and the 1938 models were being touted as featuring mechanical changes foremost.

Fenders To Be Larger

Chevrolet is doing away with the streamline crease which in this year's models extends across the hood and part way across the front door. The radiator will have a more pronounced slope, although at the top it will reverse its curve and project outward slightly, creating the illusion of forward motion.

Front fenders will be larger with a deeper draw in the hump just behind the wheel, so that the top of the fender will extend parallel with the hood for a short distance. Running boards are planned narrower, giving additional body room. Radiator grille is to be changed, and the new one will resemble somewhat the style used in this year's Olds—die cast with bars extending diagonally downward from the center strip. Lines of the rear panels have been altered slightly.

Buick, which is daily setting new production records, and has been accorded a noteworthy reception this year by the buying public, also has some changes in store, chief of which is a deeper front fender along the lines of the Chevrolet. Viewed from the side, these larger fenders

harmonize better with the sweeping lines of the hood, but they do not make press work any easier and probably will require more steel.

Radiator style of the Buick will not be changed appreciably, although it is planned to die cast the nameplate integrally with the grille, instead of attaching it to the grille as in present models. A new design has been worked out for the hood vents.

Plans are under way to have the new LaSalle ready for a public appearance by August 1. Die work for stampings is now in process of being awarded. Reports are to the effect sales of the current models have been a little disappointing; hence work is being pushed on a considerably revised design. Cadillac is planning to go to 19-gage sheets for fender stock instead of the present 18-gage, a change which will apply to all Cadillac-LaSalle models and will permit an estimated saving in material of about \$2 per car.

Sales Hold at High Level

Three designs for 1938 Oldsmobile models are reported to have been shaped up for submission to General Motors executives, and one of these is reputed to be radically different from anything Olds has ever built, somewhat along the lines of William B. Stout's Scarab car, which leaped into prominence a few years ago. Oldsmobile at the moment is straining for peak production to satisfy dealers' demands, and has been able to edge up a little from week to week, now averaging in the neighborhood of 1300 cars daily.

Packard is engaged in attempts to whittle down costs on its projected 1938 models, which have caught the rapt admiration of those privileged to see the plans. Design of the steel top has been revised in recent weeks. Fenders will be of the two-piece type. Draws will be required both in the hood and hood side. Characteristic Pack-

ard radiator lines will not be eliminated.

Packard sales during March were well over twice the total for last year and production is steady at around 3300 units weekly. Earnings of the company in 1936 were good for 47 cents a share, against 22 cents in 1935. Net after depreciation and reserves for taxes amounted to \$7,053,220. So far this year stock dividends have amounted to 15 cents per share, and from all indications earnings this year should approach \$1 per share.

PRODUCTION continues to be pushed strongly at Ford plants, now nearing a rate of 7000 assemblies per day, figure for the past week being 34,800. Faced with difficulty in providing sufficient semi-finished steel for the continuous strip mill, Ford is "thinking" about additional open-hearth furnace capacity. At present, the steel plant has nine 110-ton furnaces and a 400-ton duplexing unit. All are being operated at full capacity.

With a new tire plant now under construction, Ford recently purchased about 300 presses from an Akron, O., rubber machinery builder to equip the plant.

Another new Ford plant recently was christened at Northville, Mich., 30 miles from the Rouge plant. A single-story air conditioned building with 30,640 square feet of floor space, it replaces the former Northville plant which has been operated for the past 16 years in which time over 181,000,000 valves were ground, finished and inspected. This plant was the first of Ford's "village industries" and marked the birth of the Ford policy of a closer alliance between the farm and industry.

New equipment and additional employes permit the handling of 70,000 valves in 16 hours. Rough valve castings are trucked to the plant from the Rouge foundry and the finished parts trucked back to the motor assembly department.

Word has just come out of an at-



MIRRORS OF MOTORDOM

tempt made on the life of Harry Bennett, head of the Ford service and police department, by a gang of five men who forced Bennett's car off the road late one afternoon about two weeks ago. As the men approached him, Bennett drew his revolver and the gang beat a hasty retreat.

Despite absence of Chrysler and Hudson from the production picture, the industry held weekly output at a high level, total for the week being 99,005. General Motors moved 51,280 cars from assembly lines, to account for half the week's total.

Negotiations Are Suspended

Hiatus in the Chrysler strike negotiations resulted from the departure of Mr. Chrysler and Mr. Lewis early in the week. The parley was getting nowhere without them, so Governor Murphy called a recess Tuesday until Friday when the two principals were to return. The Chrysler management refused to accept an agreement with the UAW patterned after the General Motors pact, while the UAW refused to be content with anything less than this. Hundreds of variations on this type of contract have been drawn up, but none has been satisfactory to both management and the union.

No further attempts to settle the Hudson strike controversy have been made, either by the UAW or by the management. A report was being circulated to the effect all plant employes had been paid off with the inference they would not be rehired. The condition of dealers' stocks of cars may have an important bearing on how soon production is resumed at both Hudson and Chrysler plants.

Meanwhile sitdown strikes broke out afresh, this time among tool and die departments. The busy season on automotive dies is at hand, and rumors have been current for weeks of impending labor trouble in tool and die shops. At National Stamping Co., 14 men on a night crew, members of the MESA union, stopped work, demanding recognition of the union. The company employs 600 and recently a company union joined with the UAW, giving the latter a reported majority. Another sitdown broke out at Buell Die & Machine Co., union members

Automobile Production

Passenger Cars and Trucks—United States and Canada			
By Department of Commerce			
	1935	1936	1937
Jan.....	300,335	377,306	399,426
Feb.....	350,346	300,874	383,637
2 Mos.....	650,681	678,180	783,063
March....	447,894	438,992	*490,000
April.....	477,059	527,726	.....
May.....	381,809	480,571	.....
June.....	372,085	469,355	.....
July.....	345,297	451,474	.....
Aug.....	245,075	275,951	.....
Sept.....	92,728	139,785	.....
Oct.....	280,316	229,989	.....
Nov.....	408,550	405,702	.....
Dec.....	418,317	519,132	.....
Year.....	4,119,811	4,616,857	.....

*Estimated.

Calculated by *Cram's Reports*

Week ended:	
March 6.....	126,975
March 13.....	101,684
March 20.....	99,013
March 27.....	101,805
April 3.....	99,005

complaining over the discharge of shop stewards.

Late in the week a new wave of sitdowns hit two General Motors plants—Fisher Body in Pontiac and Chevrolet No. 2 in Flint—which forced cessation of Pontiac assemblies and suspension of Fisher Body No. 2 in Flint due to piling up of bodies there. Yellow Truck & Coach also was closed by a sitdown, while a brief disturbance in the tool and die room at Fisher Body's Cleveland plant held up work for two hours. Approximately 17,000 employes were affected by these newest labor disturbances, all in disregard of the UAW agreement not to call strikes in GM plants for a period of six months after March 12, and again demonstrating the irresponsibility of automobile labor unions and their inability to control actions of their members.

Alarmed by conditions arising from industrial unrest in this city, a group of citizens has formed a voluntary organization known as "Citizens of Michigan" with the "sole object to affirm respect for law and to encourage impartial law enforcement for the benefit of workmen and all alike." The organization is headed by Philip Breit-

meyer, former mayor of Detroit, and is sponsoring publication of petitions to Governor Murphy urging respect for and enforcement of the law.

The group points out it is not a vigilance committee but a movement of citizens who "fear a total destruction of government may follow if the present trend toward lawlessness and disrespect for the courts and their orders is not checked."

STRONG sellers' market continues in steel, with faint rumblings even heard of another price increase in third quarter and of the possibility of premiums being paid for deliveries. Your sober purchasing agent, however, scoffs at these reports, and mentions such things as the easing of pressure on mills in the past fortnight, and steel salesmen now promising six to eight weeks deliveries instead of the former ten to twelve weeks.

LONDON, Chatham, Paris and Windsor are among Canadian communities now making strong bids for American export plants to automobile producers in this country. They point to the rigid enforcement of property rights in connection with strikes, and commerce boards are vigorous in their efforts to persuade Detroit motor executives to move some production across the river . . . Local No. 12 of the UAW in Toledo, O., has negotiated for purchase of a new headquarters in the Cherry street residential area for a reported \$58,000 . . . Plans for construction of a new motor and axle plant by Chevrolet in Buffalo have been made public. The plant will have a capacity of 1200 motors and axles daily, will be of single-story brick and steel construction with 1,000,000 square feet of floor space, will employ between 3000 and 4000 and will supply assembly plants in Buffalo, Tarrytown, N. Y., and Baltimore. Production will start around Jan. 1.

Introduction of a new No. 2 set of precision gage blocks at a price somewhat less than the cost of the present No. 2 sets is announced by the Johansson division of Ford; it includes 35 blocks providing 80,000 different size measurements in steps of 0.0001-inch, and two jaws and two adjustable holders as accessory items . . . Truck and commercial car shipments by Studebaker for February were the highest of any month in the history of the company—1251 . . . Work is about half finished on the two new 300-foot all-welded diesel-powered boats for Ford at Great Lakes Engineering Works. The ships will be used to transfer parts from the Rouge plant to an assembly plant at Bridgewater, N. J.



WINDOWS OF WASHINGTON

WASHINGTON

IN SPITE of the important opinions by the Supreme Court last week and the continual discussion on the President's court reorganization program, the sit down strike situation still claimed the greatest attention from legislators on Capitol Hill and government officials.

Despite the decision of the President and his close advisers that the federal government can do nothing in the situation at this time, as agreed at the conference the President held upon his return from Warm Springs, there is no doubt many of the wise heads here, and there are still some left, believe that the administration will have to do something about this sooner or later and it might just as well be sooner.

Many of the President's advisers are deeply interested in this subject. Secretary of Commerce Roper at every opportunity discusses the question and he is not hedging on that point if he does on some others. He believes the workers should not be allowed to occupy plants when they have been ordered out by the court.

Green in Conservative Stand

Madam Perkins reversed herself a week or so ago. As soon as she found that the President was going into the matter on a serious scale she expressed herself as being of the opinion that the workers should get out of plants when so ordered. This is a different stand from what she has been taking.

Last week also William Green of the A. F. of L. took a good crack at the sit down strikers which brought forth the usual reply from CIO Lewis.

Said Green: "The sit down strike has never been approved or supported by the American Federation of Labor because there is involved in its application grave implications detrimental to labor's interests. It must be disavowed by the thinking men and women of labor."

The A. F. of L. president said

that: "Public opinion will not support sit down strikes. That means labor loses public support when any part of it engages in sit down strikes. Without such support organized labor cannot win strikes or establish and maintain itself as a vital force in the economic and industrial life of the nation. Labor cannot afford to lose the support of public opinion."

Green also said that: "Temporary advantages gained through sit down strikes will inevitably lead to permanent injury." In concluding his statement Mr. Green said that: "I therefore publicly warn labor against this illegal procedure. Both personally and officially I disavow the sit down strike as a part of the economic and organization policy of the A. F. of L."

Looks Like a Backdown

Hopes were running high here just before the President came back from his short vacation. He had indicated that he was calling a conference to take up the sit down strike situation. Effort was made to minimize this conference but those in the know felt that it was most important and would end in something definite. It did, but not the way it had been supposed. For some unknown reason those who watch the wheels go round here were of the opinion that the President was going to intervene in some way or other and put an end to the sit down strikes. Probably this was because there is no question that many of his advisers here feel that he will have to do something about it, and that quickly.

However, after an all afternoon conference with various members of Congress, of the cabinet, and unofficial advisers, Senator Robinson, majority leader of the upper house, made a short statement to newsmen, simply telling them that no conditions had arisen under which the federal government could or should take action in the sit down strike situation. He said that: "It

is felt that the sit down strike situation in a general sense is improving."

Last week also the National Association of Manufacturers broadcast the legal aspects of the sit down strike as seen by its legal experts.

In summarizing the bulletin of the association it found that:

"1. The sit down strike, like any other kind of strike, is clearly unlawful if it is conducted for an unlawful purpose.

"2. The sit down strike is, however, unlawful in and of itself, irrespective of its purpose, since it necessarily involves a seizure of the property of others by the strikers, and such means are in themselves unlawful.

"3. The individual sit down striker is liable as a trespasser:

(a) from the time he enters the premises, if he does so in pursuance of an agreed plan to participate in a sit down strike after entering;

(b) from the time the sit down commences, in any event, if he participates voluntarily.

Sitdowner Is Liable

"4. His liability is both civil and criminal if he fails or refuses to leave the premises after either notice to quit or discharge from employment by the employer.

"5. All who participate in a sit down strike by agreement, actual or implied, are liable as joint trespassers, both civilly and, probably in all states, criminally.

"6. A combination to conduct a sit down strike is an unlawful conspiracy under the common law rule, and under the statutes of most, if not all, states.

"Such conspiracy is criminally punishable when entered into; it becomes actionable in a civil suit for damages against all who call, participate in, aid, encourage, abet, or direct it, if it is actually carried out.

"Even though the conspiracy is confined to relatively few persons at the outset, all who participate or as-

sist thereafter become equally liable with the original conspirators.

"Punitive or exemplary damages may be recovered in a civil suit for conspiracy.

"7. A seizure of the employer's property, and the threat, actual or implied, that the property will be held until certain demands are met, may bring the case within the statutes against extortion in many states, and be both criminally and civilly actionable.

"8. Since the sit down strike is not only a seizure of the employer's property, but operates to prevent willing employes and 'would-be employes' from working, such persons, as well as the employer, have well grounded rights of action.

"9. It is an indictable conspiracy at common law to prevent others from working, by force, violence, threats, or intimidation. The threats and intimidation need not be actual, but may consist of 'moral intimidation' occasioned by the general attitude and conduct of a body of persons acting in concert.

Employers Can Eject

"10. One whose premises are occupied by a trespasser is not obliged to rely exclusively upon public officials to eject the trespasser. He may employ 'self help', indeed the law contemplates that recourse shall be had to public assistance only when necessary. But in ejecting a trespasser by force, no more force may be used than is reasonable and necessary. Exceeding this limit, which is sometimes fixed by statute, makes the employer liable to an injured trespasser.

"11. Causes of action, both criminal and civil, may arise from wrongful acts incidental to unlawful occupation of the premises, for example, barring the gates or doors to the employer and his agents; violence and destruction of property; loss or destruction of tools, machinery, equipment and supplies; coercion of fellow employes who do not wish to participate in the sit down.

"12. The possibilities for recourse, then, embrace:

(a) Self help by ejectment, using no more force than is necessary.

(b) Criminal actions for trespass, conspiracy, extortion, forcible disseizin, and malicious injury to property.

(c) Civil actions for damages, including not only actual damages, (including less of business and profits), but punitive and exemplary damages where permitted. In some states there are special statutory provisions for treble damages.

(d) Injunctions to restrain the illegal conduct, to end a continu-

ing trespass, and to dissolve the criminal combination.

"In all these cases, it is necessary to examine carefully the statutes and decisions of the particular state as to offenses and as to remedies and to consult relevant local ordinances. The foregoing outline, however, will, it is hoped, serve to point out the applicability of general law in this novel field."

Representative Dies bill (H. R. 5933) in connection with sit down strikers caused much comment and attention last week. The bill has been referred to the house committee on the judiciary.

It would amend the Sherman antitrust law "dealing with monopolies and combinations in restraint of trade." It provides that that act "shall include the act or acts of employes in refusing or failing to vacate the premises and grounds of any plant, mill, industry, or business of their employer upon receipt of notice from such employer or his fully authorized agent to do so, and upon the assurance of such employer or his duly authorized agent that a reasonable time to be fixed by the secretary of labor of the United States will be allowed for negotiation of differences and an adjustment of disputes before operation of such plant, mill, business, or industry will be resumed."

MUCH GUESSING ON WAGNER LABOR LAW DECISION

The big guessing contest here last week was when the Supreme Court would hand down its decision in the Wagner labor cases, including that of Jones & Laughlin Steel Corp., and what it would have to say about the constitutionality of the act.

There is varying opinion regarding what the court will have to say. Many who know the law and have watched Washington happenings for many years are trying to make themselves and everyone else believe that the precedent-establishing cases decided last week by the court means that they will uphold the constitutionality of the Wagner law. However, equally prominent lawyers take the opposite view. Many feel that the decision will come down April 5 and that the important decisions of last week were only the forerunner of what is to come.

Provisions of the railway labor act were unanimously upheld last week in one of its most important opinions of the day. The decision requires railroads to engage in collective bargaining with employes in an effort to settle industrial disputes. Railway workers are not included under the Wagner act and it is this decision that administration leaders have been looking into to see if they can guess what the court will do in the Wagner case.

Also by a 5 to 4 decision the court

overruled an earlier decision when it upheld the constitutionality of the State of Washington's minimum wage law for women and children. In this case the court overruled its former decision of Adkins vs. the Children's Hospital which was regarded as a legal landmark and denied congress the power to fix minimum wages for women in the District of Columbia. In effect also this decision reverses its stand when it invalidated the New York state minimum wage law last year.

There was much comment on the floor of both houses of congress last week when these decisions became known, it being said, among other things that the President had converted the Supreme Court to his way of thinking. However, some important administration cases are pending before the court and the President's adherents may have an opposite opinion before it is all over.

FEDERAL TRADE COMMISSION MAY GET MORE POWER

The senate last week passed S.1077, which broadens the control of the federal trade commission over unfair trade practices. The bill, as it passed, would give the commission authority to bring action against violators without filing a specific complaint by a competitor. Congress tried to enact this at the last session but it failed.

The bill, as it passed, applies to section 5 and 6 of the trade commission act. The amendment relating to section 5 would relieve the commission of the necessity of proving competition in proceedings in relation to unfair trade practices. The amendment to section 6 would materially expand the commission's investigation powers. This amendment was defeated in the house at the last session and it is reported here that it will again encounter stiff opposition in that body.

There are now pending in the house amendments to the trade commission act, one of which relates to section 5 and is similar to the section as just passed by the senate relating to relieving the commission from proving competition.

Another amendment being considered by the house would specifically authorize the trade commission to deal with false advertising of food, drugs and cosmetics, and would allow it to ask the federal courts for temporary injunctions against such advertising, pending proceedings by the commission.

MUCH STEEL FOR NAVY

It is being estimated here that the two battleships to be built by the navy will require some 28,000 tons of steel each. Of this 10,000 tons will be for medium steel and the remainder for armor and special plates.

Era of Steel Expansion Seen In Steadily Growing Demand

WHAT the future has in store for the steel industry may surpass the general expectations. The goal in recent months has been to equal the record set in 1929. Present production has reached a volume practically equal to the 1929 rate, and no stretch of the imagination is necessary to vision a new mark, above the previous record.

Of the three largest users of steel, railroads, building construction and automobiles, only the latter has come to full volume after the depression. Railroads and construction have improved but still have much further to go before they will be considered at their normal rate. Some of the smaller classes of consumers of steel also are lagging, and with full recovery will be pressing for larger supplies.

As present production facilities in the steel industry are being operated at close to practical capacity it follows that output must be greatly enlarged to supply new requirements as they arise.

Numerous finishing mills have been built and put into service, with others in progress and still others in the blueprint stage. To feed these prodigious mills it will be necessary to provide enlarged facilities for making steel and expenditures now in view for this purpose total possibly as much as half a billion dollars. These will include soaking pits, now a bottleneck in the steel cycle, open hearths, coke ovens and blast furnaces. More than 30 steel companies now have inquiries out for additional soaking pits, the first blast furnaces in eight years are under construction and various open-hearth installations are under way.

Steel Sees No Saturation Point but Presses on To New Records of Achievement and Production

Steel always has been forward-looking, preparing for the larger market that has been ever just ahead. Never has it assumed that it has reached its highest point. Always there has been something beyond for which preparation was to be made. In the present instance the outlook is broader and higher than ever before. The country has been growing apace during the depression years but until recently little steel capacity has been added. The time has come when certainty urges building.

Probably it will not be long until the 1929 records

will be overshadowed to a degree that will make them look like foothills in the production chart. Attention is not focussed on the larger consumers alone, for the total needs of a multitude of smaller users presses forward and furnishes the rapidly swelling volume. So widely is steel employed in every sort of convenience of everyday life that renewal of buying power among the multitude at once brings heavy demand.

The American Iron and Steel institute at the beginning of the year announced that a total of \$290,000,000 had been earmarked by steel companies for construction in 1937. Since that time an unexpected amount of additional equipment has been planned or contracted. Of the earlier finishing mills several have been put into production and others are near completion.

Probably at no time in the past has the industry been faced with so great an incentive to expand. While the world situation has some effect on demand for steel in this country, exports are not in large volume and pressure for tonnage is mainly for domestic consumption. The reason for this is not far to seek.

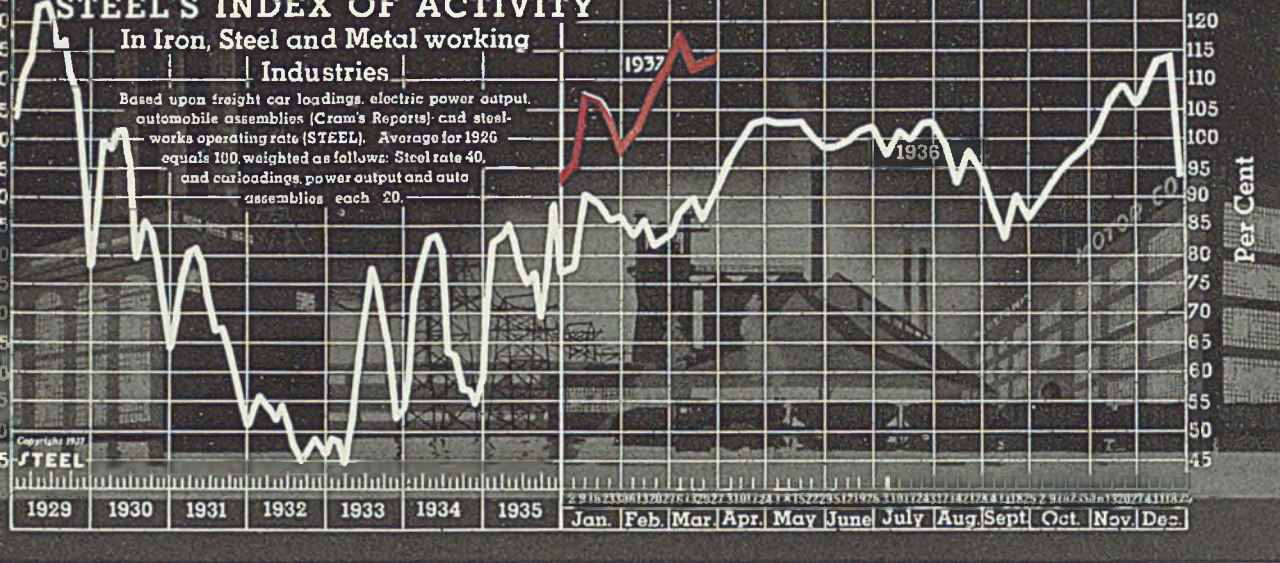
Great Incentive To Expand Brings Outpouring Of Millions for New Mills and Equipment

The steel industry, always dynamic, has been advancing to new frontiers and pioneering constantly in the production of better material and wider use. What has been accomplished is history. The effects are shown in need for steel to meet present demand, demand not based on armaments or foreign buying, but on home needs.

In the past quarter of a century steelmaking capacity in the United States has grown from 39,689,265 tons, in 1913, to 68,475,509 tons in 1936, a gain of 75 per cent. It is this capacity which is proving inadequate, and no second-sight is required to see even larger growth in the next 25 years.

Steel manufacturers know that their immediate problem is to provide facilities to make more steel in the open hearth, and to assure a supply of ingots for the tremendous appetite of the finishing mills. To this end they are pouring out their millions, which, in turn, provide employment for many men and plants in the equipment field.

As in the past, steel will meet demands made on it and will plan for the future. In quality and quantity it has advanced with changing conditions and in the present situation is eager to go forward and to provide facilities for perhaps the greatest demand for steel that ever has presented itself.



The

STEEL'S index of activity gained 1.1 points to 114.2 in the week ending March 27:

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
Feb. 13	101.9	82.8	82.4	72.4	48.3	55.5	75.4	100.9
Feb. 20	108.8	81.8	80.5	75.5	46.0	54.5	76.0	97.7
Feb. 27	112.8	83.4	81.1	76.8	47.4	55.1	75.8	99.7
March 6	117.9	87.7	82.0	78.6	43.4	54.1	79.2	98.3
March 13	112.7	89.7	84.0	79.9	42.7	54.8	80.6	97.5
March 20	113.1†	86.0	84.0	79.7	44.6	54.4	81.3	98.1
March 27	114.2*	91.2	84.3	79.3	45.2	53.5	80.6	99.6

*Preliminary. †Revised.

Index of Industrial Activity High Despite Labor Trouble

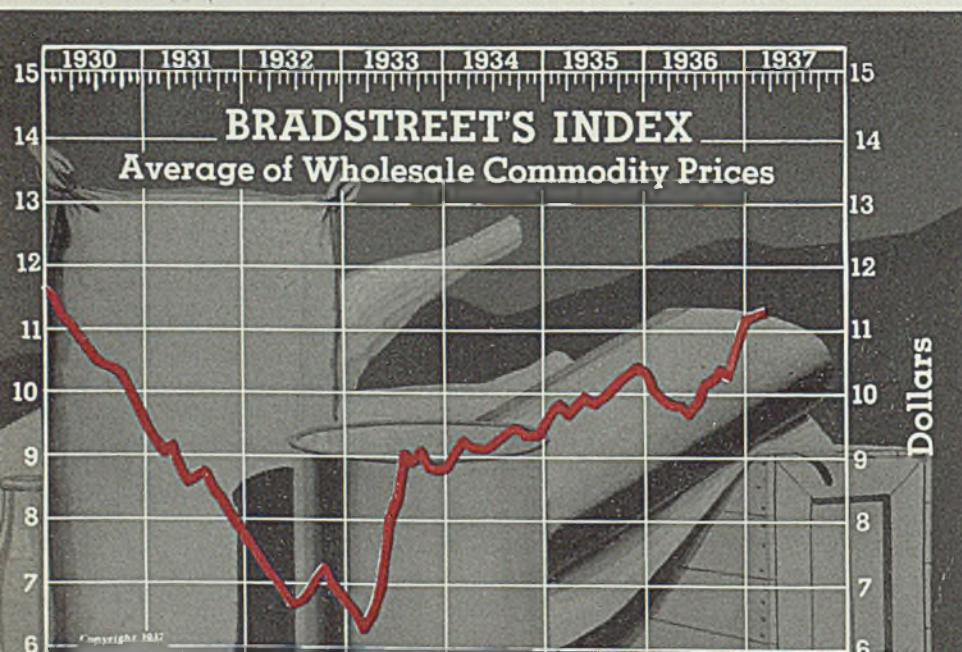
DESPITE continued labor troubles in the automobile industry, STEEL'S index of activity in the iron, steel and metalworking industries showed remarkable stability at high levels through March. During the month, the swing from the high of 117.9 to a low of 112.7 represents a loss of only 5.2 points. The index for the week ending March 27 stood at 114.2 compared with 113.1 in the preceding week.

The gain of 1.1 points during the week was accounted for by the continued upward trend of steel-

making operations and a slight increase in automobile assemblies. Steel operations advanced from 89 to 90 per cent of capacity, by far the highest rate in the recovery period.

Automobile production continues close to the 100,000 per week mark. Total for the week ending March 27 was 101,805 cars, a slight gain over the previous week.

The two remaining key barometers, electric power output and freight car loadings, continued to hold steady at levels of the preceding week. Power production for the week ending March 27 was 2,200,143,000 kilowatt-hours compared with 2,211,052,000 in the preceding seven days. Car loadings are expected to remain close to the 760,000 mark, a slight gain over the 759,269 cars loaded in the preceding week.



	1937	1936	1935	1934
Jan. 1	\$11.13	\$10.36	\$9.49	\$9.01
Feb. 1	11.23	10.02	9.78	9.26
Mar. 1	11.34	9.92	9.79	9.17
Apr. 1	9.85	9.66	9.16	
May 1	9.81	9.79	9.14	
June 1	9.73	9.90	9.24	
July 1	9.85	9.84	9.32	
Aug. 1	10.14	9.91	9.48	
Sept. 1	10.19	10.00	9.45	
Oct. 1	10.27	10.17	9.27	
Nov. 1	10.22	10.28	9.29	
Dec. 1	10.78	10.40	9.49	

BUSINESS TREND

Building Awards Show Fourth Consecutive Decline

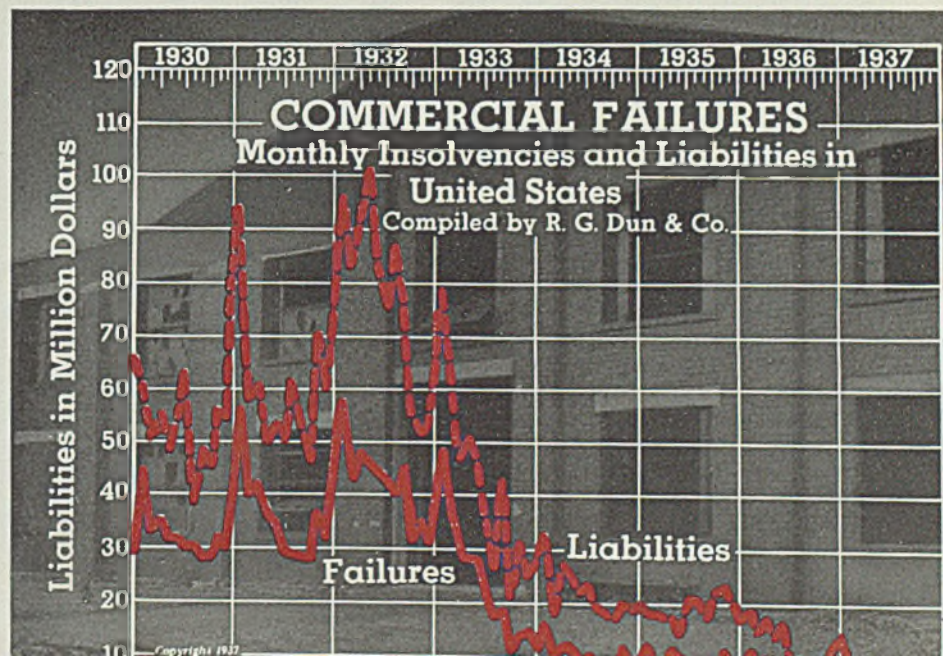
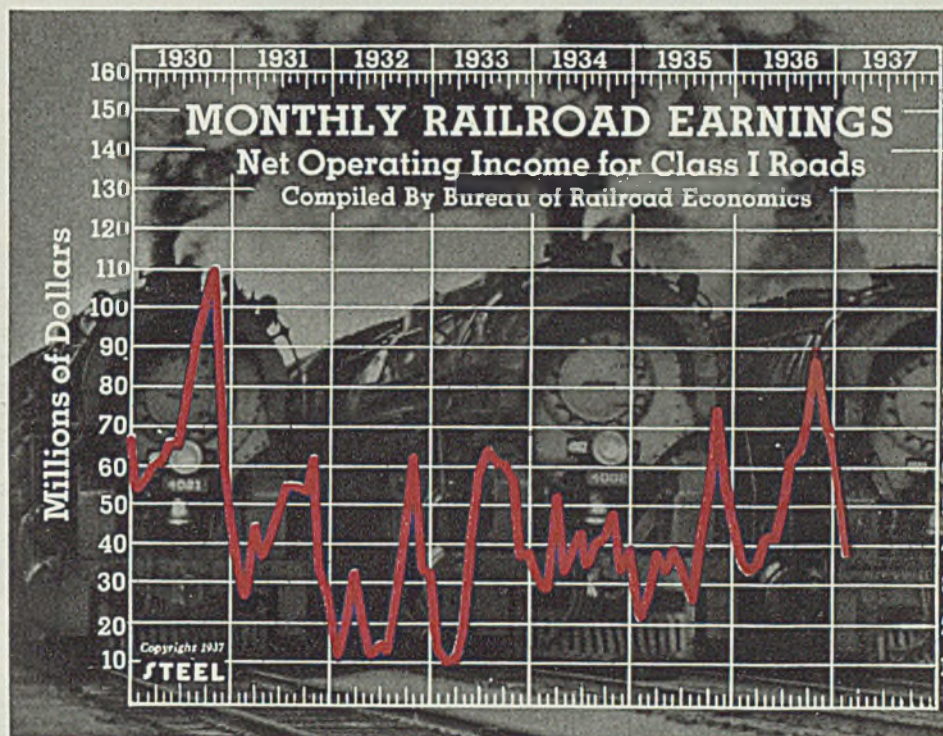
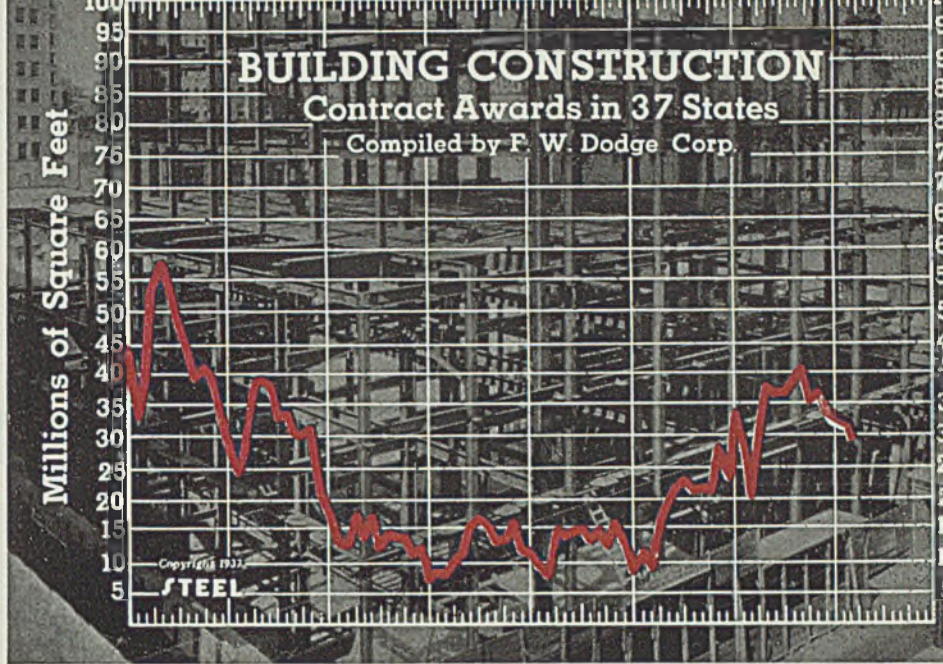
	Square Feet		
	1937	1936	1935
Jan.	33,470,000	27,053,300	11,245,100
Feb.	29,942,100	20,856,700	9,670,300
Mar.	31,308,100	31,308,100	15,845,300
Apr.	37,490,200	37,490,200	19,917,300
May.	36,362,100	36,362,100	22,276,200
June	36,883,900	36,883,900	22,878,800
July	38,762,500	38,762,500	21,565,900
Aug.	40,285,100	40,285,100	21,545,400
Sept.	35,448,000	35,448,000	21,365,700
Oct.	36,718,900	36,718,900	27,775,900
Nov.	34,947,500	34,947,500	24,120,700
Dec.	33,632,600	33,632,600	33,441,900

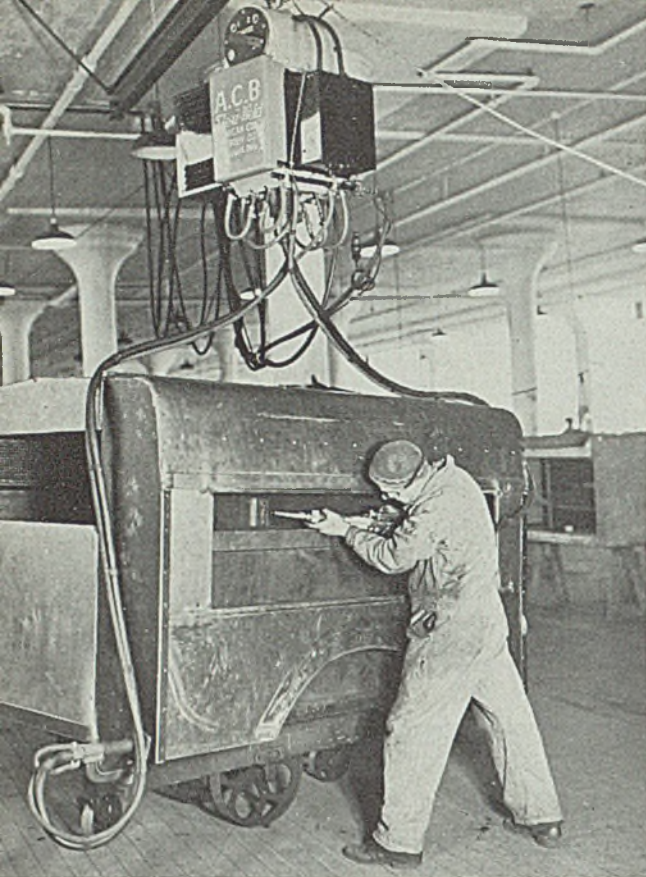
Class I Railroads Earn 2.7 Per Cent in January

	1937	1936	1935
Jan.	\$38,436,679	\$35,728,532	\$21,934,645
Feb.	33,594,718	33,594,718	26,296,411
March	35,205,513	35,205,513	38,129,871
April	41,547,644	41,547,644	34,708,718
May	41,842,147	41,842,147	39,598,511
June	50,312,580	50,312,580	34,102,703
July	61,773,765	61,773,765	26,919,343
Aug.	64,680,717	64,680,717	42,156,706
Sept.	70,166,026	70,166,026	57,349,265
Oct.	89,851,409	89,851,409	75,454,501
Nov.	72,410,571	72,410,571	54,224,290
Dec.	70,519,601	70,519,601	46,020,695

Commercial Failures Down in February; Liabilities Gain

	Failures, Number		Liabilities, Dollars (000 omitted)	
	1937	1936	1937	1936
Jan.	811	1,077	\$8,661	\$18,104
Feb.	721	856	9,771	14,089
March	946	946	16,271	16,271
April	830	830	14,157	14,157
May	832	832	15,375	15,375
June	773	773	9,177	9,177
July	639	639	9,904	9,904
Aug.	655	655	8,271	8,271
Sept.	586	586	9,819	9,819
Oct.	611	611	8,266	8,266
Nov.	688	688	11,532	11,532
Dec.	692	692	12,288	12,288





Making Resistance

Separate Twin

BODIES to be spot welded are placed on a four-wheeled truck and rolled under the welding unit suspended from a monorail. The ground electrode is clamped to the body as shown; the other electrode is held by the operator

NCESSITY is the mother of invention! This adage, penned in the sixteenth century, has had its truth substantiated repeatedly in the history of man. Lacking those things necessary to preserve his existence, to attain greater comfort and to maintain progress, man has utilized his inventive genius to create that which was needed.

So it is in industry, just as much today as it was in the beginning of the mechanical age. In the metal-working industry, for example, when a machine is required to perform some specific job or operation, the engineer designs and builds equipment to do that work. Thus it is that entirely new types of machinery, and improved models of existing equipment constantly are making their appearance on the market.

Problem Encouraged Solution

Manufacturing exclusively an extensive line of steel truck bodies and equipment for motor vehicles used by public utilities, such as electric power, gas, water and telephone companies, the American Coach & Body Co., Cleveland, recently undertook to utilize resistance welding more extensively in the fab-

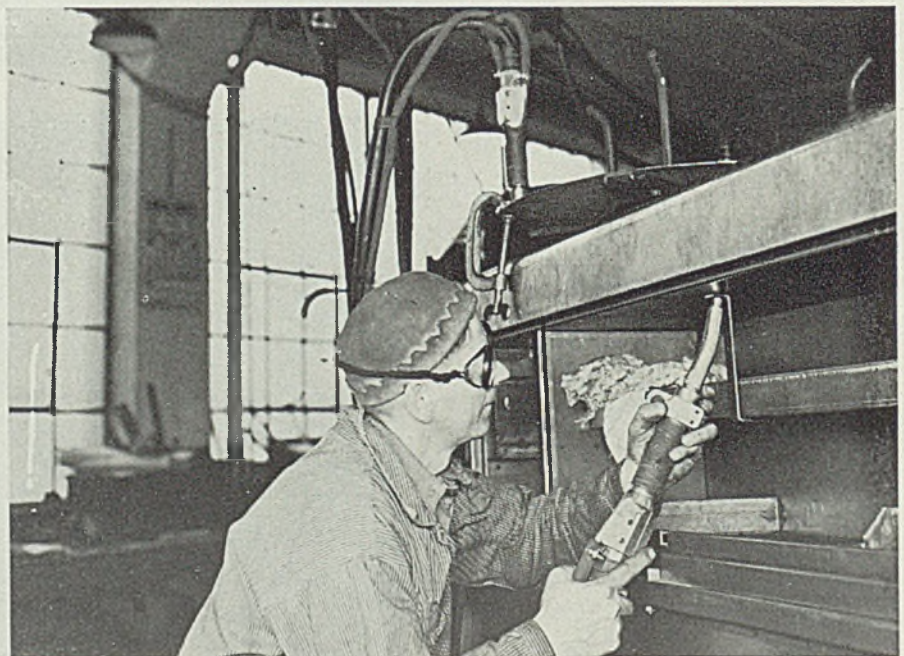
rication of bodies. It was soon discovered, however, that commercial equipment capable of doing the work in the most convenient and effective manner was not available, therefore, the management engaged an experienced welding engineer to design and build suitable equipment.

After several months of experimentation and development work, a new type of welding unit was perfected. A number of the welders were manufactured and placed in service on production work and a

few months were spent in observing performance. So successful was performance of the units that the company has established a welding division to manufacture and merchandise the new equipment in the sheet metal fabricating industry.

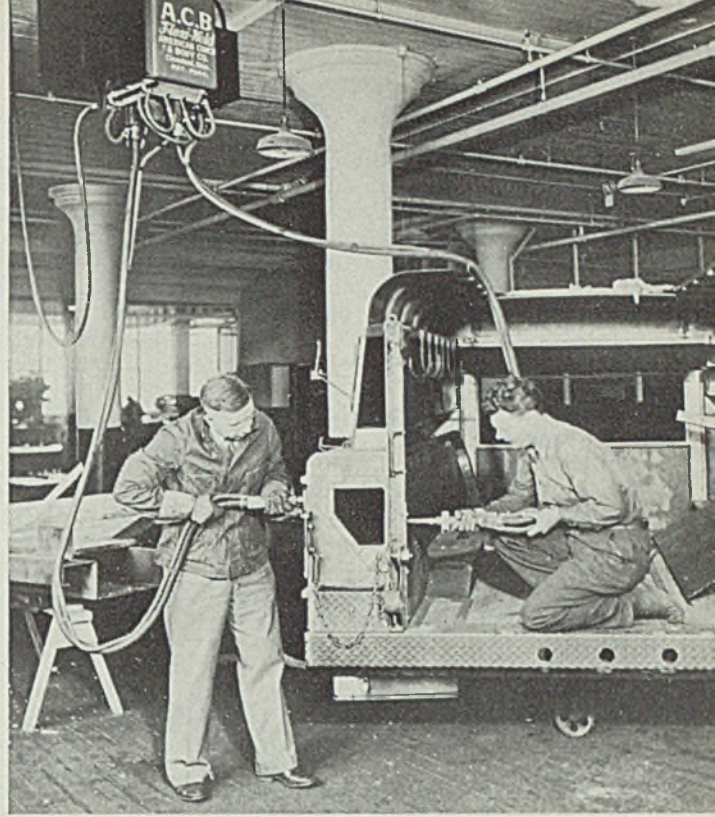
The American Coach & Body Co.

HOLDING a single electrode weighing not more than 10 pounds, the operator has considerable freedom of movement. When the button at the operator's left thumb is pushed, a spot weld is timed and made



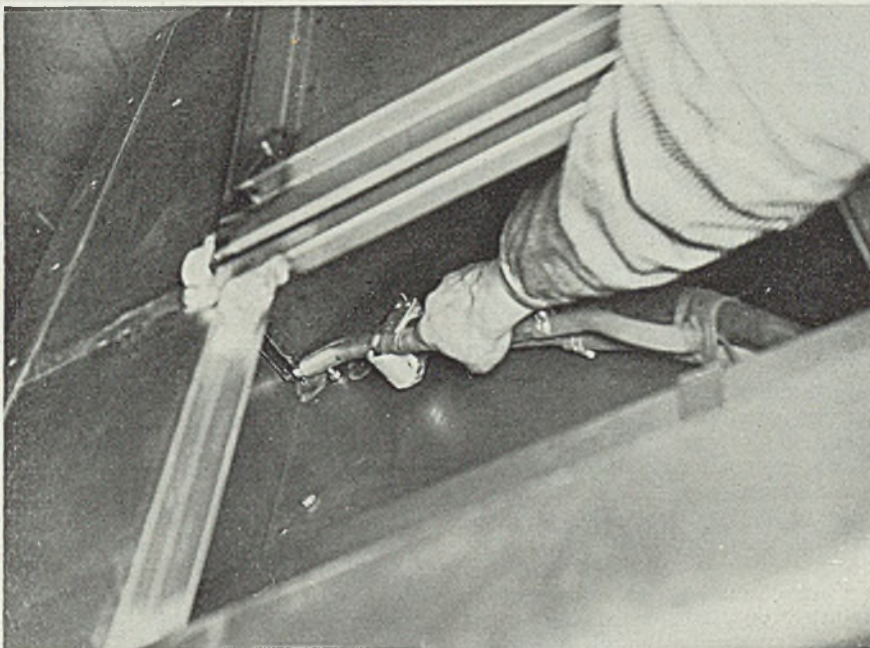
Welds with Electrodes

BY E. F. ROSS
Associate Editor, STEEL



fabricates heavy, medium and light bodies and attaches them to standard truck chassis. Formerly it operated three plant units—one devoted to heavy bodies, the second to medium bodies and the third to light bodies. About a year ago, however, the company acquired a new plant

CLOSE quarters impose no serious obstacle to use of the electrode, as shown here—welding inside a compartment. Offset, angular or special point holders are used to reach particularly awkward locations



and consolidated its production under one roof. The heavy body division was located on the first floor, the medium body division on the second floor and the light body department placed on the third floor. The layout is arranged so that incoming material is routed to a stockroom and from there is distributed to the various departments to flow through the sequence of operations in an orderly manner without unnecessary backtracking.

All bodies are constructed principally

WHEN sheets are to be spot welded to heavy framework, such as steel castings, the electrodes should be about 20 inches apart. Two operators are used as shown here, the second man simply holding the ground electrode against the truck body

from low carbon sheet and strip steel which ranges from 12 to 16-gage. These bodies incorporate various types of bins, compartments, shelves, tool boxes, and similar construction, to provide storage space for materials and tools used by construction and service crews. Some of these intricacies are shown in accompanying illustrations. It is obvious that steel of the thickness mentioned is suited admirably to fabrication by resistance welding, but it is also obvious that because of close working quarters in the truck bodies and compartments many difficulties would be encountered in placing electrodes in position to make welds.

Electrode Separation Needed

Bodies, even of the lighter type, were too cumbersome to take to stationary spot welders and no portable gun welders could be found which would function with one electrode on the inside of a body and the other on the outside, sometimes with as much as 6 feet intervening. What was required, it was decided, was a portable welding unit with separate cables and twin electrodes, one of which could be clamped to the body

and the other used by the workman to make the welds.

Proceeding along these lines, the company's engineers succeeded in designing a unit which met all of the required specifications. As shown in the accompanying illustrations, the welder, designated as the Flexi-Welder, consists of a power transformer of special design, which may be suspended from the ceiling, mounted on a trolley, or gib crane, or placed on a hand truck. Two light-weight flexible cable leads up to 12 feet in length are attached to the transformer and terminate in separate twin electrode handles. These flexible cable leads and twin electrodes provide remarkable flexibility in welding operations. With the new equipment, welds can be made at any point which can be

tions in heat output at the electrodes.

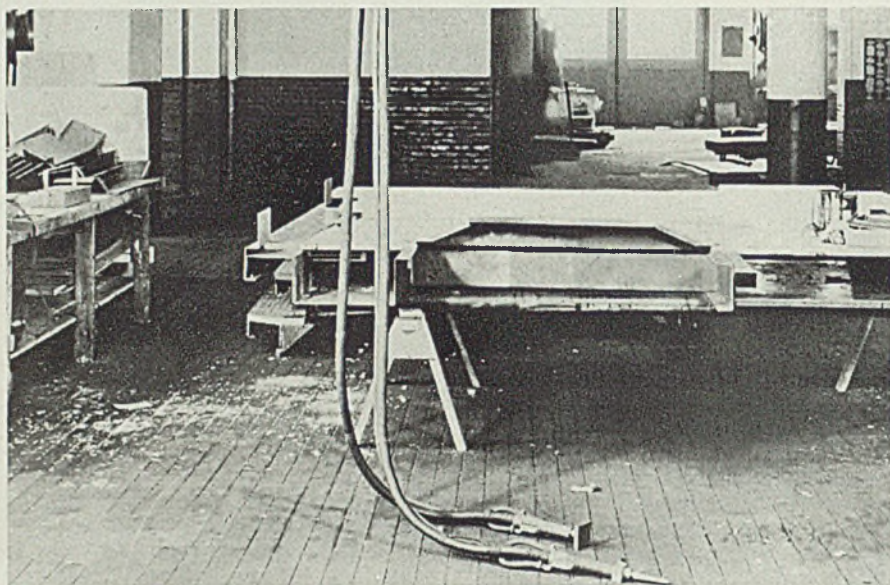
The heat regulator is built into the transformer housing with a panel on each end, one panel being marked "coarse" and the other "fine." Changes in heat are obtained by changing the voltage, or electrical pressure, by means of taps and the slip plugs provided.

Leads from the transformer are of flexible cable, ample in proportion and efficiently water cooled and well insulated. They are sufficiently flexible to bend around an 8-inch radius and light enough for the operator to handle on continuous production. Weight of the electrode handles with leads attached is from 8 to 10 pounds each. Electrode handles are of electrolytic copper and are designed particularly

mounted adjacent to the welder, if this arrangement is desired.

Any of the good timers on the market will perform satisfactorily with the new welder. It is the practice to use the timer which is most suitable for a specified type of welding.

As stated previously, the welder was developed for welding 16-gage or lighter sheet stock, such as is used in automobile body and similar construction, to any frame work, and for use by any ordinary workman. For steel heavier than 16 gage, it must be borne in mind that proper heat, time and pressure are requisites. It has been found that the average workman cannot exert sufficient pressure manually to consummate welds in 12 and 14-gage stock. It can be pointed out, how-



reached with a straight, offset or right-angle electrode.

As is the case with all resistance welders, the transformer is the heart of the unit and was designed specially to possess the characteristics required for the work. Primary coils are of electrolytic copper with extra heavy insulation to insure long life against grounds and short circuits. Secondaries are of high-grade boron copper and are amply proportioned to carry the heavy induced current for welding. They are internally water cooled by water passages through their sections—no steel water pipes are used. The core is made of high-grade silicon armature steel.

The transformer has a capacity of 75 kilovolt-amperes and is of the shell type with primaries and secondaries interleaved for efficiency. Built compactly, it is housed in an aluminum case. Characteristics include minimum loss and maximum output. The primary is tapped to give a 50 per cent range of varia-

to meet the requirements of production work. They may be disconnected from the cables and reconnected to them in approximately 5 minutes. These handles have point holders that may be removed quickly by the workman and replaced with offset, angular or special point holders. The point holders take standard tips which are of special high-conductive alloy and interchangeable in all holders.

All Elements Adequately Cooled

Particular attention has been paid to the internal water cooling system of the transformer, cables, handles, point holders and points. A multiple parallel system keeps them cool under all working conditions.

The contactor is magnetically operated, making and breaking both sides of the supply line simultaneously so that current flows through the transformer only when welds are being made. This contactor is mounted on the side of the transformer housing, although it can be

◆
IN the early stages of truck body fabrication, sections are assembled on horses and welded together into subassemblies. Twin electrode spot welding equipment facilitates this work because of the ease with which the electrodes can be handled
◆

ever, that American Coach & Body workmen are able to weld these gages with complete satisfaction when adequate pressure is applied.

The technique of making welds with the equipment is simple. As will be observed from accompanying illustrations, one of the twin electrodes has a square flat head. This electrode is ground to a convenient part of the truck body with an ordinary C-clamp and because of the flat head makes a good contact. Several of the illustrations show the ground electrode attached in this manner. Holding the other electrode in his hand, the operator presses the welding tip to the work, pushes the control button in the handle and almost instantaneously the weld is timed and made.

On 16-gage and lighter automobile body stock, it is desirable for best results to make all welds within a radius of 6 feet from the ground electrode. With the new equipment no difficulty is experienced in

(Please turn to Page 72)

The Basic Open Hearth Process-II

THE present day basic open hearth furnace is commonly designed to tap heats of 90 to 120 tons although some plants make a high grade alloy steel tap from 15-ton basic open hearth furnaces while another plant is tapping alloy steel from a 140-ton furnace. Fig. 4 shows a modern 120-ton basic open hearth furnace. Improvements of the furnace proper, as already mentioned, have been made to increase tonnage output. In order to do this, a great amount of research has been carried out to establish fundamental relationships in design between the various parts of the furnace. These developments have been concentrated on port design where gas is used as a fuel and on fuel burners where a liquid fuel is used, also on regenerators, combustion control and thermal efficiency, refractories, on general furnace construction and on hearth design and lining.

Fuel Changes Are Made

Changes have been made in the types of fuels as used in the process today. The gas producer is not, as originally, the exclusive source of fuel used in the open hearth. Today, in addition to producer gas, coke oven gas, mixtures of coke oven and blast furnace gas, tar and steam, fuel oil and steam, mixtures of blast furnace gas and tar and other combinations are used as fuels. To burn the liquid fuels many types of burners have been designed, each to meet its specific job.

Likewise, in order to burn gaseous fuels, open hearths of today are built with special ports to obtain flame direction and to aid in effecting better combustion. To detail the subject of port construction and design would require a volume. Only an outline of the types can be touched upon in this brief sketch. Practice varies in different countries. For example, in Germany where water is not as free for industrial use as in this country and where labor and refractories cost less, the removable port is more commonly used. This type of port is built in the ends of the furnace. The entire end, however, may be taken from the furnace when the ports are burnt out and replaced with a newly repaired port. Among

Origin, Early History and Present Day Practice and Equipment Are Discussed

BY H. L. GEIGER

these are the Friedrichs, the Marz, and the Bernhardt types. In America, the development has been along the lines of fixed water cooled ports of the Parks, Knox, Blair and McKune types. When these built-in ports burn out the furnace has to be torn down for port repairs. The big problem in America has been properly to cool the ports so that they will outlast an average furnace campaign of 320 to 360 heats which is the average roof life of a basic furnace. In addition, the port must be so designed that it is properly cooled to outlast the other parts of the furnace, but not so much as to exert a detrimental chilling effect on the flame temperature.

Lines of the port are important in view of the fact that producer gas has a greater velocity than the air with which it is mixed, creating an unfavorable condition for obtaining complete combustion. The object of the development of port lines was to obtain in the port a greater velocity of the incoming preheated

air. The most recent development of a port to direct flame, obtain a satisfactory mixture and at the same time permit an open throat through which exhaust gases may escape, is the Rose port, illustrated in Fig. 5. This is a movable and removable port.

One of the earlier types of ports designed to meet these combustion demands was the venturi type port. It is in use today in some shops. This type of port derives its name from the venturi principle. The result was accomplished by shortening the gas port, lowering the roof knuckle and providing wing walls in front of the gas port. Thus is formed a restricted area which acts like a mixing chamber in which the gas and air are thoroughly mixed before entering the melting chamber. The venturi type is a fixed port. Results claimed for this type of construction are more rapid combustion together with a higher flame temperature and a better concentration of flame on the furnace charge.

Function of Checkerwork

Other parts of the furnace, as, for instance, the regenerators, today commonly called checker chambers, may be discussed at still greater length than the ports. Volumes have been written on this subject. The checker chambers are large firebrick filled chambers located at each end of the furnace and below the hearth, as shown in Fig. 5. Where gas is burned as a fuel there are two sets of chambers at each end, one set for air and one set for gas. When the gas is burned on the left side of the hearth, the exhaust gases pass through the checker chambers on the right side. This exhaust gas will heat up these

Part I of Mr. Geiger's article dealt with the origin and early development of the basic open hearth process, both abroad and in the United States; it appeared in STEEL of Mar. 29, Pages 38-41. Part II, presented herewith, describes the basic open hearth furnace of the present day. Part III, devoted to the making of a heat of basic open hearth steel, will be published in an early issue

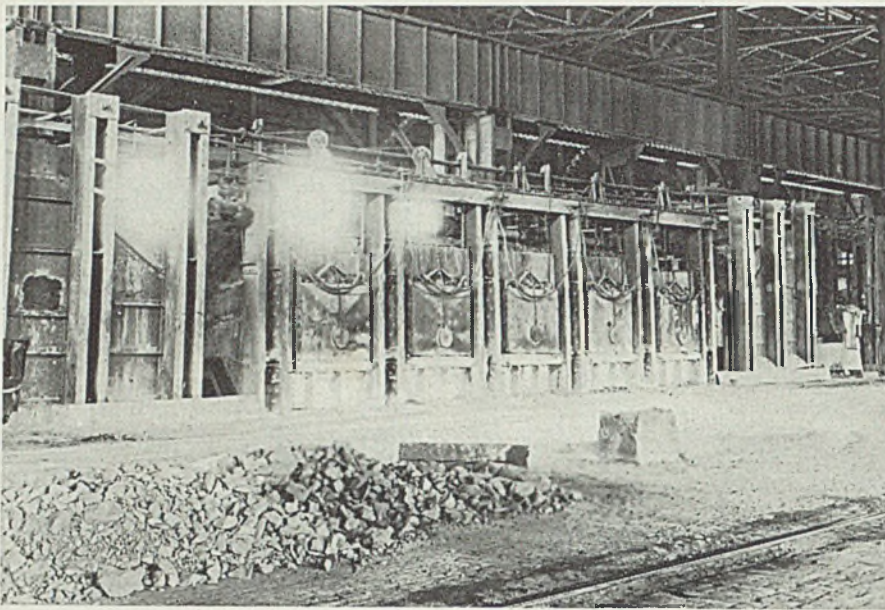


Fig. 4—A typical 100-ton basic open hearth furnace

checkers in 20 minutes to about 2000 to 2100 degrees Fahr. At the end of the 20-minute period, valves are operated so as to direct the gas and air through the checkers at the right, becoming preheated as they pass through the hot checkers. The gas is then burned on the right side of the furnace for 20 minutes and the checkers on the left side which have dropped to 1800 to 1850 degrees Fahr. during the previous reversal, are heated by the exhaust gases. When these checkers have been raised to 2000 to 2100 degrees Fahr. the furnace again is reversed to take advantage of the stored up heat in the checkers on the left side. These reversals in regeneration continue throughout the 24 hours of each day. Open hearth furnace operators have observed the following con-

cerning checker chambers:

1—The larger the chamber, the greater will be the amount of heat intercepted in it, and, therefore, the lower will be the temperature of these gases leaving the checkers for the stack;

2—The gas regenerators are usually smaller than the air regenerators because the volume of gas used is less than that of the air;

3—Total regenerator volume should be 55 to 85 cubic feet per ton of steel; hearth capacity and air chambers should be 20 to 25 per cent larger than the gas chambers;

4—Regenerators should be narrow and high to get the maximum heat economy;

5—In filling the chambers with checker brick, the following should be kept in mind: (a) As many check-

er bricks should be used as possible to allow the storing of a maximum amount of heat from the waste gases, yet not so many that there will be an undue increase in gas velocity; (b) a maximum surface should be exposed to the gases; (c) the placing of the checkers should be such as to have an intimate contact with the gases and air; (d) the materials used and the size and structure of the checker brick must be such that it will stand the superimposed load at high temperatures.

Much has been done along the lines defined in paragraph No. 5, above. Various open hearth operators have worked out systems of building up checker chambers and in designing checker bricks. Chief of these are Moll, Orth, Danforth and Dietrich.

A system of mains supplying air and gas to the checker chambers, and the exhaust gases to the stack, are operated by a series of valves. Valves are used to direct the gas and air from one port to the other in reversals, at the same time reversing the exhaust to the stack. All kinds of valves are in use, including bell type, slide dampers, butterfly, mushroom and movable hood types. They may be refractory lined, dry, water cooled and water sealed, depending on operating conditions, but they all have one function, namely, to direct gas and air flow in reversals. All of this has been mentioned to point out the high spots of gas furnace development today. Where fuel oil and tar are used, with steam, only the air is regenerated. This is still another problem, but the same principles are involved.

Automatic Control Perfected

In recent years much work has been done in perfecting automatic combustion control. Chief development along these lines has been with the Isley, Askania, Huessner, Smoot, Sykes and other systems. Some of these systems use forced draft, some proportion the theoretical amount of air and fuel to obtain perfect combustion, while still another embodies a thermostatically controlled automatic reversal of the fuel, the thermostats being placed in the checker chambers. The future will see vast strides in the use of these automatic combustion control systems. Most every open hearth shop today has at least one furnace equipped with one or another of these systems. As a result, fuel consumption per ton of steel gradually is being lowered until today 4,500,000 B.t.u. per ton of steel is fairly common practice where 6,000,000 B.t.u. formerly was considered good.

Studies of the science of heat transfer from the flame to the metal have been carried on recently

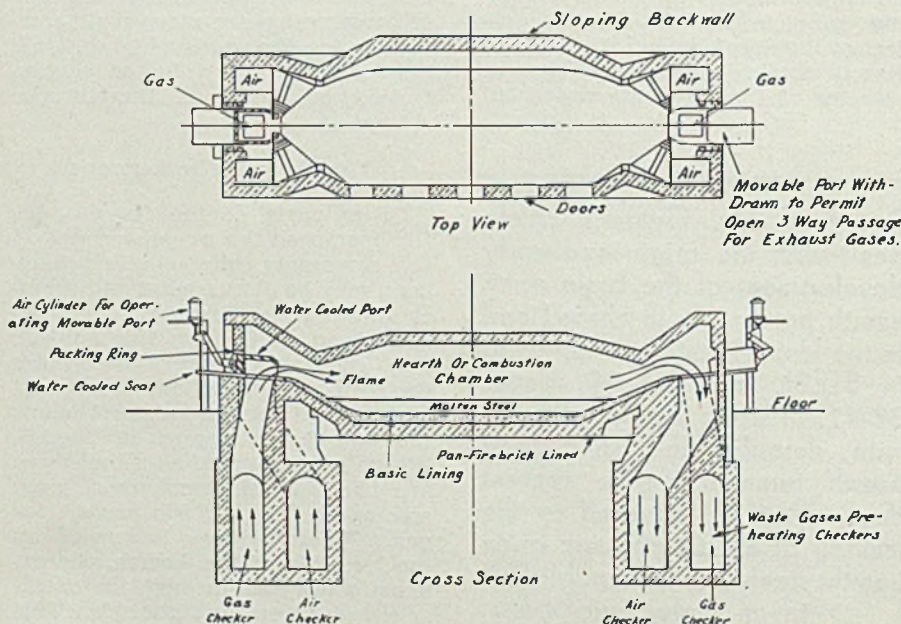


Fig. 5—Cross section of basic open hearth furnace with Rose ports

and have given rise to many questions. Does a luminous or a non-luminous flame transfer more heat to the metal? Does the greater part of the heat come from direct radiation of the flame or does the greater part of the heat received by the bath come from radiation from the arched roof of the furnace? If the latter is true, how much does the luminous flame obscure radiation from the roof and, furthermore, if true, would it not be better to use a non-luminous flame? Does all of the heat entering the bath get there through radiation, or does some of it get to the bath by conduction or convection? What per cent of the heat reaches the metal by radiation? By conduction? By convection? When these problems are understood more fully open hearth operators will secure still lower fuel consumption per ton of steel made.

Basic open hearth steelmakers in their efforts to get greater efficiency out of their furnaces have had to contend with higher temperatures and consequently have had to use refractory materials that withstand higher temperatures. Today refractories are being furnished to meet the various needs of the open hearth furnace. Although the performances of these refractories are as a rule satisfactory, much more rapid strides could be made in steelmaking if refractories could be furnished to withstand higher temperatures. The steelmaker prefers to have a refractory brick which will have a softening point about 3200 degrees Fahr. or higher as temperatures over the various parts of the furnace range up to 3100 degrees Fahr. The fluxing action of the basic oxides on the furnace brick in the vicinity of the slag line has

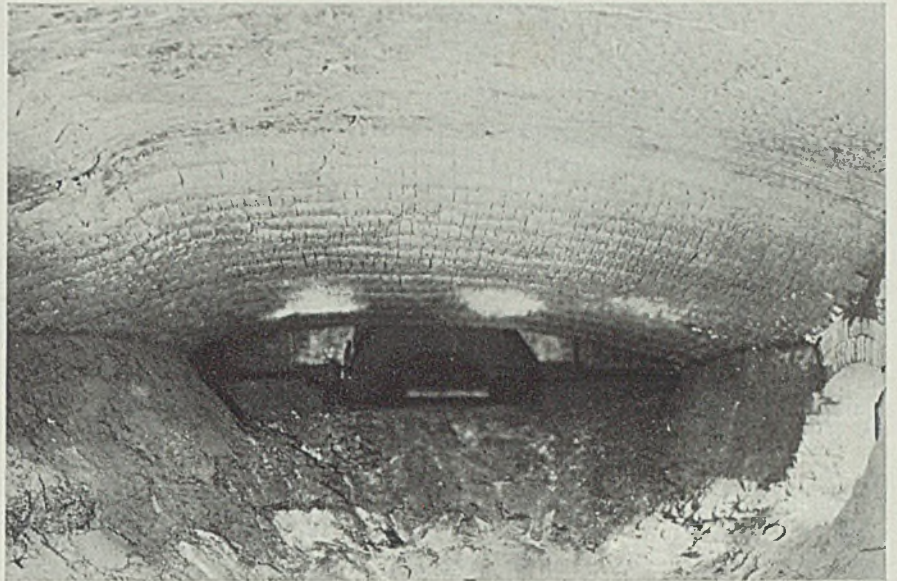


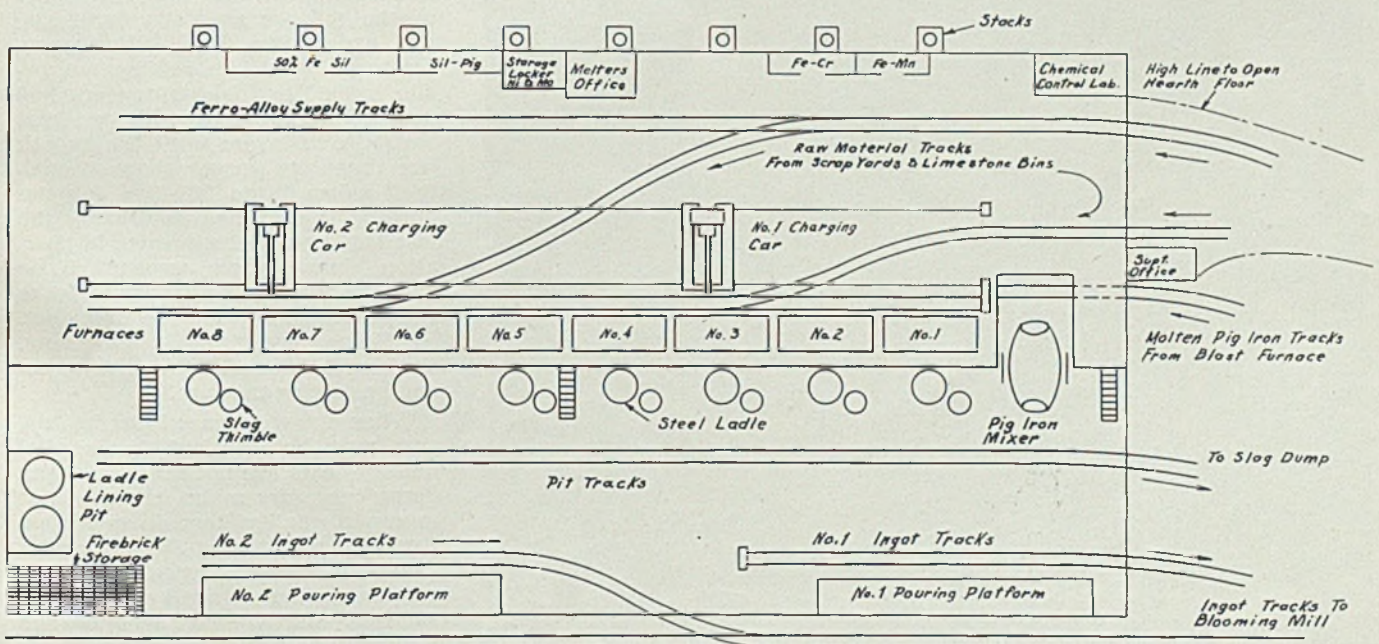
Fig. 6—Interior of 100-ton basic open hearth furnace showing basic lining, backwall at left, one of the charging doors at right and burner at end of furnace

made it necessary to use a basic or neutral material in bricks at these points instead of the readily attacked silica bricks. Operators are building the backwalls and front walls of their furnaces of such brick materials as Magnesite, Chromite or Kromag. Other basic materials are also used with satisfactory results. Where high thermal resistance is wanted, as in roof bricks and checker bricks, silica is the principal material, with fireclay brick as the other choice. In addition to the insulating effect of refractories used in the ordinary construction of the furnace, there have been some recent efforts to insulate the furnace with asbestos cement, sil-o-cel, sand filled steel casings about checker chambers and magnesite slabs.

These efforts have met with considerable success in increasing the thermal efficiency of the furnace, one completely insulated furnace reporting fuel consumption of 3,500,000 B.t.u. per ton of steel produced.

Changes in construction of the combustion chamber have followed changes in hearth shape and fuel practice. Improvements in the design of furnace roofs have increased the operating efficiency of the furnaces at lower costs. It is generally recommended that the roof of the furnace should be straight, arched in one direction with a 24-inch spring. Specially designed roofs such as the Orth ribbed roof have

Fig. 7—Plan of typical modern basic open hearth shop



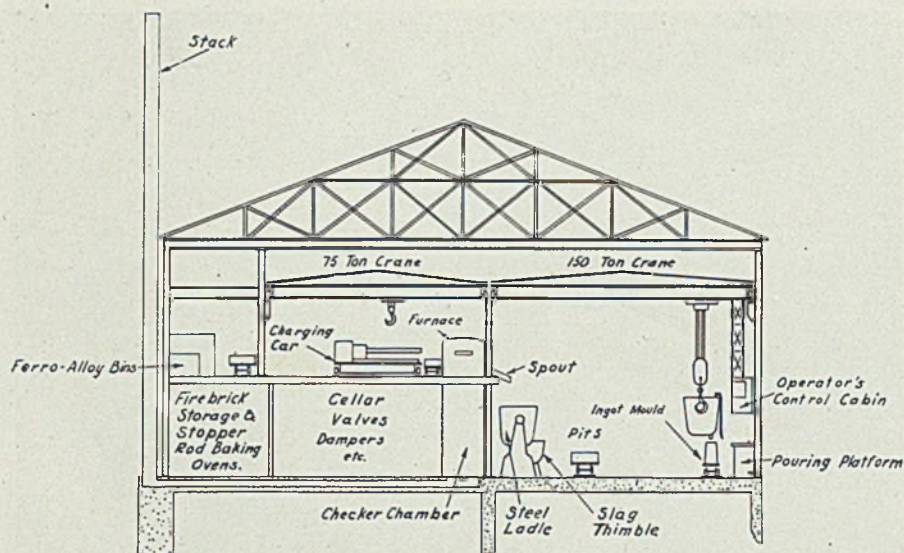


Fig. 8—Cross section through typical basic open hearth shop

been used in Europe and in this country in the past. This type of construction permits burning away 60 per cent of the face of the bricks before repairs are necessary, a performance that is made possible because this type of roof is relieved of the functions of supporting itself due to its rib construction. In the arched ordinary roof only 30 per cent of the brick face can burn away before there is danger that the roof will cave in. The Orth ribbed type of roof may be classified as a suspended roof. The general group of suspended roofs, which may be either flat or arched, has found considerable favor in certain quarters.

Another construction feature of open hearth furnaces which has been widely adopted in recent years is the sloping backwall. The backwall is a continuation of the furnace bottom which slopes upward and

outward as a result of bending the backstays at an angle of 50 degrees at approximately the slag line. Use of the sloping backwall has eliminated necessity for backwall repairs during a furnace campaign of 300 heats. Formerly, it would have been necessary to repair and rebuild a straight backwall at least 4 times during a 300-heat campaign due to attack from the basic slag. Less bottom trouble is experienced from erosion by wash of silica off the roof bricks and because of the thickness of the backwall, 12 to 16 inches, permitted by this type of construction, there is less loss of heat through the walls.

Next, consider the hearth proper of the modern basic open hearth furnace. In older furnaces, a rule of thumb set the length of the hearth at twice the width. This rule is good for small furnaces. For the

larger furnaces the length of the hearth usually is more than twice the width. The longer hearth permits better combustion conditions, while, with a hearth that is too long, the effect would be one of cooling. The limitations of width of hearth are governed by the distance material can be thrown with shovel or dolomite gun from the working doors and it is also determined by the spread of the flame. Fig. 6 shows the inside of a 110-ton basic furnace.

After all, the object of the basic open hearth is to melt and refine steel on a basic lined hearth and the size and shape of the hearth should be of paramount importance; all design, construction and operation have one object, the production of quality steel at the lowest cost per ton. Some operators claim that the depth of the hearth and bath is most important, pointing out that the deeper baths are less oxidizing and the length of time to make a heat of steel, therefore, longer. If the bath is too shallow the reaction is of an over-oxidizing character and a poor quality of steel is produced. Consequently a compromise has to be made. In 100-ton furnaces, operators have learned that a 30 to 33-inch depth of bath gives satisfactory oxidizing results. In the 30-inch depth of bath, a hearth area of 629 square feet is necessary. If the width of the bath is 15 feet, the length would then be about 42 feet. To increase the depth for a given tonnage output decreases the hearth area exposed to the flame, with a consequent slower working furnace.

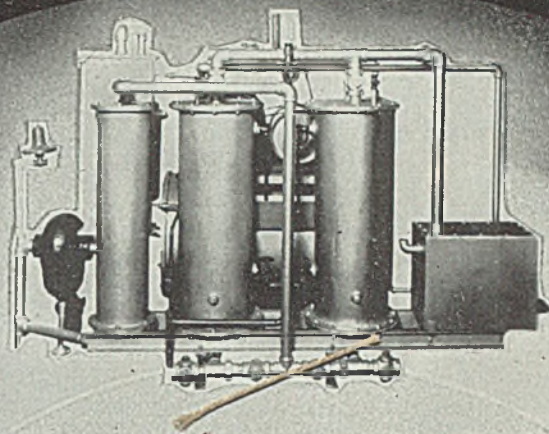
Hearth of Steel Plate

When a new furnace is built the hearth foundation usually consists of heavy riveted steel plate in the shape of a large flat pan which rests on transverse steel girders. These in turn are supported by longitudinal girders which are part of the furnace superstructure. The pan usually first is lined with refractory brick followed by magnesite brick. In this country crushed magnesite is mixed with tar and burnt in, in layers until the hearth has taken its proper shape. Usually it takes 18 to 22 days for the burning in of a hearth. During the last few days of the burning-in operation, dolomite and crushed basic slag are mixed with the tar to make the bottom ready for the first heat. In Europe, particularly Germany, the hearth is burnt in with dolomite and basic slag mixture.

When a new furnace is started up, care must be exercised that special quality heats are not made in them. Some operators make it a rule not to tap a quality heat from a new furnace until at least 25 commercial heats have been tapped to insure proper heating up of all parts of the furnace, particularly a thorough temperature saturation of the check



Fig. 9—General view of basic open hearth shop equipped with eight 110-ton furnaces. The No. 2 furnace is being charged. At right front are shown charging cars with scrap pans



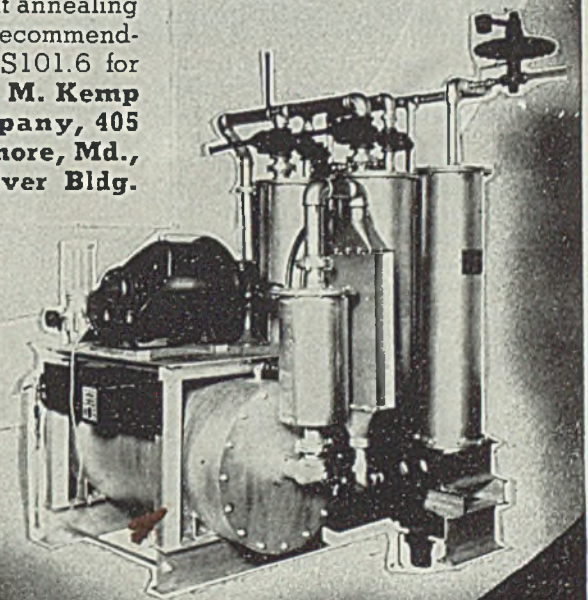
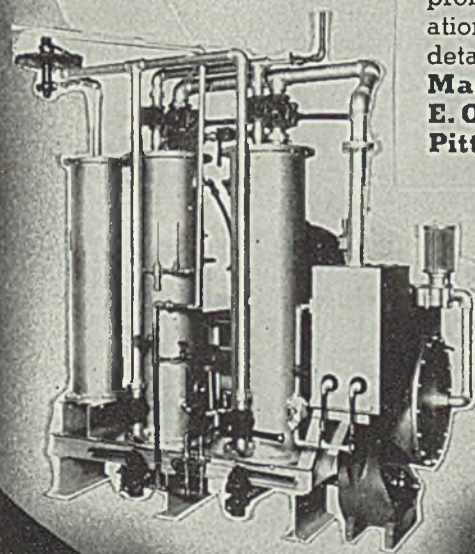
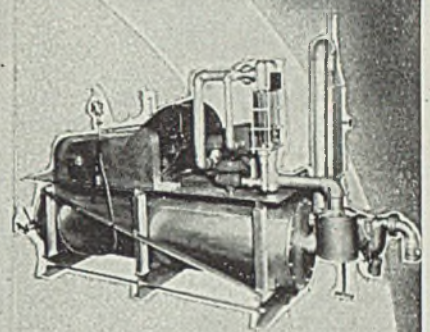
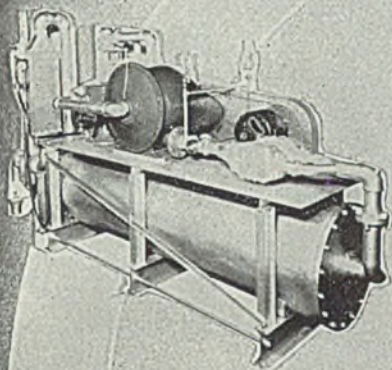
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sufficient to attain this result. When a hearth is burnt in it usually is set for the operating life of the furnace, which means that frequent repairs are necessary. Failure to keep a hearth bottom in a constant state of repair often allows the metal to break through the bottom or back-wall and a hundred tons of molten steel will run out into the pits below. The writer has seen this happen on a number of occasions, the molten metal running over pit tracks, cutting through water and other pipe lines and doing enough damage to require a week's repair program.

The above review serves to point out in a brief way the present status and trends in open hearth furnace development. It is a far cry from the little 2 and 3-ton pioneer furnaces of the seventies.

The present day open hearth shop may consist of one or more units, with as many as 15 or 18 furnaces arranged in a line. For convenience and economy, the furnaces are usually all of the same size and are usually all lined with the same material. Frequently such ferroalloys as ferromanganese, ferrochromium, ferrosilicon and spiegeleisen are stored in open bins on the working floor. The more valuable alloys such as nickel and molybdenum generally are kept in a locker storage.

Typical Shop Shown

Fig. 7 is a plan of a typical, modern, basic open hearth shop equipped to produce the ordinary run of alloy steels. The plan is typical of most shops with ferroalloy bins located on the working floor. Each of the basic open hearths has capacity of 110 tons and all eight of them are constructed in a straight line for convenience in charging and tapping. In a working day of 24 hours about 1600 tons of materials will pass through this shop, entering the working floor as steel scrap and pig iron and leaving on the pit side as finished ingots of refined steel. All tracks are labeled according to the type of material transported, the arrows indicating the direction of the movement of the stock. The scrap and ferroalloy tracks all lead up the highline to the working floor. The track parallel to the ferroalloy bins provides for convenient unloading of this material. Scrap and limestone are conveyed in small charging pans, as shown in Fig. 9, to the track in front of the furnaces. This places them in position for direct charging to the furnaces from charging cars. When cold cast pig iron is charged instead of molten pig iron, it is brought up with the steel scrap on the highline and is charged in the same manner as the steel scrap. Cold cast pigs frequently are used where special quality heats are being made and especially where the furnace man desires close carbon melt control. Most shops of this size

use molten pig iron directly from the blast furnace. In this practice iron is held molten in a pig iron mixer of 250 to 500 tons capacity or more depending on the steel output of the shop. The mixer is most generally located at one end of the shop, Fig. 7, usually nearest the incoming tracks from the blast furnace. The hot metal is usually transported in the open type ladle where a mixer is used, or it may be transported in a cylindrical ladle of the Pugh design where no mixer is used, the cylindrical ladle serving as a mixer in this case. The steel scrap usually is stored in a separate yard near the open hearth building, not shown in sketch, while the limestone, dolomite and magnesite usually are stored in bins near the scrap yard or in open piles from which they may be loaded to charging pans by yard crane.

Stock Moves From Pit Side

Once the raw charge has been melted and refined, it is tapped into ladles on the pit side of the open hearth building and cast into ingots. All arrows in Fig. 7 indicate that the stock moves out from this side of the shop. The central pit track is located at this point and is an exit for slag and scrap which go to the slag dump, while the tracks leading from the pouring platforms are so placed as to facilitate pouring and the removal of the refined steel to the blooming mill where the molds are stripped from the solidified steel ingots.

Since the life of a ladle lining varies from 6 to 10 heats tapped into it, ladle relining facilities are provided for at one end of the pit as shown in Fig. 7.

The general material handling equipment in a shop of this type usually consists of one charging car for every four furnaces and one floor crane for every four furnaces for transporting molten pig iron to the furnaces. On the pit side there usually is one pouring platform for every three or four furnaces and one pit crane for every three or four furnaces for handling the ladles and for pouring. This arrangement is possible since all of the furnaces do not tap at the same time and it is one of the melter's duties to avoid simultaneous tapping of heats.

Melting Time Varies

The time required to make a heat varies from about 11 hours for some high carbon and the commercial grade plain carbon steels to 14 to 15 hours for special quality alloy steels.

Fig. 8 represents a cross section of the shop shown in Fig. 7, showing the relative positions of the equipment and the location of the working floor, the cellar and the pit side.

(To be continued)

Gear Makers Announce Papers for Annual Meeting

A program of eight technical papers has been arranged for the twenty-first annual meeting of the American Gear Manufacturers' association, which, as announced in STEEL, March 29, page 26, is to be held at Galen Hall hotel, Wernersville, Pa., May 24-25. In addition to these papers, the program will include the president's address and a number of committee reports.

The eight papers and their authors are as follows:

"Meehanite Cast Iron," by Oliver Smalley, president, Meehanite Institute of America, Pittsburgh.

"Casting Steel in Concrete Molds," by H. F. Scatchard, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

"Automobile Transmissions," by J. O. Almen, head, dynamics division, research laboratories, General Motors Corp., Detroit.

"Application Factors for Helical and Herringbone Speed Reducers," by S. L. Crawshaw, application engineer, Nuttall works, Westinghouse Electric & Mfg. Co., Pittsburgh.

"Plant Management," by N. M. duChemin, assistant manager, General Electric Co., West Lynn, Mass.

"Wage Incentives," by Neal Foster, Boston Gear Works Inc., North Quincy, Mass.

"Foreman and Foremen's Training," by H. H. Kerr, president, Boston Gear Works Inc., North Quincy, Mass.

"Credit Unions," by E. S. Sawtelle, vice president, and general manager, Tool Steel Gear & Pinion Co., Cincinnati.

Pail Is Easy To Fill

Five gallon pails equipped with easy opening Quik-Lox rings have recently been introduced by the National Steel Barrel Co., 3850 East Ninety-first street, Cleveland. The ring permits the head to be removed, exposing the entire interior of the pail to the view of the operator, eliminating need of spotting for filling. After the filling, the gasket-lined heads are replaced and the pail prepared for shipment by closing the lever like ring. No tools or special equipment are needed to close or open these pails.

Markets Steel Flooring

Steel flooring built for use in the Riverdale plant of the Acme Steel Co., Chicago, has proved so successful that the company has decided to place a similar product on the market. The product is made from $\frac{5}{8}$ x 0.065-inch strip steel formed into a 1 $\frac{1}{4}$ x 1 $\frac{1}{4}$ -inch mesh and supplied in rolls. The steel is laid on the sub-surface, over which concrete is poured, worked into the mesh and levelled. Floors of this type have been used successfully for over eight years by the company.

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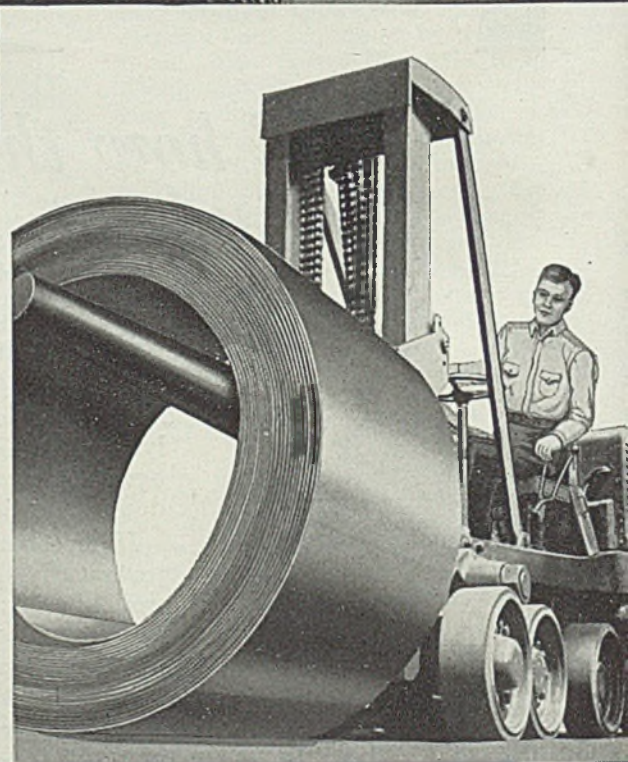
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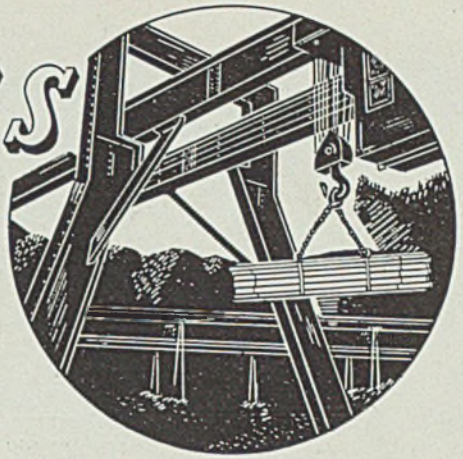
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IN MATERIALS HANDLING

MATERIALS HANDLING



Special Wirebound Skid Boxes Speed Handling of Automobile Accessories

WHEN Ryerson & Haynes Inc., Jackson, Mich., decided to construct a new branch plant at New Brunswick, N. J., it was faced with the problem of arranging its layout and planning a materials handling system which would serve adequately in the manufacture of its principal product—automotive equipment, and, at the same time would provide means for producing and handling an entirely different type of product—a special camera. The latter, incidentally, was a seasonal proposition.

As a consequence, a satisfactory solution of the problem involved not only efficient conservation of floor space so as not to interfere unduly with the main activities, but also finding a means of handling which would serve the major and more important items of manufacture. The manner in which these two goals were attained may prove

helpful to other manufacturers faced with similar problems.

The branch plant at New Brunswick is a one-story brick, steel and concrete building approximately 450 feet long and 60 feet wide and is located in the heart of the main industrial section. At the front end of the building, to one side of the office section, is a truck receiving and shipping platform, while at the rear is a railroad switch-track running off the main line of the Pennsylvania railroad and alongside a covered receiving and shipping dock. This arrangement provides economy of motion for both types of shipping, and at the same time eliminates any bottlenecks in handling either incoming or outgoing materials.

Automobile jacks, stainless steel radiator grilles and windshield molding are the main items of manufacture at the present time; a few

months ago when the cameras were being made, as many as 1500 a day constituted a production schedule for this fill-in line.

One electric high-lift truck, 36 corrugated steel skid boxes and 24 skid platforms are the basis of the main materials handling system, but supplementing these is a special type of wirebound box with wood skid legs, which is utilized for shipping finished products. The lift truck and a number of the shipping boxes are shown in Fig. 1.

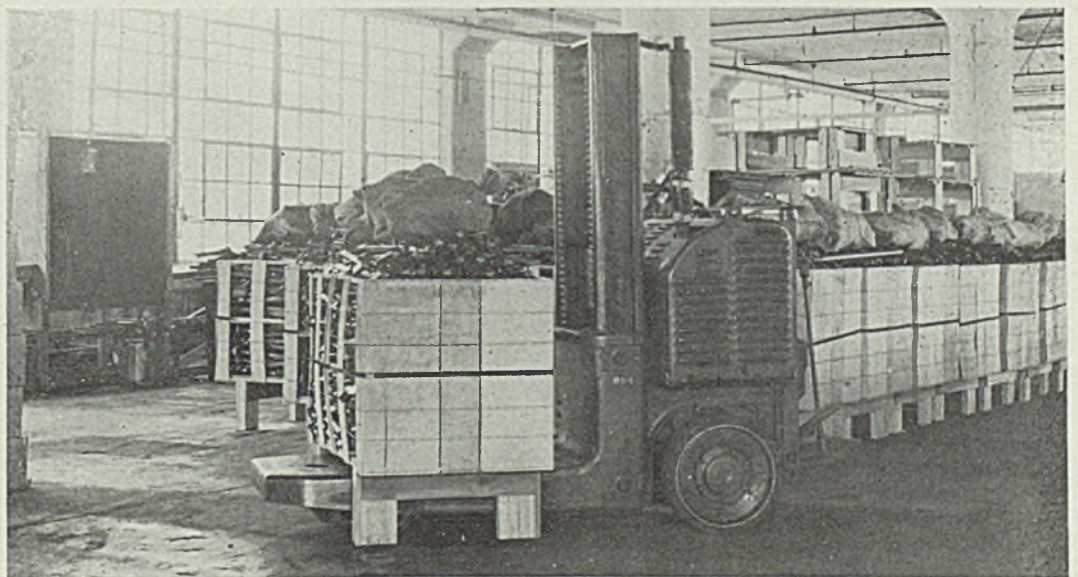
Lift Truck Is Utility Unit

Incoming materials include stainless steel, mostly in coils, wrapped in burlap and bound by steel strapping; malleable iron castings, in burlap bags; lacquer; grinding wheels; buffing materials; and coloring and cutting compounds; as well as the usual complement of tools and supplies common to this type of manufacturing. A storage area is set aside at a convenient point near the punch and forming presses and steel is handled on the lift-truck from storage to shears and thence to the presses. This lift-truck is really the utility handling device around the plant as it is used

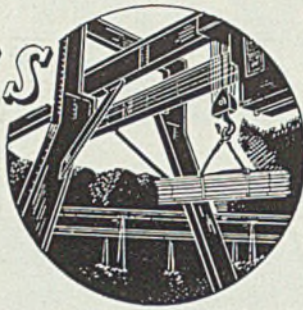
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FIG. 1—Economies in shipping have been gained by packing automobile jacks in special wirebound skid boxes. Each box contains 300 jacks and is bound with two steel straps. The industrial truck serves the plant as an all-purpose unit. A paint booth in one of the camera conveyor lines is shown at the left

◆



MATERIALS HANDLING



not only for transporting incoming and outgoing materials, but also for performing general work.

Main manufacturing operations on automobile jacks are performed on large presses of which there are five of these all of one type. In addition there are a dozen smaller presses, which are installed primarily for work of a lighter variety, including camera production operations. An automobile jack has 12 parts and each part has a press operation performed on it before it passes on to the next station. An efficient arrangement of corrugated steel skid boxes and special portable conveyor belts speeds handling of parts from the presses.

These portable conveyors, one of which is shown in Fig. 3, merit brief description. Plant Manager A. J. Snape, who has had many

years experience in charge of plants producing automotive products, is outspoken in upholding the efficiency of the conveyors which were designed and built in the plant. Powered with a gear-motor of fractional horsepower, the conveyor is equipped with fabric belting, with steel spacers on the belt at intervals of a foot. A conveyor is placed on each side of a large press and by means of an apron the pressed parts are caught and conveyed automatically into one or the other of two corrugated steel skid boxes, which are placed behind the conveyors. This use of conveyors and skid boxes has resulted in elimination of at least one rehandling at this point.

Jack shafts are two-piece welded units and require welding at four spots. This welding is performed in a separate department located ad-

acent to the presses. The shafts are placed by hand on top of a revolving tower and as the latter revolves slowly each jack shaft is brought around in its turn to the operator, who makes the spot welds. An average of 400 shafts per hour are welded at this station.

Assembly of various parts is performed on a short but interesting assembly line, which consists of two grooved rails set level into the top of the assembly table and running parallel the entire length of the table. The lower unit of a jack fits into this groove and as the operator places the upper part on top, she slides it along to the next operator. An operator at the end of the line has a two-tined fork-like tool which she uses to push the assembly into a riveter. In this machine the parts of the assembly are clinched together.

Painting Is Automatic

At this point, parts are prepared for painting, although the jack shaft is first put through a small press which performs a swaging operation on the end of the shaft. The jacks are run through a metal washer and then suspended at the starting end of an automatic painting and drying unit. This unit, shown in Fig. 2, is equipped with a parallel continuous chain conveyor to which are attached hooks for holding the work. Thus the parts are conveyed through a lacquer tank in which the parts are immersed automatically. They are then elevated and passed through a steam-heated drying compartment. The speed of the conveyor can be controlled to suit requirements, and regulation of heat in the drying chamber is provided. The complete cycle requires 16½ minutes, and 500 units per hour are painted.

After being painted and dried, the

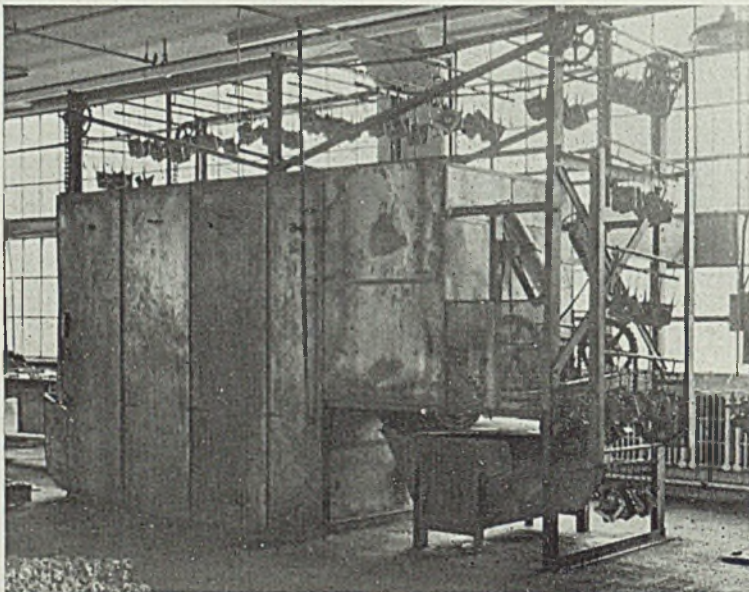
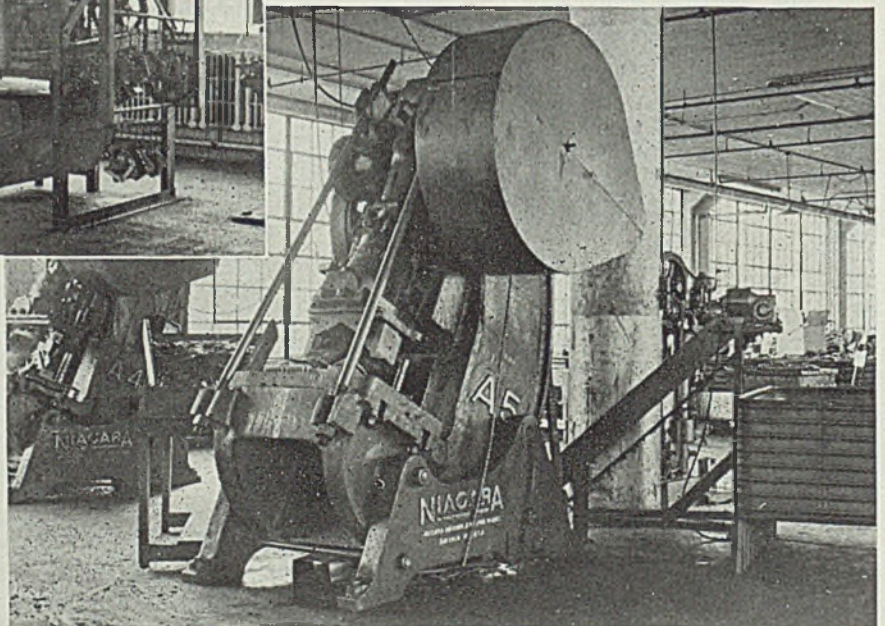


FIG. 2 (above)—Starting end of automatic painting unit. Jack parts are suspended from hooks on crossbars of a continuous chain conveyor and are carried through the lacquer tank and drying chamber at the rate of 500 in 16½ minutes. Fig. 3 (right)—At the right of the press is one of the portable conveyors which carries parts from the press to the corrugated steel skid box



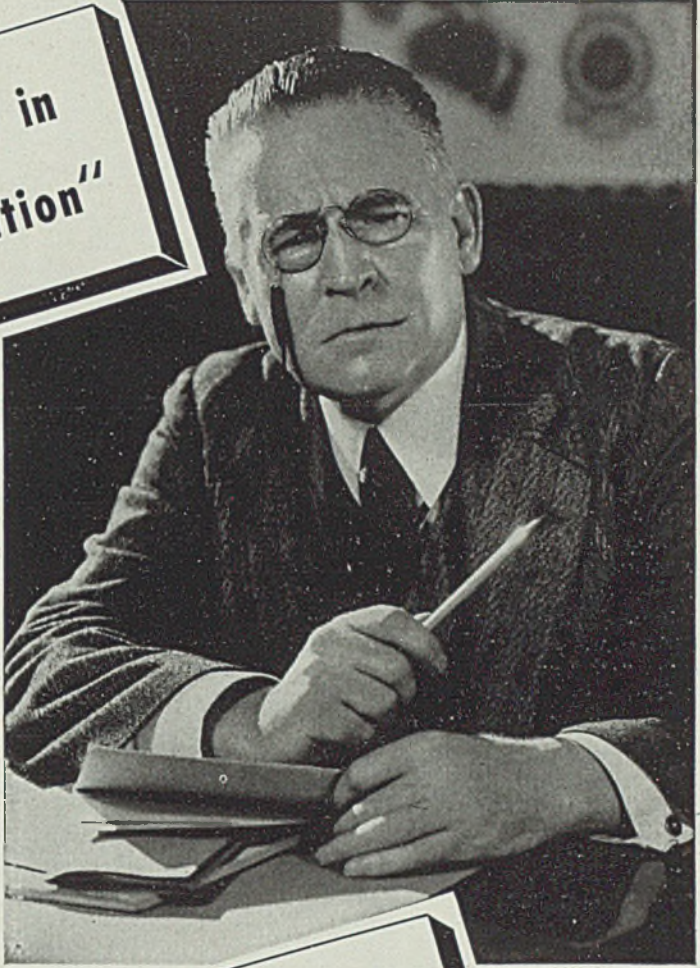
"No trouble with the battery in ten years' constant operation"

WHEN we first began operating our crane truck, in February, 1926, it was equipped with an Exide-Ironclad Battery similar to the new one we are just installing. In all of the ten years that this crane truck has been in constant operation, we have had no difficulty with the power plant. Needless to say, when it came time to replace the battery, the exceptionally fine service received from the Exide-Ironclad excluded the possibility of our considering any other equipment."

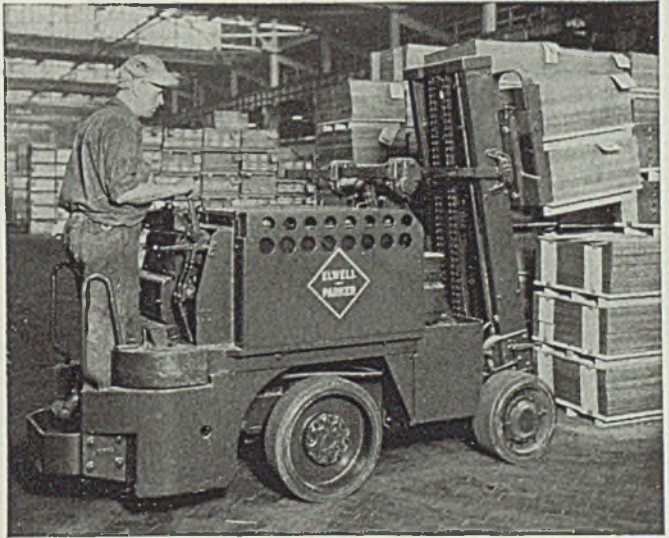
These remarks, by an experienced user of electric industrial trucks, can help other users to obtain longer, lower-cost battery service. Not only is the Exide-Ironclad a long-life battery, as such experiences show, but its high power ability and high sustained voltage assure you consistently good operating speeds under extremely tough conditions.

In material handling and in cargo handling alike, you will find that the Exide-Ironclad Battery can improve your service and cut costs. Write for free booklet, "In Selecting Any Motive Power Battery Be Sure."

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto



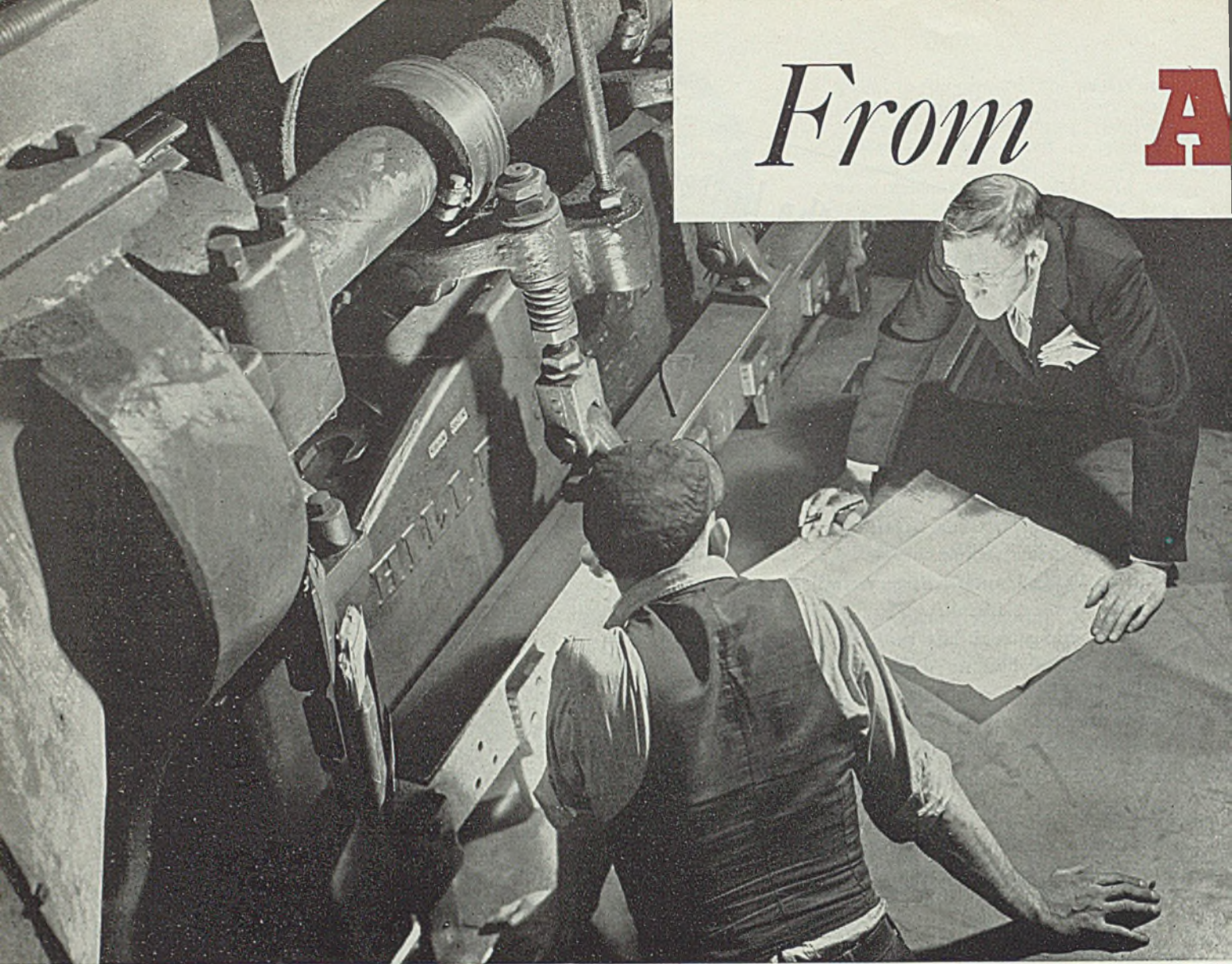
**Exide
IRONCLAD
BATTERIES**
With Exide MIPOR Separators
"MIPOR," Reg. U. S. Pat. Off.



Truck illustrated made by The Elwell Parker Electric Co.

From

A



(Right)

AUTOMOBILE parts like this hood are now stamped out of tougher, more ductile USS Automobile Sheets. Formerly deep-drawn products were more difficult and expensive.

Now automotive manufacturers make better fenders, panels, tops, frames and hoods at lower cost with USS Sheets.

(Left)

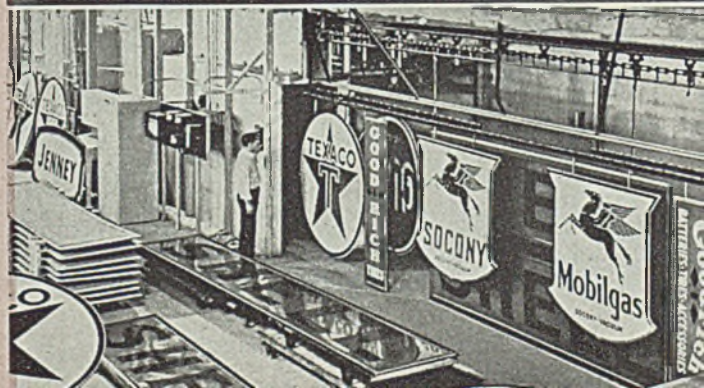
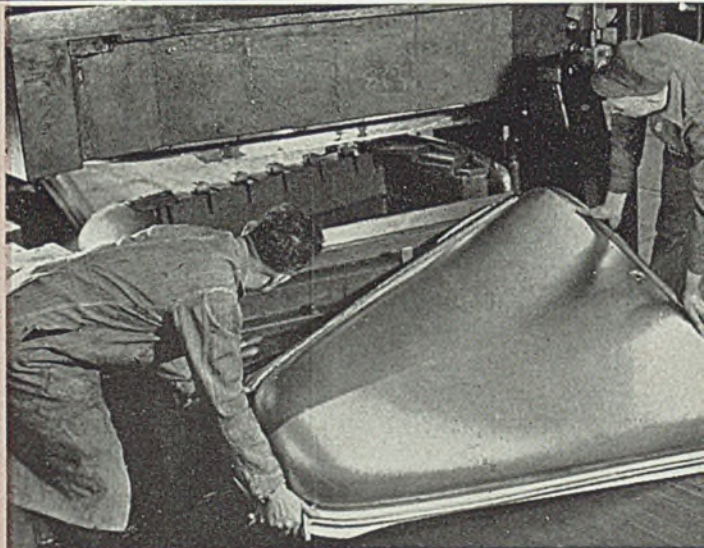
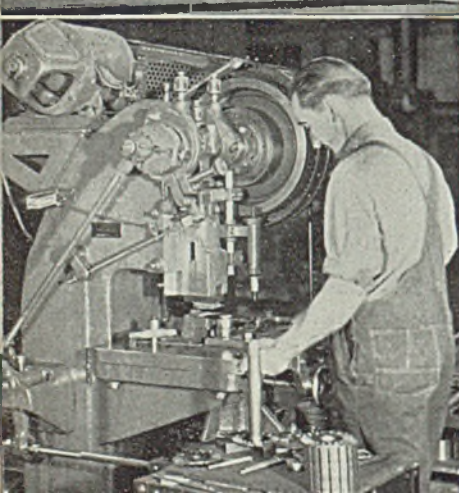
ROOFING AND SIDING sheets must withstand the attacks of variable weather and "smog"—water vapor mixed with industrial gases. That's why this coal company specified USS Copper Steel Sheets, which resist atmospheric corrosion at least twice as long as ordinary steel sheets.

(Left)

ELECTRICAL sheets for rotor and stator cores must be of good steel. That's why in this plant a workman is punching out luminations from USS Electrical Steel Sheets... sheets that are flat to give you rigid cores, punchable to reduce your die wear, uniform in gauge, with low core losses and high permeabilities.

(Right)

ENAMELING with the new opaque porcelain enamels is easier when you use USS VITRENAMEL. Enamellers find these specially prepared enameling sheets more ductile, truer to gauge, cleaner, flatter and adapted to their particular requirements.



TO IZZARD

in Steel Sheets

A TO IZZARD... or for the younger generation, A to Z... is another way of saying that you will find us the nation's headquarters for steel sheets — the sheets for your every practical need.

Here are three reasons why you will benefit by specifying USS Sheets for your product.

Variety. You can get any grade or kind which your product requires... and know that they will meet your specifications... sheets for difficult stamping or forming... sheets which are ductile and workable... sheets which resist corrosion. There is a USS Steel Sheet with the correct properties for each intended use.

Economy. You save in the high quality of the sheets, thanks to our modern equipment, our skilled production men, our metallurgical control through every step, our effi-

cient laboratories. You save also in your own operations, through the elimination of waste, through speedier, easier production... USS Sheets form easily and readily.

Service. Our technical staff, experienced in the problems of metal fabrication, is always ready to supplement your own experts... to render any practical assistance you may need in the selection of sheets and the improvement of sheet fabricating operations. Communicate with our nearest district sales office.

U·S·S STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

United States Steel Products Company, New York, *Export Distributors*



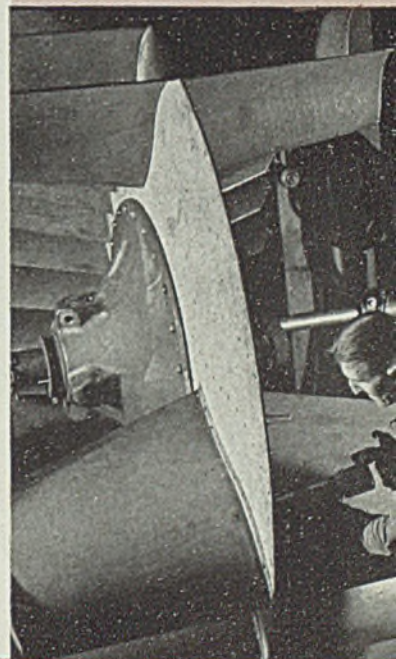
UNITED STATES STEEL

(Below)
FURNITURE made in the modern way is made of USS Furniture Sheets. Here a skilled workman is jig-welding the corners of a fine desk, fabricated of USS Furniture Sheets. The maker knows that these steel sheets form easily, have superior flatness, and are available in many grades suitable for painting and finishing.

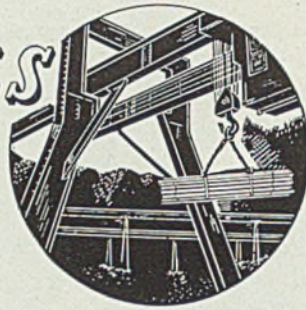


(Below)

AIR-CONDITIONING units are readily fabricated of USS Black Sheets, because these sheets have excellent forming qualities. Riveting the big blower shown below, the workman has an easier job because every USS Sheet is ductile and of uniform quality... For some ventilating equipment, specify USS Galvanized or USS COR-TEN, where you want steel sheets with additional corrosion resistance.



MATERIALS HANDLING



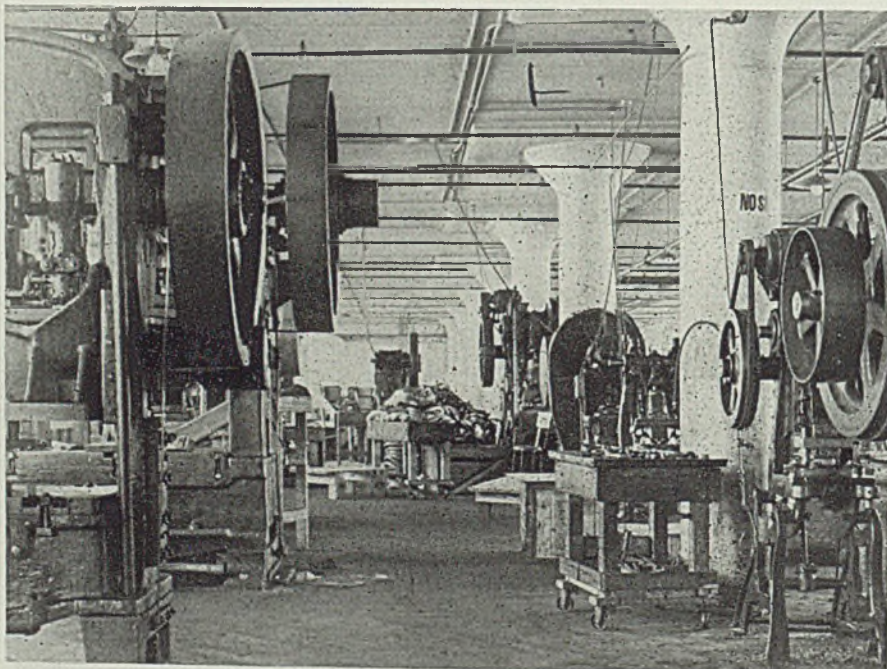
jacks are inspected carefully and then placed in skid boxes for shipment. This operation is performed manually and after a box has received its allotted complement of jacks, it is bound by two steel straps and moved to the shipping department by lift truck, as shown in Fig. 1.

Grilles Require Polishing

Like jacks, stainless steel grilles are produced largely by press operations. From the presses, however, the grilles go to a line of 18 polishing and buffing lathes, with one operator for each machine. From the buffing operation, the grilles are taken to a small press nearby, where a girl operator punches a series of holes, after which a final inspection of each grille is performed. The grilles are placed in a pile with a protective paper sheet between individual pieces.

Stainless steel windshield moldings are produced in a special rolling machine, and then are carried to the buffing and polishing station,

FIG. 4—Several varieties and sizes of presses are used throughout the plant. Production operations are facilitated by numerous portable work benches which can be moved about as needed



after which they are packed in lots of 100 to a crate, the latter being bound by two steel straps.

Although no cameras are being produced at the present time, the



operations involved are interesting. The cameras are made under the tradename, Photo-See, and are of a special type, which includes a developing equipment as part of the complete outfit so that a user may snap a picture and have the finished photograph in approximately 5 min-

utes. These cameras have a total of 125 parts. Blanks for the case are turned out automatically from coiled strip steel stock in a press to which is attached a force-feed device. Most of the smaller parts are produced on small presses, a dozen of which are utilized for this purpose when the camera department is operating at full capacity of 1500 a day. Some of the smaller presses are shown in Fig. 5.

After they have been formed in the presses, the case parts are carried on skid platforms to the starting end of a special painting line. Two girl operators, sitting on opposite side of a work bench, feed

FIG. 5—Many of the operations incidental to camera production are performed in a department equipped with small presses. Even in this department, corrugated steel box skids provide a convenient means for handling parts

the parts on a wire belt conveyor, which carries them through a paint booth where a male operator sprays the tops of the parts with lacquer. On the under side of the conveyor belt is a line of steam-heated coils which accomplish rapid drying. After the parts have been sprayed on top and dried in the manner described, they pass on to the end of the conveyor belt and are automatically dropped on the reverse side on a second conveyor belt similar to the first one. On this belt, they continue on through another spray booth where painting and drying of the underside takes place. One of the paint spray booths is shown at the left in Fig. 1.

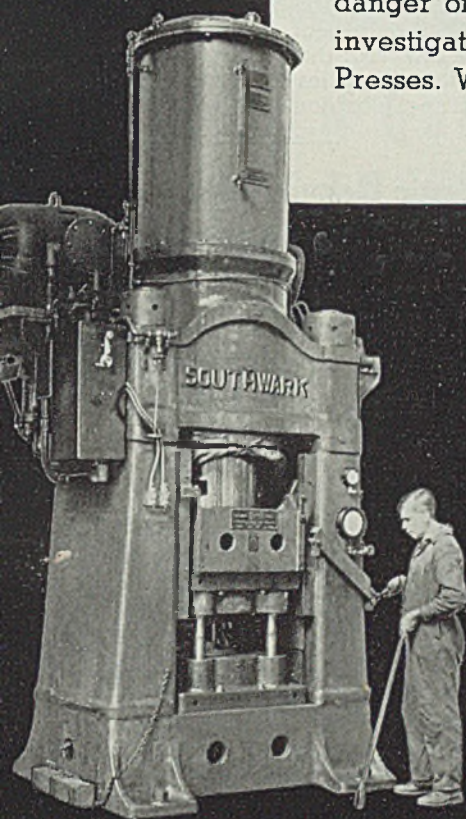
At the end of this second conveyor line, the parts are dropped into a skid box and carried to the assembly line which is a very simple arrangement, consisting of a long table, with a shorter one at the foot, the two forming a cross. Down the center of the smaller table is a small fabric belt conveyor. The

(Please turn to Page 73)

SOUTHWARK *HYSPEED* PRESSES

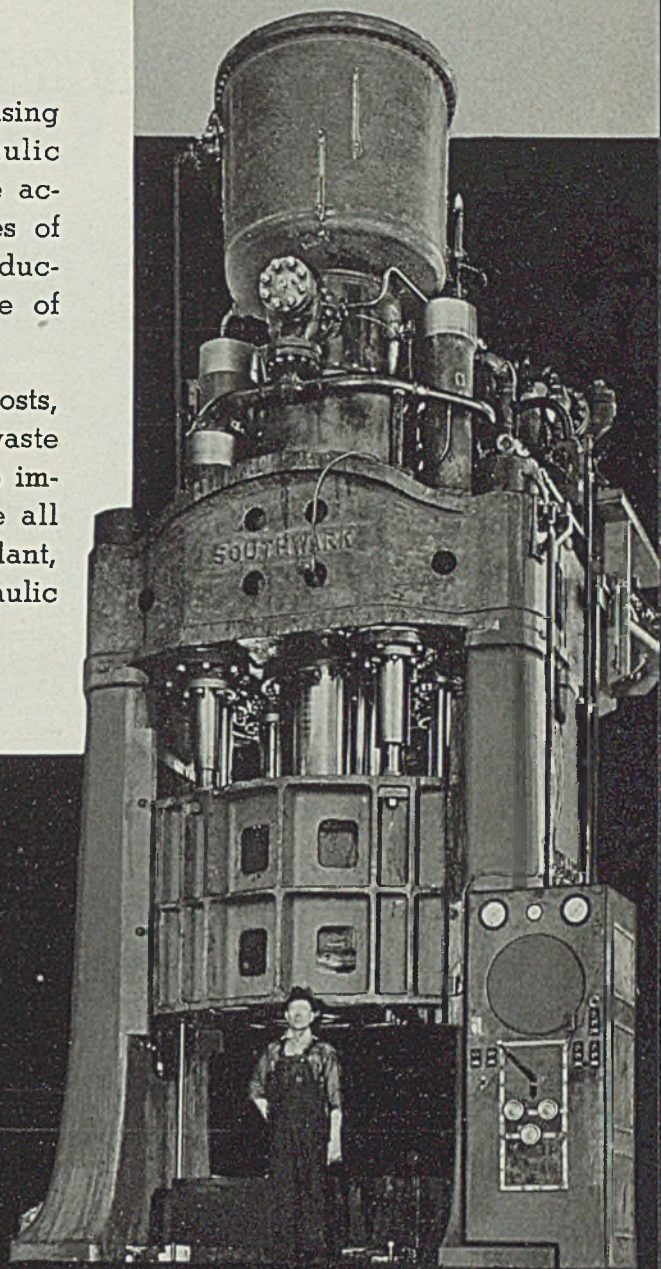
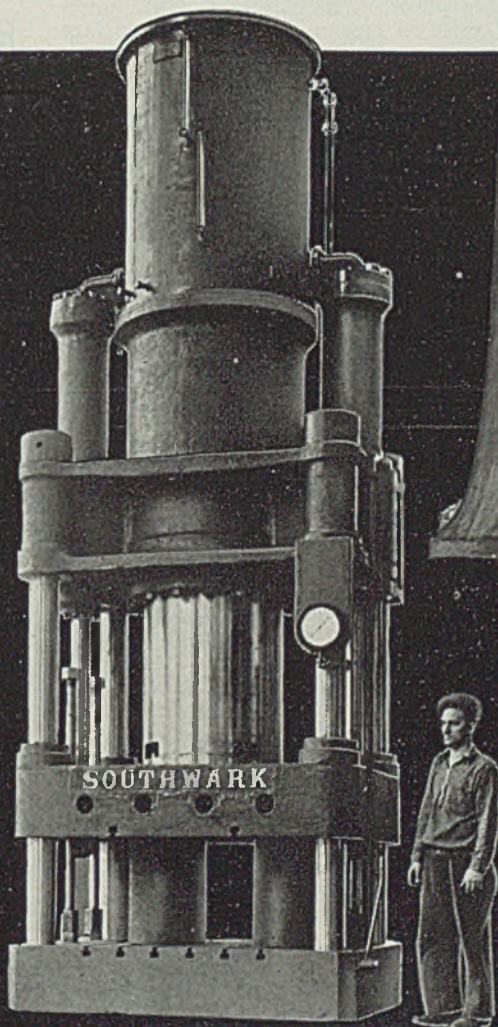
There are sound reasons for the increasing use of Southwark HYSPEED Hydraulic Presses. For they bring to industry the acknowledged advantages and economies of hydraulic operation, combined with production exceeding that of any other type of press—size for size.

For greater production, lower die costs, longer die life . . . to minimize rejects, waste of material and repressing costs . . . to improve product quality and eliminate all danger of machine breakage in your plant, investigate Southwark HYSPEED Hydraulic Presses. Write for bulletin No. 127.



Southwark HYSPEED 750-Ton Hydraulic Press engaged in production of parts at large automobile plant. The Automotive Industry uses Southwark HYSPEED Presses for forming parts ranging from small stampings to heavy chassis and body sections.

Southwark HYSPEED 750-Ton Drawing Press in use in plant of well-known Refractories manufacturer.



Southwark HYSPEED 1300-Ton Double Acting Hydraulic Press employed in forming aluminum tanks and other utensils.

BALDWIN-SOUTHWARK CORPORATION
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Pacific Coast Representative: THE PELTON WATER WHEEL CO., San Francisco



WELDING, ETC.

BY ROBERT E. KINKEAD

X-Rayed Bridge Welds

DEVELOPMENT of portable X-Ray equipment has led to its use in Germany for inspection of welds in bridges and buildings. While practically no actual welded construction of this class has been X-rayed in this country, it appears likely that this method of inspection will become more popular as more responsibility is placed on welding in important structures. Experience in the welded fabrication of boiler drums here has demonstrated that such inspection is extremely valuable in conjunction with other methods in making welded joints absolutely safe.

The first question that will start the controversy in this country will be about whether a perfect X-ray film of a weld proves conclusively that the weld is safe. The answer is that a perfect X-Ray film of the weld does not prove conclusively that the weld is safe. The film testifies merely to the presence or absence of discontinuities in the weld. Additional inspection is required to prove that the materials were right and that the proper technique was employed. Such inspection, together with X-ray inspection, will establish the safety of a weld beyond the possibility of uncertainty.

Absolute certainty is not necessary in many manufacturing operations involving welding. In the case of public interest in which thousands of people with no way of knowing for themselves whether their lives are placed in jeopardy by welding, the welding should not be relatively but absolutely safe.

Ships, large bridges, boilers and the like always involve public interest. Critical joints, the failure of which would result in death and large property loss, should be absolutely safe. The same principles apply not only to welding but also to riveting, use of steel castings and forgings.

Deflection in Structures

A GENERATION of structural designers has been mentally inhibited by a factor which may be stated roughly as the maximum per-

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.

missible deflection which may be tolerated in a building which is to have plastered walls. Structural steel handbook information is based on this factor. Few designers will permit themselves to veer from the mental groove established by these data. We would never have had an airplane, a streamlined train or a modern automobile but for the fact some designers did overcome the handicap.

Welded steel for homes faces this mental hazard. Left to structural steel designers, airplanes would have plastered cabins, twice as much steel in them, and they would never get off the ground. The idea that a room for human occupation has to be lined with mud mixed with horse hair persists.

Deflection is nature's answer to many design problems and she provides for it with beautiful precision. She builds of composite materials with the right kind of material in each element of volume of a structure. Engineers commit pitiful blunders when they try to learn the principles of design from books instead of from nature. No engineer ever did as fine a design job as nature did on his own right foot and that is a good place to begin to study the design of a structure to carry repeated application of a load. Deflection is the keynote of design in the human foot.

Co-operative Development

AN INCIDENT which occurred recently seems to show industry in a favorable light. Perhaps what industry needs is a Paul De-Kruif to interpret its struggle as the medical profession is interpreted.

A development and research program is far enough along on its way to give rise to "rumors". It is being carried on by the largest producer of steel. The rumors reached a large buyer of steel. The buyer called on

the telephone and informed the producer they were sending one of their best engineers to find out what was going on; that they wished to know whether the new development was a menace to them or whether it would mean a radical change in their business in the near future.

The buyer's engineer arrived and was given all the pertinent information as to the status of the development. Far from being a menace, it appeared to have possibilities for good effect and a cordial offer was made to co-operate in every way by the buyer's engineer. There was not the slightest element of fear of stealing the idea involved. Two large organizations were merely interested in seeing what could be done that would be beneficial to everyone concerned and the country at large.

American industry is the most co-operative in the world in research and development. No moral issues are involved; that is merely the best, quickest, and least expensive way of getting jobs done.

Plastic Deformation

THOSE who study welding and its physical behavior would do well to read A. V. deForest's paper, "Laws and Fundamentals of Plastic Deformation." Occasionally technical articles appear which deal with fundamental conceptions which are of great value to those who are trying to fit their knowledge together into a rational pattern. This is such an article.

The stress-strain characteristic of metal under load is the basis of engineering knowledge on which service behavior under stress is predicted. This characteristic is analogous to the speed-torque characteristic of an internal combustion engine or an electric motor. Under fixed conditions, everything happens according to inherent properties. Thus, weld metal has a stress-strain diagram for a given temperature and so long as everything is constant, its behavior may be predicted accurately from the stress-strain diagram. But, at some other temperature, it has a different stress-strain diagram and will behave differently.

The first sentence of Mr. deForest's paper leads to the heart of the matter: "It is somewhat more than a misnomer to speak of the laws of plastic deformation, when present day knowledge covers merely a collection of special cases."

Behavior of metal under plastic deformation is significant for the reason that the great margin of safety of welded structures under stress lies in the territory of plastic deformation.

In the "junior" field too—
LINCOLN leads by a mile

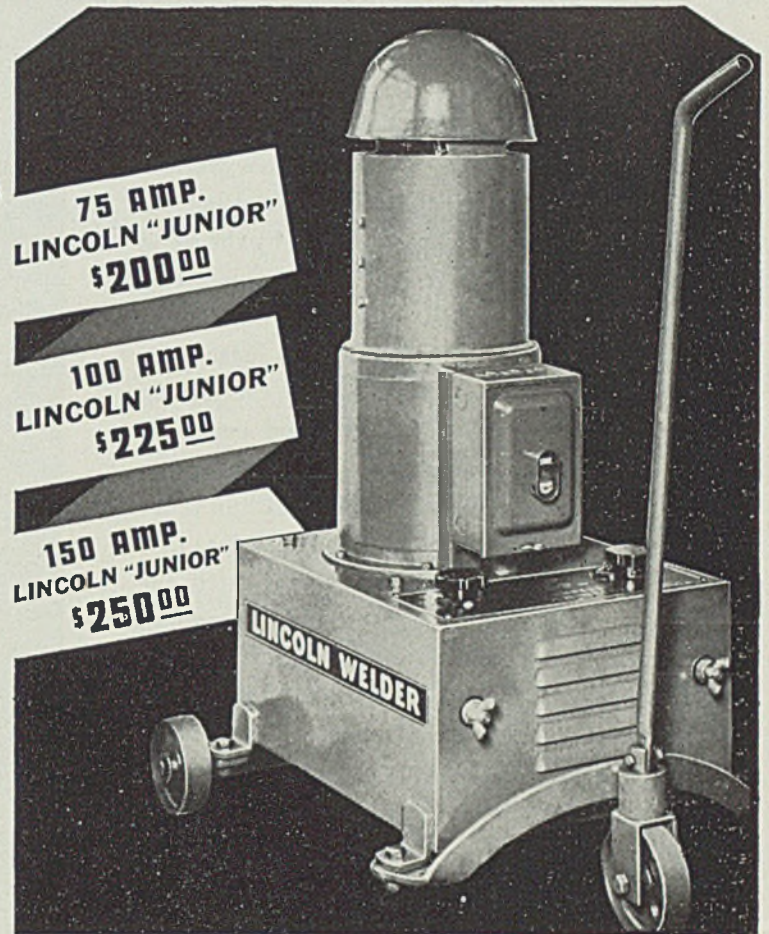
**HERE'S
 why**

**LINCOLN QUALITY
 AT THESE
 LOW PRICES!**

Think of it! A high grade Lincoln welder for as little as \$200.00! Is it any wonder that these "Junior" welders are in such demand? Shops that are starting to arc weld and shops that have been arc welding for years—welding users, small and large, by the hundreds—are hooking up these powerful little motor generator welders to the line and are discovering new short-cuts to profits.

These Lincoln "Juniors" embody the same high quality workmanship and materials as the larger Lincoln welders. ★ Vertical design makes them compact—they occupy a floor space less than 2 ft. square. ★ They have Dual Arc Control with Plus Zone Range. ★ Heavy duty motor has long-lived ball bearings. ★ Commutator and brush wear is minimum because peripheral speed is low.

The coupon will bring you all the facts about these four-star actors—the most popular welding performers in the low-price field.



75 AMP.
 LINCOLN "JUNIOR"
 \$200.00

100 AMP.
 LINCOLN "JUNIOR"
 \$225.00

150 AMP.
 LINCOLN "JUNIOR"
 \$250.00

TYPE	N. E. M. A. RATING	RANGE IN AMPS.	PRICE* (F. O. B. CLEVELAND, O., Freight allowed and prepaid)
SA-75	75 amps.	20-100	\$200.00
SA-100	100 amps.	30-125	\$225.00
SA-150	150 amps.	45-200	\$250.00

*Portable parts are \$8.00 additional.



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 TODAY!**

THE LINCOLN ELECTRIC COMPANY, Dept. Y-360, Cleveland, Ohio
 Send details concerning the SA-75 SA-100 SA-150 (check which).

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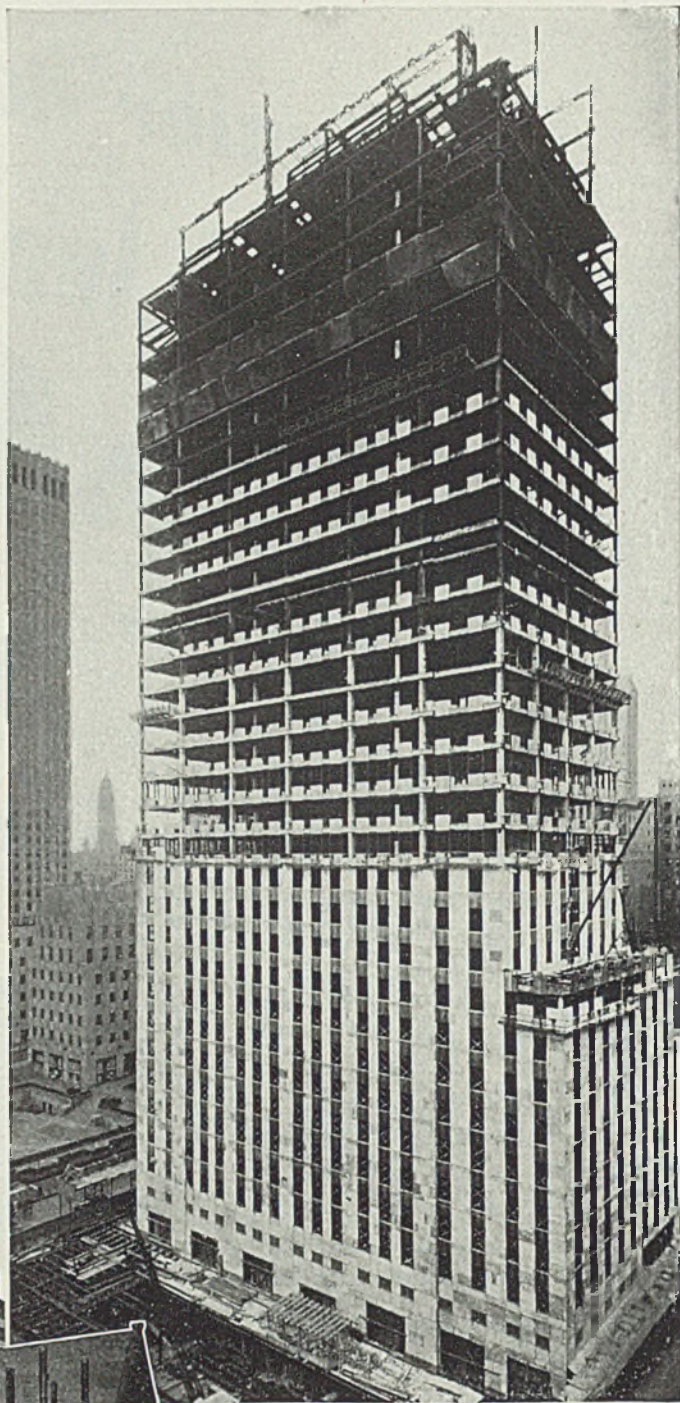
LINCOLN
 Largest Manufacturers of
 Arc Welding Equipment in the World

RECORD BROKEN

Again!

THE 36-story Building No. 5, the latest addition to Rockefeller Center, was erected in 43 working days, establishing a new world's record for skyscraper steel. This record betters the one made some two years ago by the same Steel Erectors, Post & McCord, Inc., in erecting the 41-story Italian Building, likewise a unit of the Rockefeller Group. To meet erection schedules as rigorous as this, fabricating resources — capacity, facilities and organization — must measure up to the exacting demands for ON TIME DELIVERIES in proper sequence and complete to the last detail.

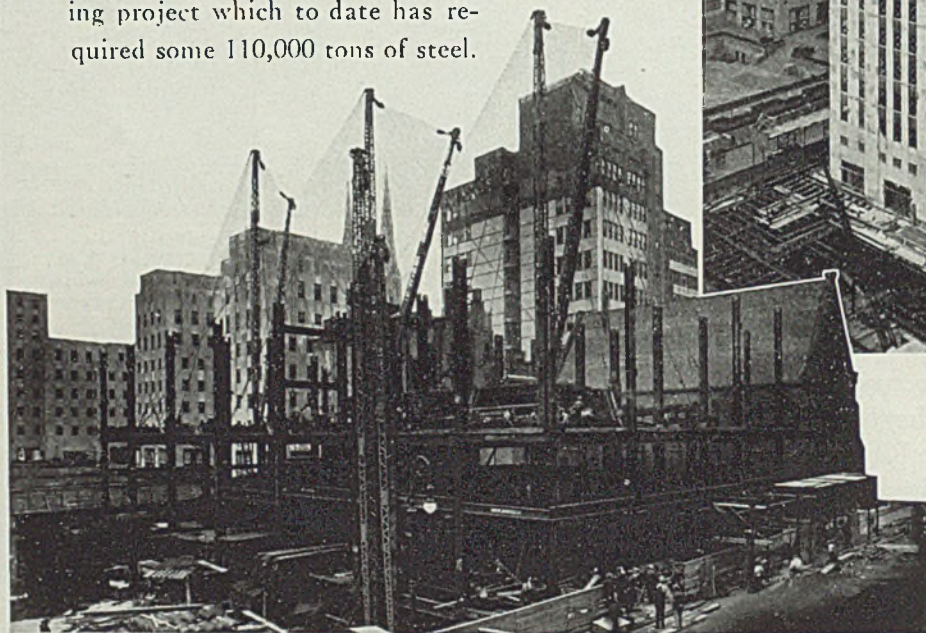
American Bridge Company fabricated the steelwork for both of these buildings, as well as that for the other 9 units which constitute Rockefeller Center — the world-famous building project which to date has required some 110,000 tons of steel.



ONE ERECTION RECORD overshadows another in this photograph. In the background stands the Italian Building of Rockefeller Center on which the previous record had been made.

FROM FOUNDATION STEEL to completion of the structure took only 43.2 days, or a rate of 208.3 tons per day for the total of 8400 tons.

Post & McCord, Inc., Steel Erectors.
Barr, Irons & Lane, Inc., General Contractors.



AMERICAN BRIDGE COMPANY

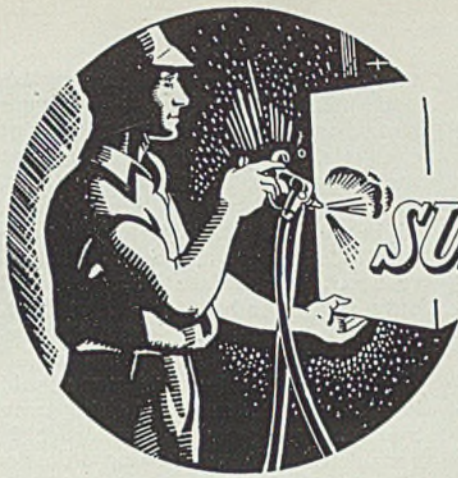
General Offices: Frick Building, Pittsburgh, Pa.

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UNITED STATES STEEL



SURFACE TREATMENT AND FINISHING OF METALS

Fundamentals of Spray Painting Equipment

BY A. W. CHRISTENSON
Manager, Detroit Branch
Binks Manufacturing Co., Chicago

AUTOMOBILE refinishers, paint jobbers, and small manufacturers are all at some time or other faced with the problem of selecting proper and suitable paint spraying equipment. If the original selection is made with care, it will invariably result in considerable savings during the life of such equipment through greater efficiency and service and because of higher quality performance.

Reviewing briefly the mechanics of spray finishing, the following fundamental machinery is found necessary to apply paint by means of a spray gun.

1. Spray gun.
2. Cup for paint reservoir.
3. Rubber air hose, with connections.
4. Oil and water extractor.
5. Air pressure regulator with dial gage.
6. Air compressor unit of sufficient capacity.

To this must be added safety and health protecting equipment such as exhaust fans, spray booth, suitable lighting, and other factors. The purpose now, however, is to deal with fundamentals, and the discussion will be limited to the six numbered items above.

Of first consequence is the matter of the proper spray gun, the importance of which cannot be overemphasized. While the spray gun itself depends on all of the five remaining items for its efficiency, it

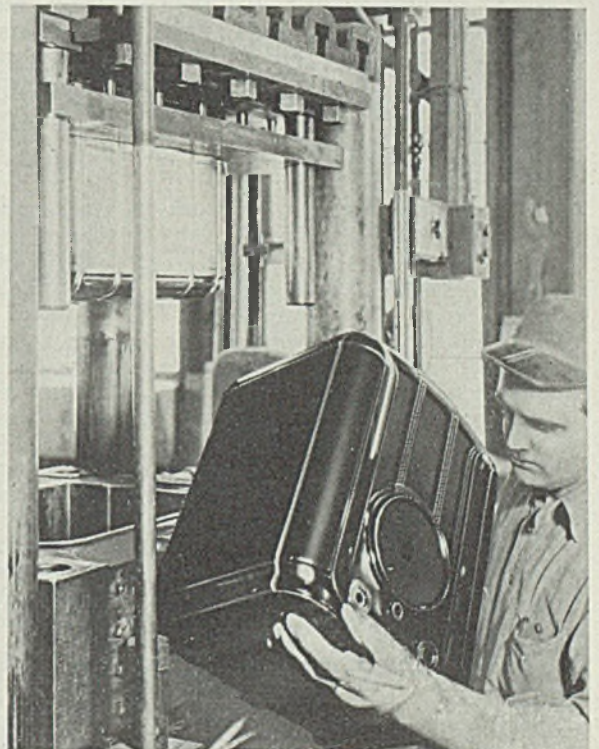
is, in the last analysis, the tool which actually does the painting, and upon which the application of a proper paint film depends. It must be borne in mind that equipment manufacturers have many distinct models of spray guns available, each for a different purpose and condition. Each model may

also require a different size air compressor for its operation. Full production types of spray guns will obviously require more air than the miniature type of spray gun designed to operate from a small portable compressor. Quality and quantity of work is the criterion by which the professional painter is judged and the finest and most suitable spray gun available is his first requirement.

The full production type of gun is intended for the paint shop whose business is production painting—no substitute will do as well. The miniature gun, on the other hand, is available for the individual who has need for it in his home workshop and will use it for his own amusement. It is true these small type spray guns have found their way into numerous shops, and even factories, but their use in such cases is confined to rough work where the

Large Molded Plastic

STEADILY increasing size of plastic moldings is typified by this radio receiver cabinet of molded Bakelite—18½ inches high, 13½ inches wide and 10¾ inches deep. The 10-pound housing is molded in a 500-ton press by Associated Attleboro Manufacturers Inc., Attleboro, Mass. The cabinet is produced in a single operation, no finishing being required other than removal of fins where the mold parts meet



requirements of speed and quality of film are not of first importance. It is even true that certain skilled spray operators (given sufficient time and material) could produce fairly acceptable work with guns of low comparative efficiency, but it would not be fair, in these days of keen competition, to impose such a handicap on a paint shop in which any interest is held.

These two examples point out the two extremes possible in spray gun usage, but between these two types are found several models designed to fit the requirements of individuals or shops which do not fall into either of the extreme classifications. These include automobile sales and service stations, used car departments, fleet owners, garages, jobbers and small manufacturers.

Upon closer investigation it is found that the high production syphon type gun requires approximately nine cubic feet per minute of free air delivery for continuous and perfect operation. Graduating downward in efficiency, the guns next in line require approximately 7, 6, 4½, 3, 3½, and 1¾ cubic feet per minute.

Air Capacity is Vital

It now becomes apparent that, having made a careful selection of the most suitable spray gun, an even more careful selection of the air compressor must be made as the continuous and uniform operation of the gun depends on sufficient volume of air at a given pressure at all times. How often this reasoning has been reversed would be impossible to say, but only too often the inexperienced painter is apt to purchase a compressor first and then give consideration to the spray gun. If the compressor happens to have sufficient capacity, no damage is done, but in most cases the trend is to a smaller size and its owner finds himself attempting to adapt a gun or nozzle to the air capacity rather than to the quality of workmanship he originally sought.

In connection with this fact there exists a confusing idea among many painters as to the relationship of *volume* of air to *pressure* of air. Frequent mistakes have been made in selection of the air compressor because attention has been focused on the pressure the compressor was capable of producing instead of the more important factor—the volume of air the compressor piston displaces per minute. Volume of air displaced by the compressor is determined by multiplying the area of the piston face by the length of stroke by the number of revolutions of the compressor. This volume of air must, of course, be stored at a given pressure.

If a spray gun having a nozzle

which permits nine cubic feet of free air to escape per minute is used in connection with a compressor whose free air capacity is only six cubic feet per minute, a situation is soon reached where the gun has used the compressed air in storage and is "starving" for lack of sufficient air under pressure. The gun must then be closed off until the compressor has built up a new reserve, but the process would surely be repeated and no effective results could be expected.

Pressure for automobile refinishing purposes usually ranges from 80 pounds down. High speed factory production sometimes requires air pressures as high as 100 pounds but this does not apply to average conditions. It does, however, lead to the subject of preparing the air for use in the spray gun.

Pressure Must Be Variable

Assured of a uniform and uninterrupted supply of air, the next consideration is the conditioning of this air so that it best serves its purpose. Of first importance is the matter of air pressure regulation. Item No. 5 in the list of equipment, the air pressure regulator with dial gage, is recommended because by its use air may be served to the gun at any desired pressure. Such pressure usually varies with different types and makes of paint, lacquer or enamel. Lacquer usually requires less air pressure for proper atomization than synthetic enamel, but no fixed rule can apply as each manufacturer may vary the characteristics of his product so as to necessitate a change of air pressure with each change of paint. For instance, most spray equipment manufacturers suggest an average atomizing pressure on production syphon spray guns for refinishing work of 50 to 60 pounds. On the other hand there are synthetic enamels on the market which the manufacturers recommend be sprayed at approximately 20 pounds. To meet this wide variety of requirements, a spray operator must have a regulating device of some kind in the air line.

In a case where an air pressure range from 40 to 60 pounds, for example, would do equally well, it is always preferable to use the lowest figure. The reason for this is to avoid "exploding" the paint more than necessary. The main function of the nozzle is to mix air with paint in the correct proportions. Compressed air, when released, has a natural tendency to expand and the higher the pressure, the greater the expansion. Should a higher pressure be used than really necessary, there is a decided tendency to "blast" out of the paint solution the very essential ingredients so neces-

sary to proper flow and leveling action. These essential ingredients have been introduced by the paint chemists, who definitely plan on their presence in the applied film to insure the results they foresee. If, because of too high an air pressure, such important chemicals never reach the surface being sprayed only rough and sandy, or at best, eggshell instead of gloss finish results.

The oil and water extractor should be given consideration in the same manner any form of insurance is considered. In purchasing this device it should be remembered that dirt, dust, rust, scale, water and oil are among the worst enemies of a good paint job. The very nature of air makes it necessary to provide means for extracting moisture, because all air contains it. Because it is detrimental to lacquer and enamel films, this moisture must be extracted before it can mix with the paint. Oil is an even greater hazard to fine work and the utmost precautions should be employed to prevent its passing from the compressor to the spray gun. The use of a good oil and water extractor will save many difficult and costly hours of repair work caused by foreign matter reaching the nozzle of the gun.

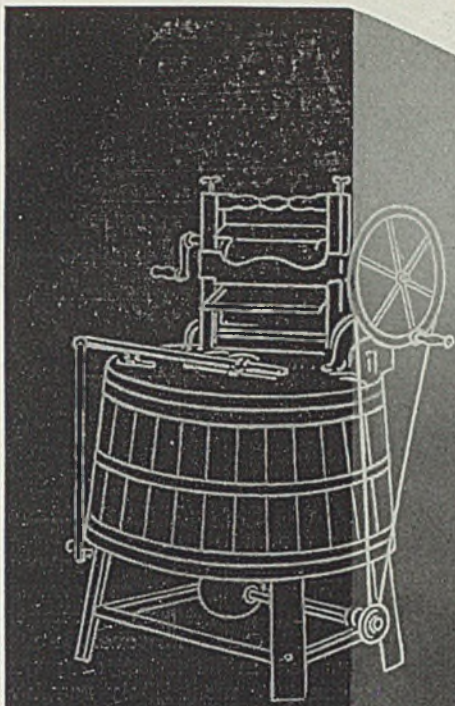
In short, air is the "prime mover" which predominates the entire paint shop. By means of air the paint is atomized to exactly the right mixture. By means of air the shape of the fan of sprayed paint is formed. By means of air a thin and controlled film of paint is correctly applied. By means of air in sufficient quantity, thoroughly cleaned, thoroughly dried and with suitable pressure, workmanship is obtained which will prove the wisdom of careful planning and selection of equipment.

Baked Flexible Finish

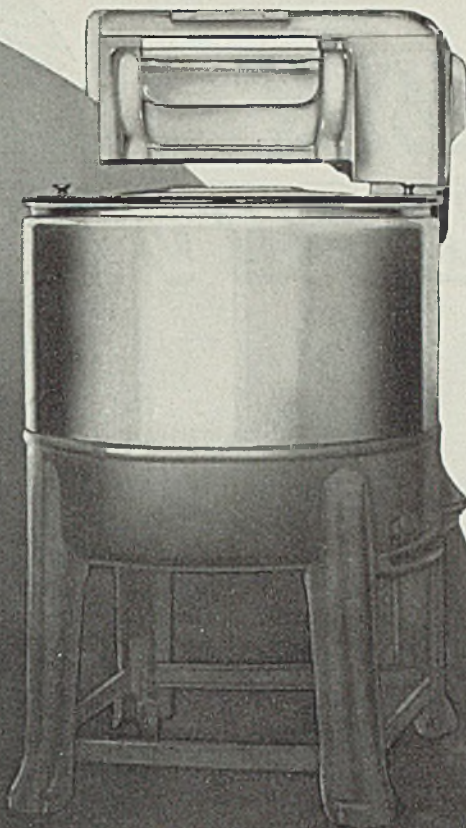
A new flexible finish for high-grade metal products subjected to extremely hard usage, such as golf sticks and fishing rods, has been developed by Maas & Waldstein, Newark, N. J.

In gloss and wearing qualities, the new finish, which is known as "Duflex", is said to resemble the finish produced by extruding or cementing celluloid upon a metal base, according to the manufacturer.

In finishing a product, such as the metal shaft for a golf club, with this material, the product is first covered with a primer coat of synthetic enamel, which air-dries rapidly and does not require baking before graining. The grain is then applied in the usual manner, and both coats are baked. After baking, the product is given five dip coats of clear lacquer.



The **WASHER** goes modern with



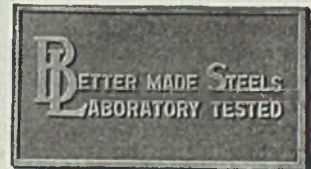
← WRINGER ROLL SHAFTS

← WRINGER ROLL DRIVE
SHAFTS
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COUPLING
CLUTCH
PARTS

← AGITATOR DRIVE
SHAFTS
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★ **COLD FINISHED STEEL**
built into vital working parts of
washer and wringer adds years
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★ **STEEL**



The evolution of the washer . . . from the wooden type, hand-operated machine of grand-mother's time to the motor-driven, streamline model that daughter demands today . . . is a story of *steel* and its application to the problems of washer construction.

First came improved appearance with streamline effects, and the encasing of all moving parts for safety in operation . . . then easier control and motor drive . . . and increased endurance by the use of *cold finished steel* and heat treatment in vital working parts of the washer and wringer mechanisms.

American manufacturers are to be congratulated on their success in producing the safest, fastest, quietest and sturdiest washing machines in the world . . . and within purchase reach of every family.

B & L engineers are proud to have shared in this achievement . . . by the development of special steels which have added to the serviceability of the equipment . . . and subtracted from its production cost.

B & L Cold Drawn Steels are found in the leading makes of modern washers . . . reducing mechanical troubles . . . increasing wear life . . . eliminating service complaints . . . and introducing economies in manufacture.

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POWER DRIVES



Economy of Group Drives Is Dependent On Number and Type of Machines Used

AFTER deciding whether to group or drive individually, the next problem is to establish size of groups. This should not be done by any fixed rule as to number but rather according to definite principles. Automatic screw machines, except in the larger sizes and certain types usually make ideal group drives because of the fluctuating cycle of load and power demand.

In planning of grouping one Chicago concern engaged in contract production work laid out groups which could be operated by one man or, in the larger machines, by one man and a helper. Thus, by carefully scheduling the work to definite groups some groups were kept fully loaded, even during the depression, while others remained idle. This economy was only possible by restricting the size of the groups and having several groups instead of laying out all from a single drive. In planning the number of machines per man the policy was to underload rather than overload because much of the work is on extremely close tolerances.

Subdivision Permits Economies

In a Bridgeport, N. Y., plant 187 automatic screw machines are divided into groups of 5 to 10 machines each according to size and driven by a 5- or 7½-horsepower motor. This method of subdivision permits important operating economies since all groups of machines are not operating at all times. The first cost of the installation was considerably lower than if individually driven. Additional savings are made in power cost and decreased maintenance.

In the efficient operation of groups much depends upon the care with which work is scheduled to the different groups. Usually the best

plan is to schedule long runs to definite groups, if possible, so as to keep them loaded all the time and short runs to other groups so if the work ends the entire group is not held up and kept in operation by a long run.

♦ ♦ ♦

Interruption Insurance

STOCKS of spare parts and equipment may be considered as breakdown insurance. The amount and type of such protection to be carried depends upon type of equipment used in the plant, severity of service, availability of outside sources for replacement parts and necessity of uninterrupted operation.

Isolated plants, or those located some distance from distribution centers where replacement parts and supplies are available, naturally must carry larger and more complete stocks. Similarly, where a breakdown would seriously interfere with production or in process operations where stoppage would entail loss of product, necessary parts or even spare equipment are essential to prevent losses. This is necessary even where replacement parts are available from the distributor but obtaining them would require an hour or more even by special messenger.

Many plants adopt a policy of immediate replacement by spare equipment in case of a failure, except in case of fuse failure or other minor and obvious causes of interruptions. This policy is adopted because of the possibility of working on equipment and finding that the trouble is more extensive than is assumed at first and then having

to replace in the end, thus perhaps doubling the time out.

Replacement parts and spares, therefore, are the only safe insurance against long interruptions to production. Care, however, must be exercised in selection of parts and spares for most likely requirements and in the storage, handling and re-ordering so that they will be usable and on hand when required. Carelessly stored and handled parts and supplies are more than doubly expensive in that new parts must be purchased and the expected time saving insurance is not available when needed.

♦ ♦ ♦

Plants sometimes find staggering starting is advisable, especially on Monday or cold mornings. With too many motors thrown on the line at the same time the excess power requirement may reach dangerously near the peak generating on incoming power supply capacity. This may be the case where a plant is operating at practically full-load capacity of circuits and power supply.

♦ ♦ ♦

Insulation on cables and feeder circuits deteriorates with age. This damage is accelerated if the conduit is mounted near a steam line or other heat source. Under extreme circumstances such deterioration may result in a short circuit or fire.

In many cases difficulty with a drive has been traced to improper feeding of the work or the tool. Usually this also results in poor quality or rejected work. The remedy lies in better supervision by the foreman.

♦ ♦ ♦

After a study of friction losses by graphic meters ball-bearing thrust bearings replaced plain thrust bearings on a group of machines at a cost of \$450. As a result, the saving in power alone amounted to \$1665 per year or a 270 per cent profit on the investment.

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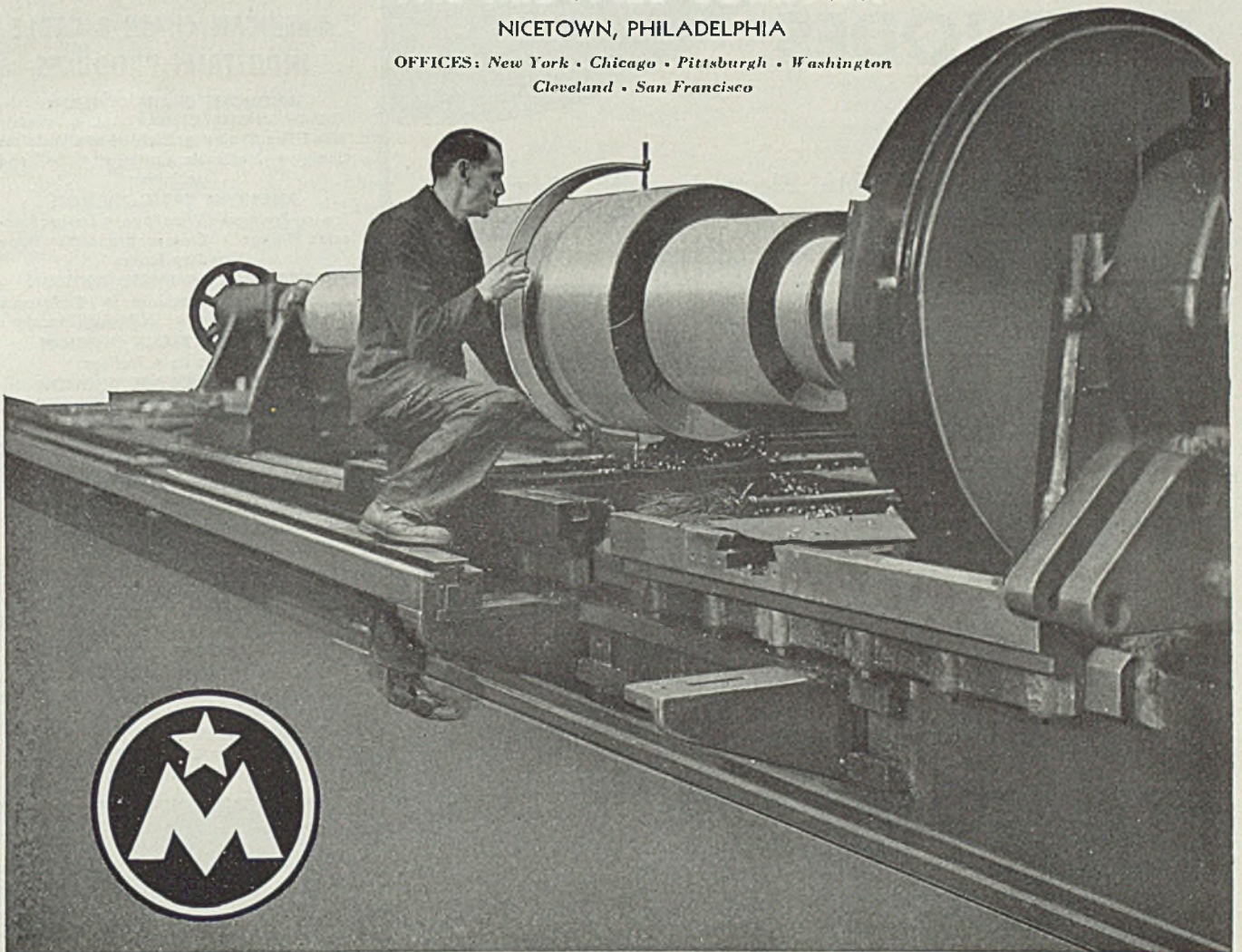
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AMERICAN CHAIN & CABLE COMPANY, Inc.
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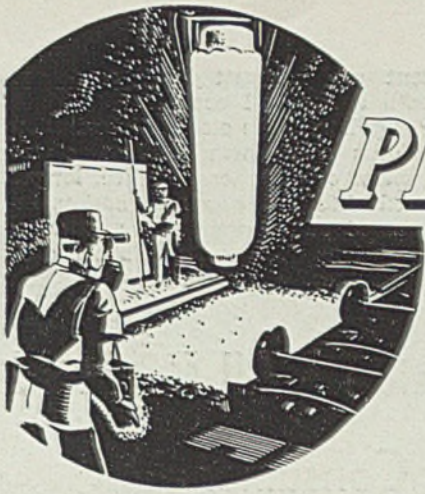
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PAGE *Welding* **WIRE**

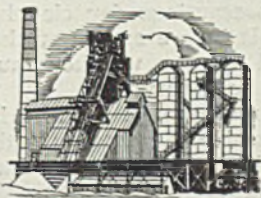


PROGRESS IN STEELMAKING

Blast Furnace Operators Display Interest in Rehabilitation

RECENTLY blast furnace capacity has loomed as one of the bottlenecks in the steel industry. Within the past year 14 furnaces have been rehabilitated and rebuilt and contracts for two entirely new furnaces, at Indiana Harbor, Ind., and Detroit, have been placed.

These activities are only of an introductory character inasmuch as a cursory scrutiny reveals that at least 34 blast furnaces in the steel industry will have to be rehabilitated extensively in the near future. This number will be increased considerably if it is decided that certain furnaces, now in emergency operation after they long had been regarded as obsolete and ready for dis-



mantling, should be continued as productive units.

The foregoing figures do not include a number of merchant furnaces which are due for early rebuilding.

Nothing definite yet can be said about plans for constructing additional entirely new blast furnaces in the steel industry. Several such units are under contemplation as a result of shortage of pig iron at certain plants. It is possible that action may be taken in the near future in some of these cases.

In rebuilding careful attention is being given to possibilities for

increasing capacity. One furnace about to be rebuilt has a hearth diameter of 29½ feet. It was found that, without moving the columns, the diameter can be increased to 22 feet, with the rest of the furnace in proportion. The job is to be carried out along these lines with the result that capacity of the furnace will be increased from 700 to around 800 tons of pig iron per day.

Work Is Sublet

An interesting feature of current reconstruction is the tendency of steel companies to turn the work over to outside organizations specializing in this class of work. The contractors bring in their men and equipment and vanish when the work has been done. Thus no names are added to steel company payrolls and the job usually is done with a lot more speed than if it were handled by organizations already heavily burdened with operating responsibilities.

The new and rebuilt furnaces reflect many improvements which result from engineering progress during the depression years. In designing new skip hoists speed and acceleration are considered as of utmost importance. These objectives are accomplished by using the variable-voltage system of operations and having a motor generator set for each skip. The system is about the same as used in operating elevators in modern skyscrapers. Acceleration is smooth and easy. The skip is moved close to the dumping position at high speed, is slowed up and again started and returned at high speed to the loading position. The drive employed permits smooth acceleration, without strains, from

zero to 600 feet a minute in four seconds.

All new blast furnace plants under construction will be equipped with highly efficient stoves and the necessary fine gas cleaning. On rebuilding jobs small checkers and fine gas cleaning prevail. Many plant operators actively are studying the possibilities in making more extensive use of blast furnace gas as a steel plant fuel.

Considerable thought is being given the problem of distribution of material in the furnace as a result of adoption of larger stock line diameters and bells. Questions along this line are responsible to some extent for holding hearth diameters below the limits favored by some operators.

An interesting development in blast furnace construction and reconstruction is the use of welding. Six stove shells of welded design are being installed in the Pittsburgh district. Their performance will be watched with interest. Use of welded construction for air and gas lines



around the iron and steel plant, of course, is becoming widespread and represents nothing new.

Another striking tendency is the increasing adoption of electrically-operated mud guns capable of stopping the furnace under full blast pressure. Also, a radical departure in pig machine design, which recently has proven highly satisfactory, is bound to influence the practice in rebuilding pig machines in the future.

Of interest from a general blast furnace point of view, because of its value in increasing pig iron pro-

duction through increasing the iron content in the furnace burden, is the sintering process. Because the steel industry has many problems at this time there is a tendency to go slow in building new sintering machines. Latest plant of this kind to be completed, that of Republic Steel Corp. at Thomas, Ala., again has demonstrated the benefits from sintering. It has brought about an increase in the iron content of the furnace burden from 32.30 to nearly 36 per cent, with resulting increased pig iron output and economies in fuel consumption. It is of interest to note that a new 1400-ton per day sintering plant now is projected in the Pittsburgh district.

Ideas as to sintering seem not to have been thoroughly clarified as yet. In some quarters the belief is strongly held that all ore eventually will be sintered in order to save the cost of transporting moisture in ore. Proponents of this conception think the best location for sintering plants is to be found at lower lake ports, with the result that only sinter would be shipped to Pittsburgh district and other inland furnaces. Economies would include not only increased production of pig iron without increasing the capacity of present production equipment and lower coke consumption per ton of iron, but important savings in rail freight charges in view of the elimination of the moisture content from the ore. Upper lake locations for sintering plants are not favored because they would necessitate a considerable increase in fuel shipments from lower lake ports and this extra-cost, it is felt, would more than counterbalance the present cost of carrying moisture to the lower lake ports.

The plan, as stated, calls for sintering of all ore, rather than just the fines, and is based on experience that has demonstrated the advantage of using at least a large proportion of sintered material in blast furnace burdens. This plan, of course, would entail adequate crushing facilities.

Kettle Heated Electrically

Economic and technical problems involved in galvanizing were solved by a company by designing a kettle especially suited to its production requirements and to electric heating with wired radio control to avoid the power system peak. Control of the bath temperature is effected through a potentiometer recorder and controller connected to a pyrometer in the zinc and one in the heater space between the brickwork and kettle. The former pyrometer maintains the bath temperature within 5 degrees and the latter unit

prevents overheating. The installation is said to be the first to use off-peak control actuated by the increase and decrease of the substation load. Operating on 46 kilowatts the kettle will handle between 650 and 700 pounds of work an hour per day's run. Based on an operation of four months an off-peak rate of 1

cent per kilowatt hour compares with a bare oil cost of 6.67 cents per gallon. The electric installation affords a uniform product, closer control of bath temperature, longer kettle life, less dross formation, increased output and better working conditions on account of absence of gas fumes.

Symposium on Corrosion Will Be Held For Benefit of Metal Consumers

METALLURGISTS have long been "corrosion-conscious" and this state of mind is extending to metal users in general, according to the national bureau of standards.

Methods for determining the corrosion of metals vary greatly and uniformity in testing of this kind is greatly to be desired, it was stated. With this thought in mind, the American Society for Testing Materials, through its corrosion committees, arranged for a discussion of the subject at its spring meeting.

Atmospheric corrosion testing is of vital concern to the manufacturers of paints, lacquers, and coating materials in general, as well as to metal users, particularly users of sheet metal. The trend toward the use of metals by architects for decorative structural purposes, as well as the increased use of metal in trains, automobiles and aircraft, have served to emphasize the importance of atmospheric corrosion testing.

As the basis of a paper for the A. S. T. M. corrosion symposium, the various methods of carrying out tests of this kind were critically reviewed by H. S. Rawdon, chief of the bureau's metallurgical division. Some of the outstanding points as presented in Mr. Rawdon's paper are as follows:

Laboratory tests are usually carried out for a specific purpose. Their indications with respect to the serviceability of any material should be confirmed by field tests; the latter, however, are not to be regarded as identical with service.

The results of atmospheric field exposure tests should always be correlated with the prevailing atmospheric conditions at the test location. It is not uncommon to find that conclusions based on results at one location are wholly inapplicable at other places. The prevailing atmospheric conditions at any test site, particularly the degree of pollution of the air, should be known with considerable certainty. Some cognizance should also be taken of the

season at which outdoor field tests are started.

A relatively large surface area with respect to the mass of the specimen is always advantageous for atmospheric corrosion tests. When the progress of corrosion is to be followed by change-of-weight determination a large area to weight ratio is required. This practically limits such tests to sheet or similar material.

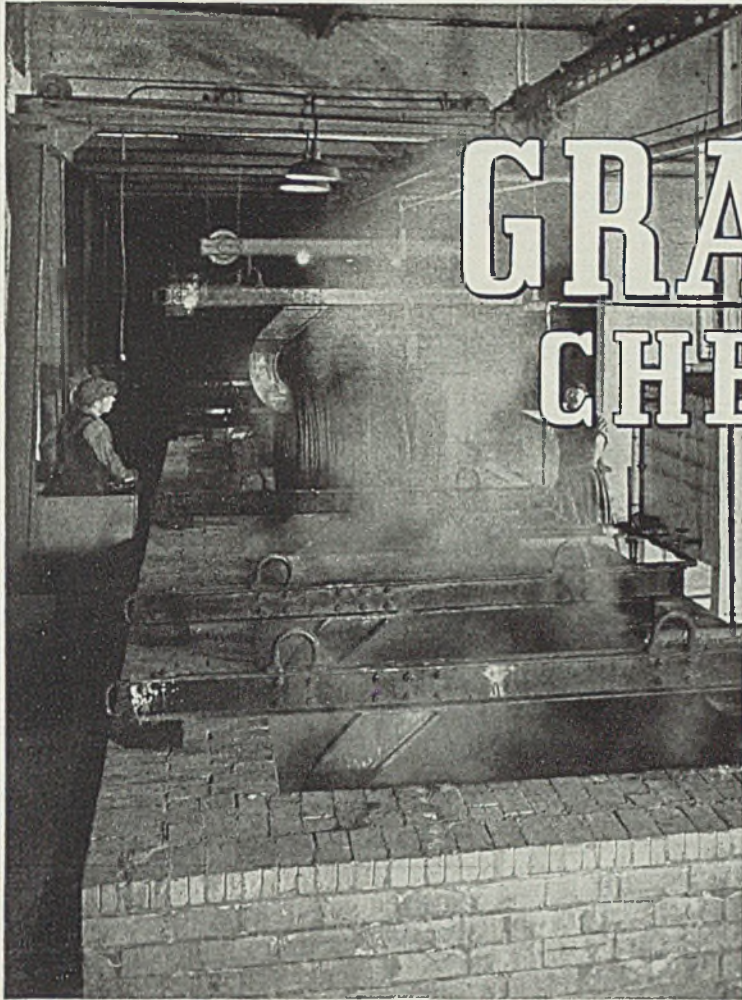
For field exposure tests, the specimens should be supported on rigid permanent supports in such a manner that no specimen is influenced through contact, rain drip, or otherwise by another specimen, or by the supports used. The necessary supporting points should be restricted to contact with inert nonmetallic materials. Exposure toward the south at an angle of 30 to 45 degrees with the horizontal is a favored method for sheets. A distinction should be made between the results obtained on the lower surfaces and those on the upper surfaces.

Most tests of this kind are carried out by determining the change of weight of the specimen occurring during exposure to the weather. The usual precautions for cleaning the materials before and after they are exposed to the weather must, of course, be observed.

In some cases it is most helpful to determine the change in the mechanical properties of the materials resulting from corrosion.

Announces New Spark Plug

To be known as the AC Blue Top, a new line of spark plugs has recently been announced by the AC Spark Plug division, General Motors Corp., Flint, Mich. The new plug is a high quality product retailing at a premium price. The improvements of the entire AC line have been embodied in this new series, according to company engineers, and refinements have been made to enable the makers to limit the line to 27 types, as against 82 types in the previous line.



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"More Effective Machine Tools"

EDITORS' NOTE: The following comment has been received from Clayton R. Burt, president of the Pratt & Whitney Division, Niles-Bement-Pond Co., Hartford, Conn., and embodies his reaction to the article published in the March 8 issue of STEEL by George T. Trundle Jr., titled, "What Price New Equipment?" Mr. Burt is also president of the National Machine Tool Builders association.

MR. TRUNDLE'S article entitled "What Price New Equipment" develops the idea that works managers and superintendents are in many cases recklessly urging the purchase of new equipment without basing their requests on studied data, and without taking into account such elementary considerations as (1) the probable volume of work available for the new machine; (2) cost of frequent set-ups on runs of comparatively short duration; and (3) the even greater possibilities of earnings which lie in better management, the employment of operators of greater skill, and better working conditions. It is his belief that "thousands of dollars are spent in this country every year in purchases of new equipment not justified by actual facts."

This brings to mind the story of the mother who was trying to persuade her son to eat his spinach. "It's good for you, Bobby, and I know lots and lots of boys who are glad to eat their spinach," she explained, to which her son retorted tersely, "Name six."

With literally hundreds of salesmen in the field constantly urging upon the superintendents of industrial plants a factual study of what new machinery can do for them, it is misleading, to say the least, to convey the impression many superintendents are going off half-cocked, and that many executives are cheerfully appropriating thousands of dollars on the mere ground the superintendent is willing to bet there will be a saving.

Although we have heard of no actual instance of this kind, it may happen. We doubt whether it would happen a second time in any well-run plant. Occasionally a man bites a dog—occasionally. But a plea to the Society for the Prevention of Cruelty to Animals to put an end to such brutality would probably elicit more skepticism than sympathy.

It is a commonplace for superintendents to make a careful study of the factors entering into the purchase of new machinery. Practically every plant manager can cite places in his shop

where he can prove the advisability of making a replacement. We need more studies of this kind, because we know every intelligent survey of obsolescence shows the same thing: That industry is losing millions of dollars annually because obsolete machines still are in constant use.

The problem is how to find the money for such replacements in the face of the federal tax on undistributed earnings, and the need for building up corporation reserves sadly depleted by the depression. Having solved that, we find ourselves facing another problem: How is the machine tool industry going to meet this tremendous demand, how can it with its present capacity, facing a shortage of skilled men, replace the accumulated obsolescence of a dozen years or more?

It is true that in such a study the number of pieces to be produced is an important factor. The superintendent bases his estimate on what the sales department thinks it can sell, and what volume actually has been handled in the past year or so. He cannot make infallible statements regarding the future. There may be occasional instances in which a change in design or in the market changes the picture after the machine is bought (under present conditions this unusual) and if we can find no other work in the plant on which the new machine can be profitably employed the situation is extremely unusual. But in such case we cannot condemn the superintendent. After all, no machine tool manufacturer is as yet able to offer the trade a good, reliable crystal globe. If we base predictions of the future on a careful study of the past and present, that is all that the stockholder can reasonably expect.

Frequent Set-Ups Raise Cost

The cost of frequent set-ups in cases of short runs is a familiar factor in such studies, and in our experience almost invariably is another consideration pointing to the need of buying the new machine, because the set-up time is almost invariably less on the new machine, and the quantity to be made is not reduced by such a purchase.

Undoubtedly great possibilities of profit lie in other directions. It would help if we could have more skilled operators, as Mr. Trundle points out, but it is not necessary to abandon the program of replacement while this other problem is being attacked. And if the superintendent finds such men scarce and slow to develop, does it not become apparent new machines, better built, not worn, with simpler features of operation, with automatic lubrication, and a greater range of speed, will increase production even in the hands of imperfect operators?

We face a period of inflation—it is more than a possibility, it is a fact. If industry is to raise wages and shorten hours without raising prices to the consumer it must do it by increasing output per man-hour, and that means better equipment. It is clear every company should have a well-defined program of continual replacement based on careful studies, and rare indeed is the superin-

tendent who does not know on the basis of cold facts and painful experience just where his worst leaks are to be found.

Consideration of this problem is not complete without mention of occasional instances where an old machine, properly maintained, is still as productive as a new machine would be on the particular jobs for which it is employed. Furthermore, we all have "stand-by" machines which are available for occasional jobs for which they are well suited, and which run only a fraction of the time. We doubt whether any machine tool salesman could persuade a superintendent to throw them out, while in every shop we still have old, inefficient and inaccurate machines in the production line.

Better working conditions do pay profits, but it may be doubted whether the typical American industrial plant can earn as large a profit by expenditures in this direction as it can by giving management new and more effective machine tools.

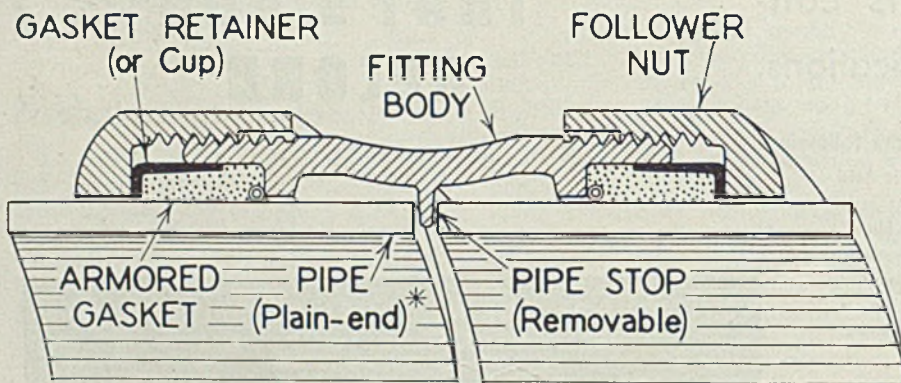
New Pipe Fitting Uses No Threads

"Time out" for cutting pipe to exact lengths, threading, grooving, flaring, or screwing up joints in cramped quarters, are no longer necessary, with development of a new line of fittings by S. R. Dresser Mfg. Co., 802 Fisher avenue, Bradford, Pa. With the standard line of style 65 fittings just announced, nothing but an ordinary wrench is needed to complete a joint in a few moments. Special tools and equipment are not required and accurate measurements are unnecessary.

After inserting the plain-end pipe into the fitting (which comes completely assembled), it is only necessary to tighten two threaded octagonal follower nuts with a few turns of the wrench. As this is done, resilient "armored" gaskets at each end of the fitting are compressed tightly around the pipe, forming a positive seal. The resulting joint, is claimed to be permanently tight and to absorb normal vibration, expansion and contraction movement, as well as permitting deflections of the pipe in the joint. If the pipe is already threaded, it can be joined in the same way, as the threads do not interfere with the new-type coupling.

The complete line of fittings includes: Standard and extra-long couplings, ells (both 45 and 90 degrees) and tees, all supplied in standard steel pipe sizes from 1/2 to 2 inches inside diameter, inclusive, black or galvanized according to the needs of the buyer.

The fittings are recommended by the manufacturer for simplifying joint-making and repair work on both inside and outside piping, for oil, gas, water, air, or other industrial lines. The basic principle is essentially the same as that used in other styles of the Dresser coupling, as shown in the accompanying diagram.



* Threaded or beveled pipe can also be used.

Cross section of pipe joint made with special type of fitting which requires no threading of the pipe

Clean, even deposit

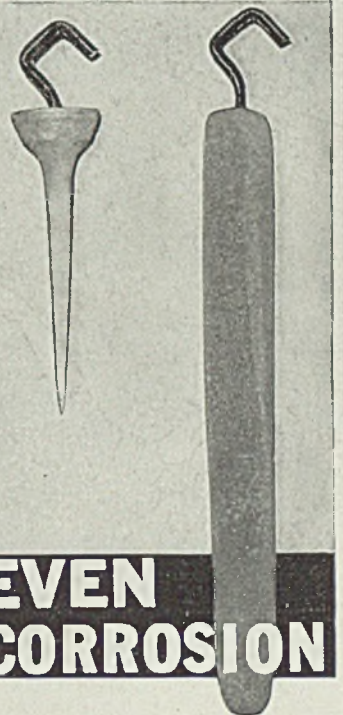
THE REASON



PYROMETRIC CONTROL



THE PROOF



EVEN CORROSION

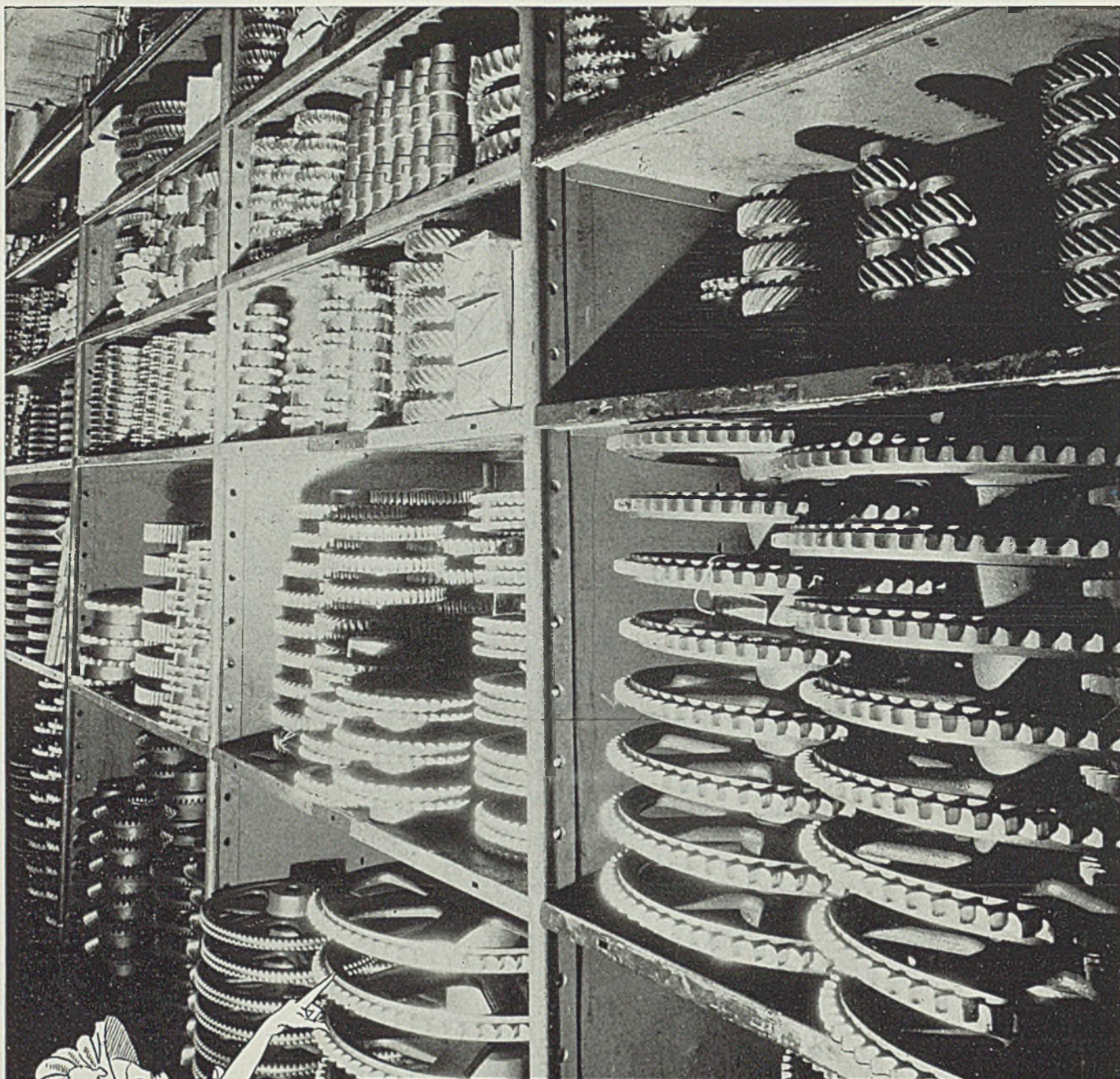
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BOSTON

Special Methods Bring Speed With Safety in Motorcycle Production

BY FRED B. JACOBS

IN ANY manufacturing plant where intensive production is carried on, interesting special tooling methods will be found. At the plant of the Indian Motorcycle Co., Springfield, Mass., specialized tooling has been developed to a high degree.

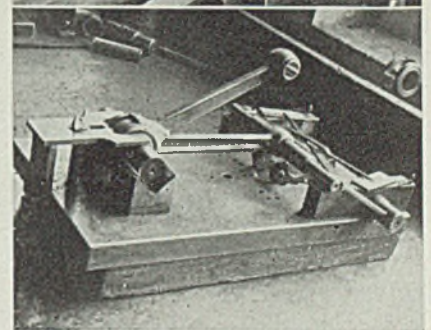
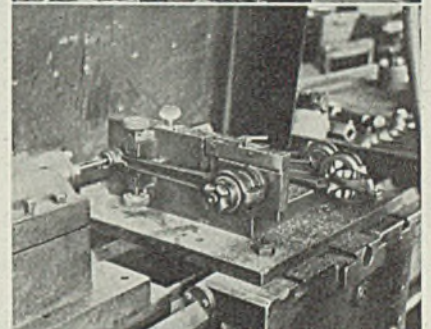
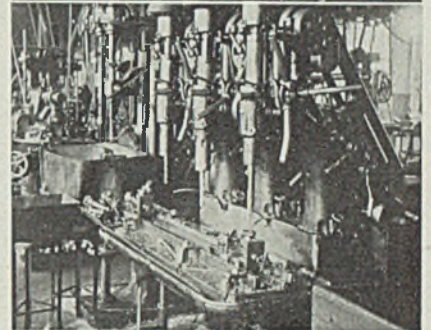
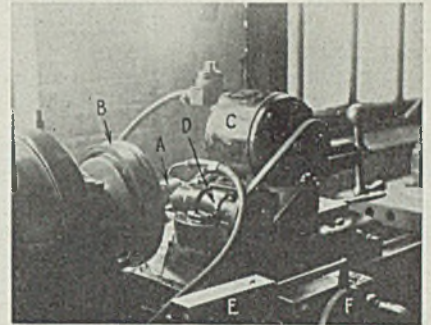
In Fig. 1 is shown a practical device for safeguarding two milling cutters on a Pratt & Whitney hand miller to which an extra spindle has been added. The milling operation consists of cutting into two parts a semisteel brake drum 7 inches in

diameter and 1½ inches wide. The work is securely clamped in place on an angle iron fixture. While the operator is unloading and loading the fixture, the cutters are guarded by the substantial guard *A*. As the operator feeds the work toward the cutters the member *B* comes in contact with the lever *C* and thus swings the guard outward and away from the cutters. After the milling operation is completed and the work moved away from the cutters, the guard automatically resumes its position over the cutters.

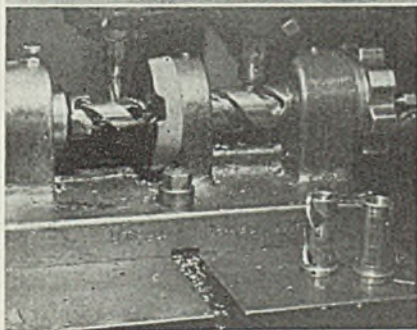
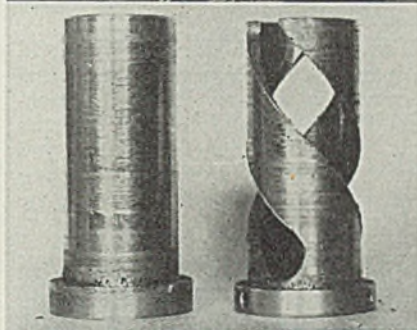
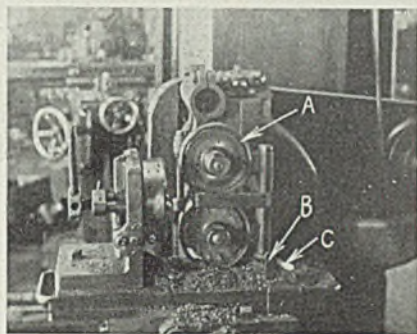
Make Special Cam

The part shown in Fig. 2 is a cam for a motorcycle handle control. The body section is 1¾ inches long and ¾-inch in diameter. The double spiral is ⅜-inch wide with a lead of one turn in 3½ inches. Fig. 2 shows the part before and after cutting the spiral. This work is done on a Pratt & Whitney profiling machine as shown in Fig. 3. A special fixture is provided with a leader at the right which engages the former pin. At the left the work is located in position so it turns with the fixture arbor. As the operator moves the machine head sidewise the former pin turns the work arbor and the lead on the leader is duplicated by the milling cutter on the work. The part shown in Fig. 2 has a left hand lead. Another leader is used for generating right hand leads.

An ingenious fixture for cutting a steel reverse gear barrel cam 1¾ inches in diameter and 5 inches long is shown in Fig. 4. The fixture is used on an engine lathe and was designed and built at the Indian plant. Barrel cam is shown at *A* being held between centers, while *B* is the leader which runs over a roll not shown in the illustration. The back and forth movement of the leader duplicates the desired shape to the cam path. The motor *C* drives the cutter spindle *D* and the cutter is fed in a slight amount at the completion of each cam revolution, by means of the automatic



TOP to bottom—Fig. 4—Special fixture for use in cutting cams. Fig. 5—Method employed for continuous operation of a multiple spindle drill. Fig. 6—Boring a piston pin bushing hole. Fig. 7—Unit designed for testing rod alignment



TOP to bottom—Fig. 1—Safeguard for milling cutters. Fig. 2—Cam for hand control. Fig. 3—Profiling machine showing use of special fixture

feeding device *E* which actuates the ratchet wheel *F*.

Continuous operation of the 3-spindle drill shown in Fig. 5, which is used for finishing the piston pin bushing hole in connecting rods, is accomplished by simple means. Two jigs are provided which slide along rails located on the drill platen. The loading station is at the left and while the operator is loading one jig, work in process of drilling is in the other jig. As soon as the operation is complete at the right, the jig is taken off the rail and the loaded one at the left slid along to the working position. Thus the operation is continuous and the operator loses no time in the loading and unloading operations.

Connecting rods for Indian motorcycles are fitted with bronze piston pin bushings. The bushing seats in a ground hole and after it is forced in place, using a special locating fixture in a punch press, the bushing is diamond bored as illustrated in

Fig. 6. The rod is accurately located from the hole in the large end which is slipped over a hardened and ground locating stud. The small end locates between two screw actuated jaws as the illustration shows. The fixture is located directly on an engine lathe bed. The diamond tool has a single point and it revolves at a speed of 1200 revolutions per minute, while the carriage is fed forward with the fine feed necessary in such operations.

In Fig. 7 is shown the type of fixture used for testing rod alignment. The rod in position is the double type used on twin cylinder V-motors. The large end is slipped over an aligning bar and held down on two V-blocks with a clamp, while another aligning bar is passed through the hole in the small end of the rod. Indicator points are brought in contact with the aligning bar and thus actuate the indicator hands, both of which rest at zero if the alignment is correct.

direction of travel while moving through the furnace and when being ejected. It also provides a constant heating period for each successive piece.

In Fig. 1 is shown a view of the heating furnace at the exit end. When the stock drops from the furnace conveyor a moving arm automatically centers it in position for forming. A bulldozer shapes the leaf, at the same time notching it on one edge. This notch is provided in order to hold a binding strip in place after the spring leaves have been assembled. In some spring leaves a center bolt hole is punched instead of the notch.

After forming, the leaves drop into an oil quenching bath. Temperature of the oil is kept constant by circulating through a cooler. Temperature of the cooling water is regulated automatically by varying the rate of flow, hot water being drawn off and used for office purposes.

In the oil bath the leaves travel on a conveyor which carries them to the tempering furnace after quenching. Conveyor of the latter is timed to operate at the same speed as the bath conveyor, thereby providing an even flow of material. Production is about 18 pieces per minute.

Forming and quenching equipment employed in processing larger springs is demonstrated in Fig. 2. In former practice the edges of the leaves received the first contact with the quenching oil. By the time the entire piece was submerged distortion had occurred, due to the uneven application of the coolant. This necessitated a subsequent strengthening operation.

The present equipment is designed to introduce the leaves end first and eliminate distortion during quenching. The heating furnace of this unit is similar to the one employed for the smaller springs. A piece ready for forming is removed by

Quality of Leaf Springs Is Improved And Output Speeded by New Methods

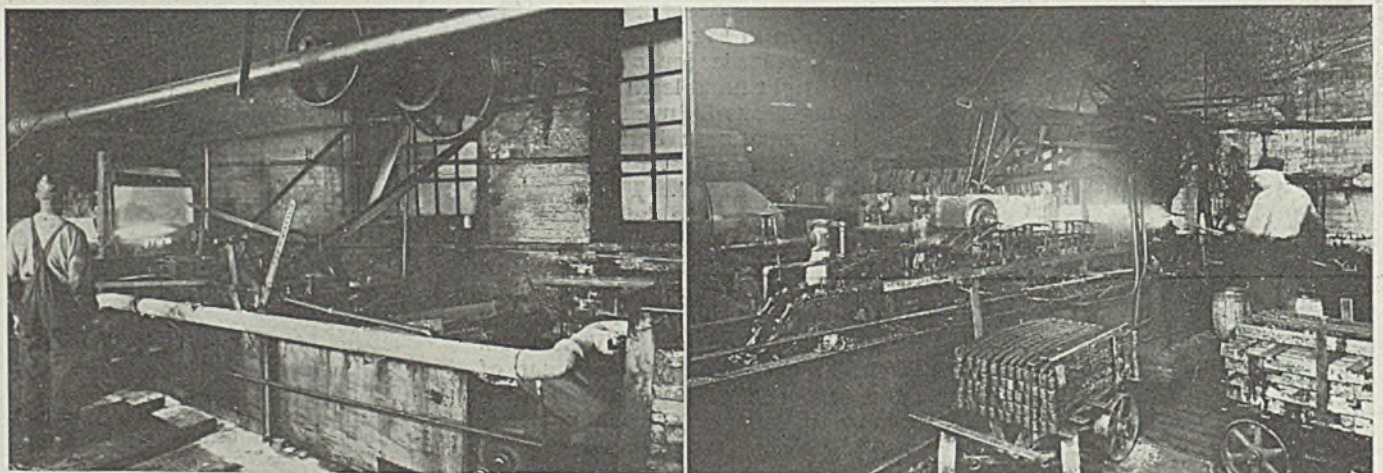
FEATURES designed to improve both quality of product and speed of output are incorporated in equipment developed recently by the Tuthill Spring Co., Chicago, for the forming and quenching of leaf springs.

This company manufactures leaf springs for various types of service and in sizes ranging from 1 to 500 pounds. It specializes in automotive leaf springs in sizes ranging from those suitable for midget cars to 10-ton trucks.

In processing small springs, such as those employed for washing machine wringers, the equipment is

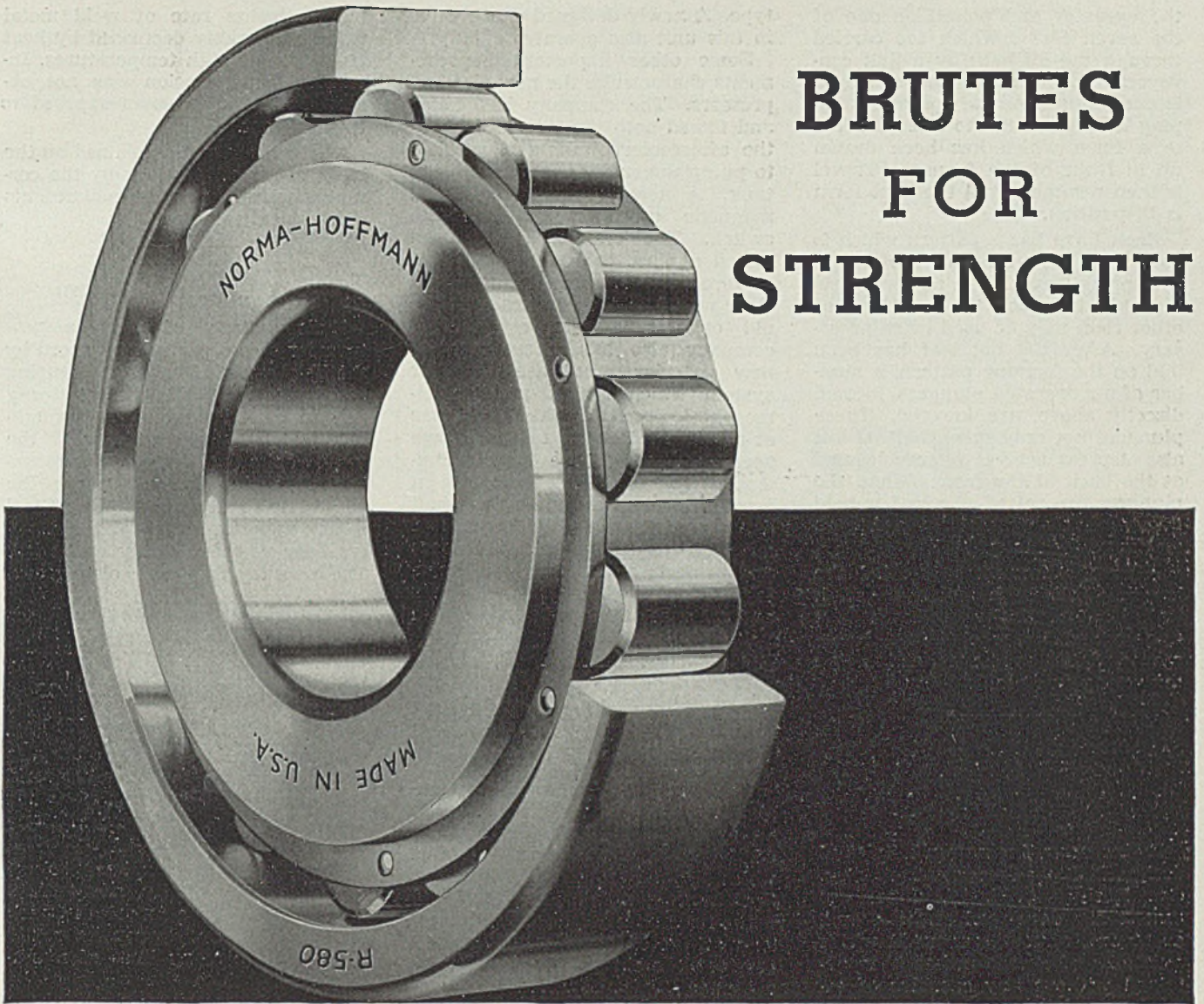
laid out so that the leaves move continuously in a straight line through the heating furnace, forming machine, quenching tank and tempering furnace. Furnaces are fired by a Vapofier which introduces fuel oil into the combustion chambers in a gaseous state, giving close temperature control.

The heating furnace is the walking beam type. The usual walking beam mechanism has been changed, however, so that the travel of the carrying parts follows the path of a square rather than that of a circle. This assures that the leaves will remain at right angle to the



When stock leaves heating furnace shown at left it is formed into spring leaves and then dropped into an oil quenching bath, operations being largely automatic. Forging and quenching equipment used for larger springs is shown at right

BRUTES FOR STRENGTH



THE outstanding performance records made by NORMA-HOFFMANN PRECISION ROLLER BEARINGS under the heaviest and most exacting duties, are the logical result of the following distinctive factors:

Full line contact of rolling surfaces, affording a larger radial load capacity for continuous and intermittent service than any other type of single-row bearing, and providing a temporary overload capacity 50% above normal catalog rating, with greater resistance to shock and vibration.

Highly durable, completely machined and balanced bronze retainer riding on inner ring shoulders and minimizing internal load.

Lower frictional coefficient under heavy loads than any other single-row anti-friction bearing—due to extreme precision and design characteristics.

Test these PRECISION ROLLER BEARINGS in your own hardest service; remember that they have all the high speed qualities of the best ball bearings, and are interchangeable, size for size, with all single-row metric ball bearings.

Write for the catalog. Let our engineers work with you.

"NORMA-HOFFMANN"

PRECISION BALL, ROLLER and THRUST BEARINGS

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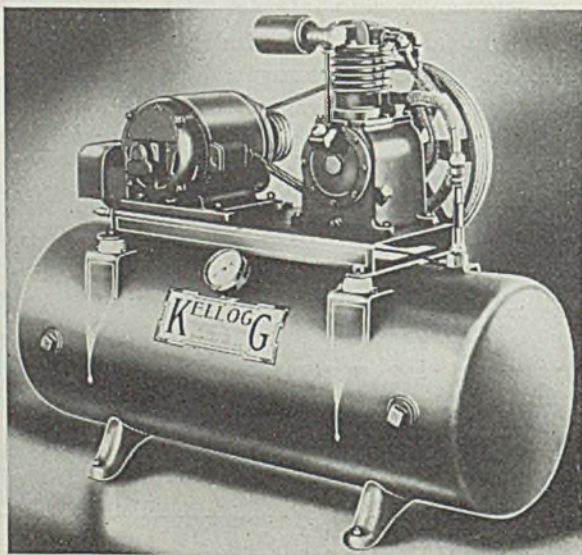
the operator and placed on one of the seven forms which are carried through the oil bath by a link conveyor. Movement of the conveyor is not continuous, the operator stopping it long enough to affix the leaf to a form which has been drawn up in front of the furnace. Travel is then resumed until the next form is in position.

Each form has a pattern which is curved in the contour desired in the spring leaves. The pattern is removable in order that sections of other radii may be used when necessary. After the hot leaf has been laid on the forming pattern, a number of air operated plungers, located directly above, are lowered. These plungers not only form the leaf but also depress several fingers located at the back of the form. When the plungers are raised, the leaf is held firmly on the form by the fingers and is ready for quenching.

After the form has traveled the length of the bath and emerged, a latch automatically releases the fingers and the cooled leaf is removed, later to be taken to the tempering furnace.

Air Compressor Operates Quietly But Efficiently

By incorporating new principles of design, Kellogg Compressor & Mfg. Co., Rochester, N. Y., announces that it has developed an improved, cushioned, air compressor in which quietness of operation has been obtained without any sacrifice of efficiency. All moving parts are mounted on a platform attached to the compressor tank on rubber mounts. By a rearrangement of the head valve system the company was able to obtain a quiet head valve with removable seats that are just as efficient as the former noisier



type. A newly designed check valve in this unit also operates quietly.

Some other important improvements characterize the new air compressors. The company has coiled and finned both the intercooler and the aftercooler, making it possible to pump unusually cool air into the tank. A new part is a combined magnetic unloader and pressure switch. The crankcase has been sealed against the corrosive action of foreign substances which found their way into the crankcase in the old open type compressor. The company also has incorporated a new exterior crankcase breather system which makes possible atmospheric pressure in the crankcase at all times. Former features have been retained. These include controlled splash lubrication with a large oil reservoir, multiple V-belt drive, welded steel construction and a compressor cabinet which encloses and protects all moving parts, permits forced draft circulation of air and enhances the appearance of the unit.

Show Results of Corrosion Tests on Stainless Steel

Recently published by the national bureau of standards as research paper RP963 is the result of a series of laboratory corrosion tests of welded low carbon stainless steel. Specimens containing less than 0.06 carbon were exposed to the corrosion attack of three solutions, and results were obtained as follows: In a copper sulphate-sulphuric acid solution, no intergranular corrosion occurred, regardless of heat treatment; in boiling nitric acid, corrosion occurred only in certain heat treated plates, not in any weld metal; in concentrated hydrochloric acid, corrosion rate of plate metal was not affected by heat treatment,

but corrosion rate of weld metal was considerably decreased by heat treatment at high temperatures. Intergranular corrosion was not observed in any specimen exposed to this reagent.

These results are explained on the basis of selective attack by the corrosive agents on certain constituents of the steel samples.

Transfer Case Is of Steel

Built entirely of steel, a new transfer case recently announced by the Yawman & Erbe Manufacturing Co., Rochester, N. Y., is extra strong due to electrical welding throughout, and a heavy steel bar at the front of the door which permits unlimited backing and removes the possibility of sagging drawers. Steel rollers make operation of the drawers easy whether empty or loaded. The cases are finished in olive green.

Making Resistance Welds With Separate Electrodes

(Concluded from Page 38)

welding sheet stock to various types of tubular or structural framework. It is also stated that welding coated steel, such as galvanized sheets and terne plate, is entirely practical.

Because the welder has the advantages of flexibility, adaptability and portability, the American Coach & Body Co., anticipates its ready acceptance in many lines of manufacture in which the welds to be made are inaccessible to stationary spot welders or present-day gun welders. Among the products for which it holds promise are automobile and truck bodies, refrigerators, steel furniture and cabinets, air conditioning equipment, light-weight railway trains and street cars, steel houses, stoves and ranges, washing machines, vending machines, radios, steel boats, ships, toys, and the like.

To meet the needs of these various applications, the equipment is manufactured for 220, 440 or 550 volts alternating current as specified by the customer. The requirement is 300 amperes at 220 volts, or its equivalent in other voltages. All control circuits should be 110 volts to assure safety for operators. Any water supply having the equivalent of city water pressure will handle cooling adequately.

Weight of the welder fully equipped for installation is 700 pounds. Dimensions of the transformer and regulator housing are 12 inches wide, 18 inches long and 33 inches high. With the contactor or timer mounted on the transformer, these dimensions are increased to 18 x 36 x 36 inches.

Through several new design features this air compressor was designed to operate quietly but without any sacrifice in efficiency



Wirebound Skid Boxes Aid Auto Accessory Handling

(Concluded from Page 52)

girl operators assemble the various parts, passing them along by hand through various steps of assembly until they reach the foot of the table, at which point the units are placed on the conveyor belt and carried past the inspectors. After inspection, the cameras are packed in paperboard cartons and then in corrugated fiberboard shipping containers. The latter are carried to the stockroom or to shipping department on skid platforms on lift-truck.

Jacks are shipped in quantities of 300 to a skid, the special wirebound box skids shown in Fig. 1 being used for this purpose. Twenty of these skids, containing a total of 6000 jacks, are shipped in a single freight car. They are unit-bound in the freight car, this system saving time in the stowing operation and also reducing the cost of shipment as compared with the use of ordinary wood dunnage.

Automobile grilles are shipped in quantities of 2500 units to a skid, and, as in the case of jacks, the skid-loads are well protected both on the skid and in the freight car. Moldings are packed 100 to a crate, the latter being steel strapped.

It is stated that not a single wooden leg has been broken in transit since the new skid shipping system was placed in operation several months ago.

Controller Is Safeguard To Industrial Trucks

STORAGE battery operated trucks sometimes are damaged through careless operation of the electrical controls. Starting overloads or instantaneous reversals often cause breakdowns which add unnecessarily to maintenance charges. To eliminate this hazard, the Baker-Raulang Co., Cleveland, has developed a new type of controller and is placing it as standard equipment on its line of trucks. Tradenamed "No Plug", this controller can also be installed on most of the company's trucks now in service.

The controller prevents starting overloads by requiring the operator to start in first speed and to use the acceleration speeds which are pro-

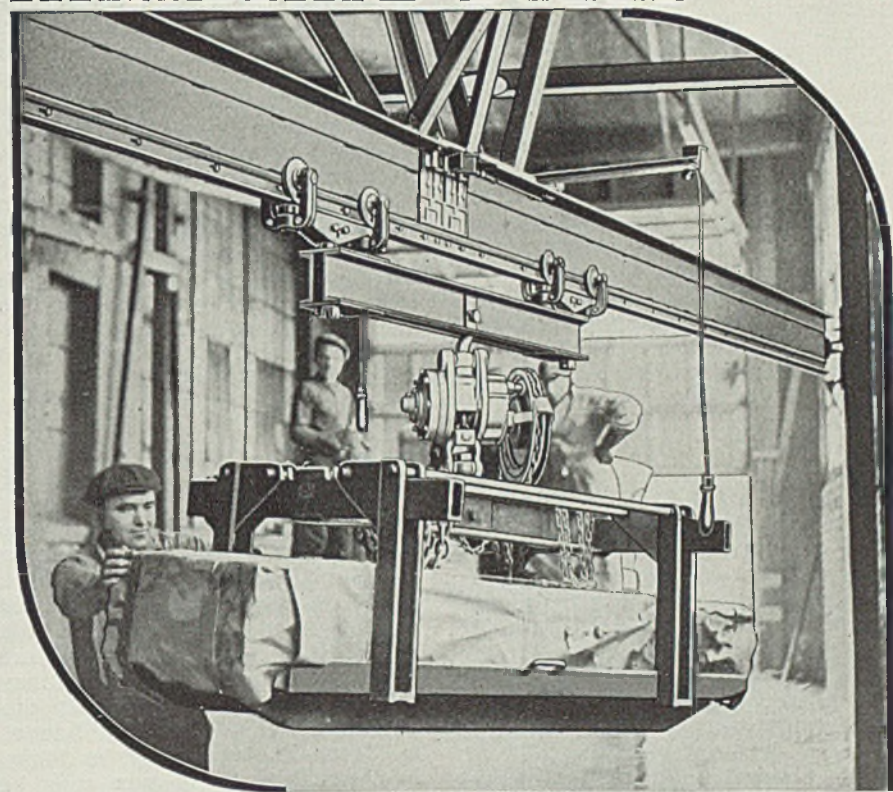
vided. Instantaneous reversal is eliminated by making it necessary for an operator to bring his truck to almost a complete stop before power can be applied in the reverse direction.

Design of the device is arranged so that it cannot be removed and consequently assures protection for the life of the truck. It is a controller of the metal-drum, continuous-torque type, providing three speeds forward and reverse, and is interlocked with the brake through a magnetic blowout, mill-type contactor so that when the operator

steps off the truck, the circuit is broken and the brake set.

The circuit can be completed only by releasing the brake with the controller in a certain position, thus requiring a conscious and sustained action on the part of the operator to put the truck in motion. This safety interlock is provided to prevent the truck from being started accidentally and is said to eliminate possibility of damage by meddlers. Reduction of maintenance charges in connection with industrial truck operation is one of the claims which the manufacturer makes.

HANDLING STEEL



the Easy Way

This toughest of all jobs—handling 3 ton bundles of sheet steel—is made easy with American MonoRail equipment. Here you find little damage to sheets—less danger of accident—lower labor costs. In fact, truck loads of steel are moved from dock to storage in one fourth the time formerly required. American MonoRail engineers, with their specialized experience, are ready to help solve your handling problem. Why not let them look at it without obligating you in any way. Write for the 192 page book "Overhead Material Handling Equipment."

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NEW EQUIPMENT

Crank and Cam Lapping Machines—

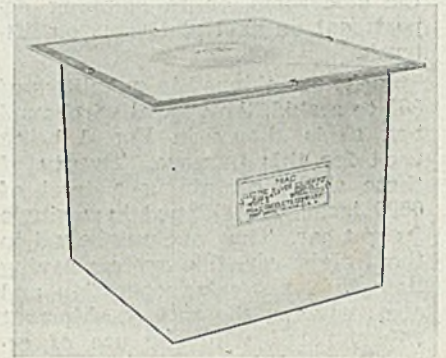
Norton Co., Worcester, Mass., has recently announced two new machines for lapping all bearing surfaces on crankshafts and camshafts. They have been named "Crank-O-Lap" and "Cam-O-Lap." The Crank-O-Lap is driven by a motor mounted on the base which connects to the head stock by a V-belt and to a hydraulic pump by a flexible coupling. A box shaped base supports the work table and lapping arm frame. The table supports the headstock, footstock and work rests and is provided with hardened steel ways on ball bearings. The lapping arm frame is pivoted and carries a bar to which guides for the arms are fastened as well as a shaft for spools of abrasive paper strip. Lapping arms are jointed so they will follow the pins of a crankshaft as it revolves. Take-up spools for winding the used abrasive strip are carried at the ends of the arms and operated by ratchets and pawls. Actual lapping of each pin and bearing is done by shoes of the correct form which hold the abrasive strip firmly in place against the surfaces to be lapped. These shoes are closed by convenient levers, and lubricant is automatically pumped on the work while it re-

volves. The cam lapping machine is built on the same base as the crankshaft lapper. Unit pressure against cam surfaces must remain constant. This is accomplished by providing a master cam for each cam lapping arm, thus controlling the movements of the arms and causing them to exert a uniform lapping action on each cam surface. Abrasive strips are held against the cams by shoes, movement of which is controlled by the master cams. To produce the proper grade of finish, the abrasive strips and supports are reciprocated rapidly in the direction of the camshaft axis while the camshaft is rotating and reciprocated with a slower motion.

Electric Brazing Pot—

Miac Products Co., Fort Wayne, Ind., has recently announced a new electric dip brazing pot designed for silver soldering of hard enameled and bare wire, small objects and similar materials in production quantities. All metals that are capable of being silver soldered may be joined to themselves or to dissimilar metals. Wires as fine as 0.003-inch diameter may be joined to themselves or in turn may be joined to wires as heavy as 0.062-inch diameter. Larger cross section area

materials may be silver soldered by utilizing a preheat. The unit is heavily insulated to reduce power consumption and to hold heat within

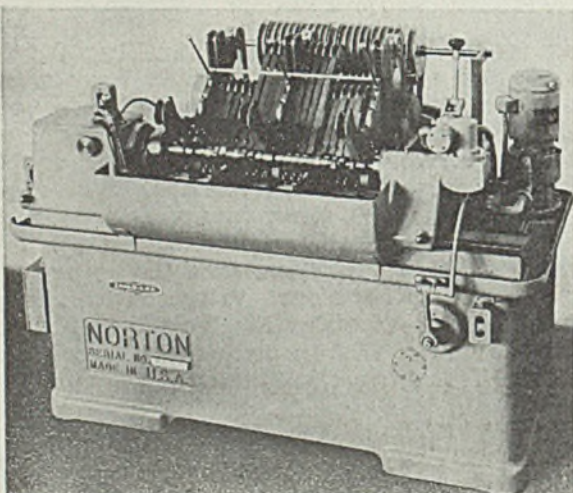


Miac brazing pot designed for silver soldering uses

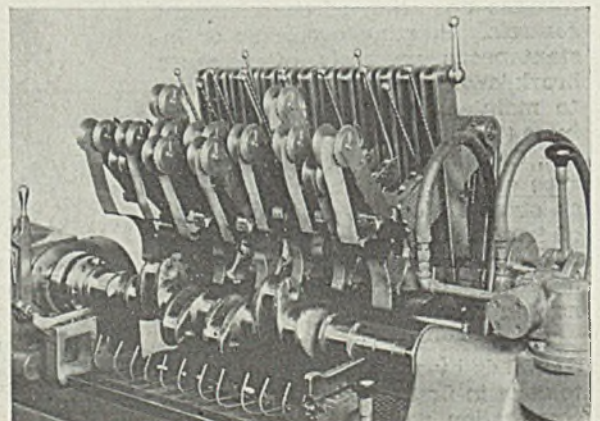
the unit. A special crucible is used which will not contaminate the solder. According to company claims the life of each crucible is 300 to 400 hours or more.

Grinder Quills—

Dumore Co., Racine, Wis., has recently placed on the market four new quills designed for use with their No. 7 Dumore grinders. The first of these, known as the P quill, is equipped with a 1/4-inch chuck for using mounted wheels and a sleeve



Norton Co. presents the new Cam-O-Lap (left) and Crank-O-Lap (right) automatic lapping machines



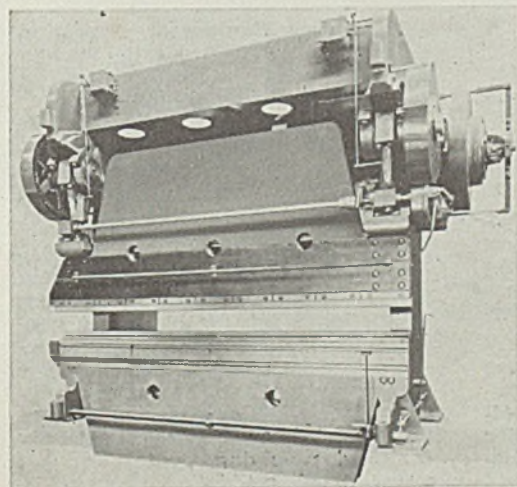
collet of 1/8-inch capacity is also furnished. Its primary use is for grinding small internal holes of diameters less than an inch to a depth of 1 1/4 inches. The second device is the N-6 which is capable of grinding a hole 11/16-inch in diameter to a depth of 6 inches. It is also capable of grinding smaller diameters to a respectively shorter depth. The third quill is the N-5, which is equivalent to the one just described except that the maximum depth of grind is 5 inches. The fourth quill is of this same type, except that it is designed for use with the No. 5 Dumore grinder.

◆ ◆ ◆
Photo-electric Cell—

Dr. F. Loewenberg, 10 East 40th street, New York, is the American distributor for a new dry disk self-generating photo-electric unit known as the Electrocell. This cell claims to show a sensitivity and current output considerably above other types, and for this reason is recommended for accurate light measurement in the testing solutions and other problems of metallurgy. The sensitivity of these cells is given as 480 micro-amperes per lumen. These elements are available in a great variety of sizes and shapes, round models ranging from 3/8 to 2 1/2 inches, rectangular models being obtainable up to 1 1/2 by 2 inches. The curve of the relative color sensitivity of electrocell elements is very broad and extends far into the field of ultra-violet radiation.

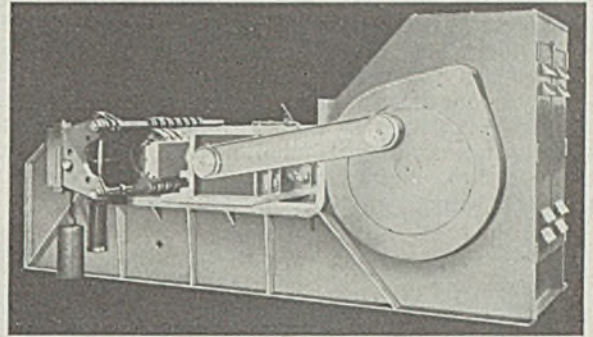
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Press Brake—

Allsteel Press Co., Chicago, has recently announced a complete line of press brakes. There are five series of these new brakes, comprised of twenty different standard sizes. The new brakes are built entirely of steel, heavy steel plate sections being welded into place together with rigid members, with the main bearings so located as to ab-



◆ ◆ ◆
 Twenty sizes are available in the new line of press brakes recently announced by the Allsteel Press Co.

◆ ◆ ◆
Steelweld bulldozer of all steel welded construction throughout



◆ ◆ ◆
 sorb the load directly in the center of the main housing plates. These bearings are of the split cap design for takeup in case of wear and are equipped with bronze bushed bearings. A special design of the pitman connection has been incorporated whereby the bending moment on the adjusting screws is reduced to a minimum. One of the new brakes is of two-plate construction to allow slugs to fall through in gang punching. The brakes are regularly furnished with V-belt drive, gear tooth drive, friction clutch, motor adjustment on the ram, automatic force feed lubricators and lower die holder. The elevating shaft is split and connected by a jaw coupling, which arrangement allows either side of the ram to be raised or lowered individually for re-alignment or taper work.

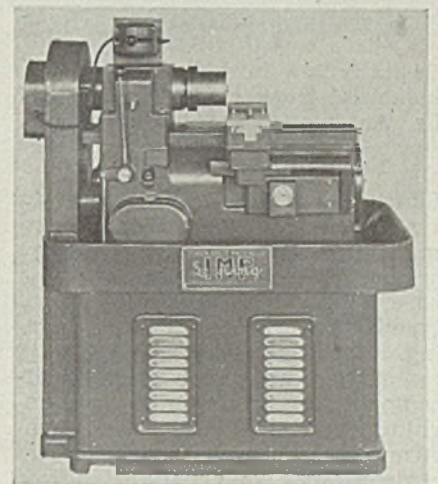
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Bulldozer—

Steelweld Machinery Co., Cleveland, has recently announced a new bulldozer of welded rolled steel construction throughout. The new machine is available in nine standard sizes. Rams of these new machines run on hardened and ground slides, and the ram gibbing is located beneath the slide within the bed, where it is protected against possible damage in making guide changes, or being struck with bolts and heavy pieces. Die holders are adjustable on many sizes to permit greater output of a wide variety

of dissimilar work and to minimize set-up time. All bearings except main bearings are of antifricition type and the entire drive mechanism is fully enclosed within the head of the machine to prevent the entrance of foreign materials. These bulldozers are of either direct motor or clutch-driven type, cut tooth steel gearing is used throughout, main bearings are bronze bushed, and the reversing clutches are standard on all sizes above the No. 4.

◆ ◆ ◆
Lathe—

Seneca Falls Machine Co., Seneca Falls, N. Y., announces a new model of the Lo-Swing Imp lathe. The new machine is intended primarily to handle work requiring high speeds and accuracy. The lathe is also suitable for turning heavier work,



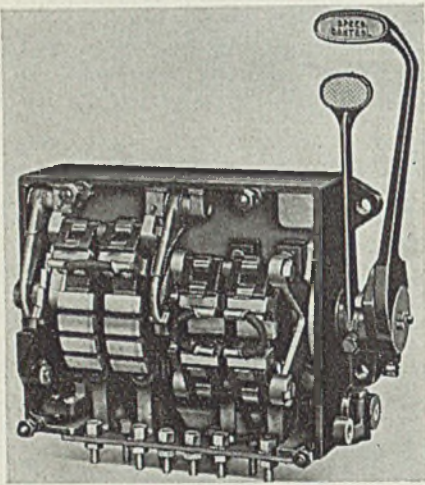
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 Seneca Falls Lo-Swing Imp lathe designed for high speed precision operations

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 such as small pistons, bushings and gear blanks. The long bearing on the carriage is obtained through the unique headstock design which permits the carriage slide to pass under it. The carriage is mounted on a flat and a V-way. Longitudinal movements are obtained by a drum cam, and an end-over plate facilitates the quick removal of this cam and permits timing the machine for au-

automatic stopping and easy adjustment of the cams for carriage-cross feed, when used. Feeds from 0.0005 to 0.050-inch per revolution are obtained by means of pick-off gears. Spindle speeds up to 5000 revolutions per minute may be maintained. The machine is equipped with a magnetic chuck or tailstock as desired.

Industrial Truck Controller—

Automatic Transportation Co., Chicago, has developed what is claimed to be the first basically new industrial truck controller in fifteen years. The fundamental change in design is the motor-type brush mounting which is rotary in action instead of stationary as formerly.



Basically new in design is this new industrial truck controller designed by Automatic Transportation Co.

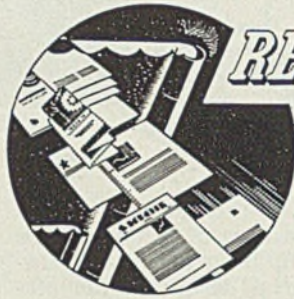
Stator segments are commutator type and are unit molded into a permanent insulated base with no loose segments and no separate parts. The base differs from the conventional type in that it is a stationary mounting. Brushes are provided with a constant spring tension which is self-compensating and requires no manual adjustment. These are also constructed with exceptionally large contact areas which result in low voltage loss. This controller will be standard equipment on all industrial trucks, tractors and cranes manufactured by the company.

Streamlined Engine —

Novo Engine Co., Lansing, Mich., is now manufacturing a new streamlined air cooled engine. It is a 2-horsepower model, streamlined for the most efficient flow of cooling air over the head and block as well as for graceful lines giving eye appeal. This engine is model A-16 and is

built for all power requirements in the industrial and agricultural fields within its power range. A new type pressed steel connecting rod is used in these engines. The carburetor is fastened behind the heavy steel end plate to eliminate the possibility

of bumps or knocks injuring this piece of mechanism. The magneto is a flange-mounted standard rotary type with impulse coupling. The engine is cranked off the cam shaft which spins the engine at double speed to facilitate ease in starting.



RECENT PUBLICATIONS OF MANUFACTURERS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland

Grinders—Dumore Co., Racine, Wis. Folder No. 44, describing its high speed precision grinders.

Grinders—Landis Tool Co., Waynesboro, Pa. Catalog No. K-37, describing its new 12 x 28-inch universal and tool grinder.

Heaters—Harold E. Trent Co., 618 North Fifty-fourth street, Philadelphia. Circular describing its electric vane strip heaters.

Rolling Doors—Kinneer Mfg. Co., Columbus, O. Bulletin No. 16, illustrating and describing its various types of rolling doors.

Speed-o-Matic Controls—Link-Belt Co., 300 West Pershing road, Chicago. Folder No. 1569, describing its speed-o-matic effort-less control for shovels, draglines and cranes.

Recorders and Controllers—Bristol Co., Waterbury, Conn. Bulletin No. 483, describing its new line of low range pressure and draft recorders and controllers.

Water Softener—Elgin Softener Corp., Elgin, Ill. Bulletin No. 600, describing its two-flow zeolite water softener, which is claimed to permit a higher flow rate.

Microscopes—Bausch & Lomb Optical Co., Rochester, N. Y. Catalog No. D-12, describing and illustrating its research microscopes and accessories.

Ammonia Mask—Mine Safety Appliances Co., Meade, Thomas and Braddock avenues, Pittsburgh. Bulletin describing its new ammonia masks for use in the servicing of ammonia refrigerating equipment.

Electric Furnaces—Ajax Electrothermic Corp. division of Ajax Metal Co., Trenton, N. J. Bulletin No. 11, describing its large coreless induction furnaces for melting ferrous and nonferrous metals.

Cycle Counter—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Catalog section No. 41-375, describing how its cycle counter indicates definitely the time of operation of any apparatus which will

or can be arranged to open or close an alternating current circuit of known frequency. Section No. 60-058 describing its new Reflectolux Luminaires for street lighting.

Corrosion—International Nickel Co. Inc., 67 Wall street, New York. Booklet dealing with the mechanism of a type of corrosion of cast iron resulting in formation of a surface layer of residual graphite.

Air Tools—Rotor Air Tool Co., 17325 Euclid avenue, Cleveland. Catalog No. 15, describing and illustrating its portable air tools, listing detailed specifications; folder describing its high cycle electric portable tools.

Anchorage Devices—Rawlplug Co. Inc., 98 Lafayette street, New York. Booklet No. 37, showing the various methods of anchoring bolts or screws in solid materials, their holding power, the advantages of each type and the correct way to install.

Bearings—Bound Brook Oil-Less Bearing Co., Bound Brook, N. J. Booklet describing its self-lubricating porous bronze-oil retaining bearings, including information on structure, methods of installation, determination of dimensions and die sizes.

Laboratory Equipment—Precision Scientific Co., 1730 North Springfield avenue, Chicago. Bulletin No. 300, summarizing salient features of construction; illustrating 28 models of standard and custom-built constant temperature baths; also shows a variety of typical laboratory apparatus built to order.

Gas Generator—Wellman Engineering Co., Cleveland. Bulletin No. 95, describing and illustrating its Wellman-Galusha clean gas generator, a self-contained unit, consisting of a continuous automatic feeding system for the fuel; a fully water-jacketed fire chamber, where the gas is generated; a specially designed revolving grate, and an elevated ash pit.

Delivery Pressure on Steel Mills Increases

Second Quarter Sold;

March Pig Iron Up;

Exports Make Gain

DESPITE every effort steelmakers are unable to make appreciable headway against backlogs and deliveries continue greatly deferred. Consumers are avid for position on mill books to give as good assurance as possible of obtaining steel when needed. Offers of premiums for delivery continue to be made but are not being accepted. A feature of the situation is the wide diversity of buyers, every channel of steel use taking larger tonnage than for years past in spite of efforts to ration tonnage. Shortened demand for automobile steel, due to strike interruptions, is more than balanced by heavy requirements of users in other lines.

In general, mills have sold practically all their production for second quarter and third quarter business is being taken only at prices prevailing at time of delivery. Some steelmakers have no contracts, all bookings being spot, with specifications attached. March steel shipments by some mills have been the heaviest in their experience. Rail backlogs are heavy and in some cases will last until September.

Pig iron production in March was at the rate of 111,233 tons daily, compared with 107,857 tons daily during February, a gain of 3.1 per cent. This is the highest daily rate since October, 1929, when it was 115,747 tons. Total for March was 3,448,228 tons compared with 3,020,006 tons in February. Since the latter was a short month the March total was 14.2 per cent higher. For three months of 1937 total production was 9,687,975 tons, compared with 5,914,357 tons in first quarter of 1936, a gain of 64 per cent. In March 182 stacks were active, the largest number since April, 1930, when the same number were blowing.

Edging steadily higher steelworks operations last week gained 1½ points to 91½ per cent of capacity, a rate difficult to maintain in face of possible furnace repairs incident to sustained production. Pittsburgh steelmakers managed to increase production by two points to 95 per cent, Eastern Pennsylvania 1½ points to 59½ per cent, Chicago half a point to 84 per cent, Cincinnati 10 points to 90 per cent and Youngstown one point to 86 per cent. Wheeling at 96 per cent, Cleveland at 79½ and Buffalo at 89 were each one point below the previous week. Birmingham at 80

MARKET IN TABLOID

DEMAND . . . Consumers seek third quarter bookings.

PRICES . . . Strong; continued advance in scrap.

PRODUCTION . . . Operations gain 1½ points to 91½ per cent.

SHIPMENTS . . . Mills unable to keep pace with new tonnage.

per cent, New England at 85, Detroit at 100 and St. Louis at 82 were unchanged.

Demand for steel plates is assuming major proportions, with award of 65,000 tons for a 285-mile pipe line for the Panhandle Eastern Co., divided between National Tube Co. and A. O. Smith Corp. Placing of 12,000 tons of plates with Carnegie-Illinois Steel Corp. for lake freighters for Pittsburgh Steamship Co. adds to mill backlogs.

Automobile production, still hampered by labor shutdowns, totaled 99,005 units, compared with 101,805 the preceding week. General Motors made 51,280, compared with 54,020 and Ford held steadily at 34,800. For two months of 1937 the total is 783,356 units, which is larger than two months production of 1936 or 1935. Chrysler and Hudson continue idle during the labor truce.

Export figures for February reveal the interesting fact that pig iron tonnage going abroad in the first two months of this year is greater than the combined pig iron exports for six years from 1931 to 1936. At the present rate over all of 1937 pig iron exports would be close to the total for the four-year period 1927-1930. Scrap exports in February rose sharply over January but for two months the total is below that of the corresponding period of 1936. Steel and iron exports for two months show an increase of 77 per cent over the first two months of 1936.

Mystic Iron Works, Everett, Mass., has booked 35,000 tons of pig iron at premium prices for export to Japan and a Tennessee producer has taken 15,000 tons of charcoal iron for South Africa.

Continued advances in scrap have carried the composite for that material to \$22.08, an advance of 48 cents over the preceding week. The same influence has increased the iron and steel composite six cents to \$40.19. The finished steel composite is unchanged at \$60.70.

COMPOSITE MARKET AVERAGES

	Apr. 3	Mar. 27	Mar. 20	One Month Ago Mar., 1937	Three Months Ago Jan., 1937	One Year Ago Apr., 1936	Five Years Ago Apr., 1932
Iron and Steel	\$40.19	\$40.13	\$40.10	\$39.92	\$36.55	\$33.10	\$29.44
Finished Steel	60.70	60.70	60.70	60.70	55.80	52.20	47.62
Steelworks Scrap . .	22.08	21.60	21.17	20.95	18.12	14.39	7.76

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

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

Finished Material	April 3,	Mar.	Jan.	Apr.	Pig Iron	April 3,	Mar.	Jan.	Apr.
	1937	1937	1937	1936		1937	1937	1937	1936
Steel bars, Pittsburgh	2.45c	2.40c	2.20c	1.85c	Bessemer, del. Pittsburgh	\$25.26	\$24.85	\$22.31	\$20.81
Steel bars, Chicago	2.50	2.45	2.25	1.90	Basic, Valley	23.50	23.10	20.50	19.00
Steel bars, Philadelphia	2.74	2.74	2.49	2.16	Basic, eastern del. East Pa.	25.26	24.76	22.26	20.81
Iron bars, Terre Haute, Ind.	2.35	2.25	2.10	1.75	No. 2 fdy., del. Pittsburgh	25.21	24.80	22.21	20.31
Shapes, Pittsburgh	2.25	2.20	2.05	1.80	No. 2 fdy., Chicago	24.00	23.20	21.00	19.50
Shapes, Philadelphia	2.45 ½	2.45 ½	2.25 ½	2.01 ½	Southern No. 2, Birmingham	20.38	19.88	17.38	15.50
Shapes, Chicago	2.30	2.25	2.10	1.85	Southern No. 2, del. Cincinnati	23.69	23.19	20.69	20.2007
Tank plates, Pittsburgh	2.25	2.20	2.05	1.80	No. 2X eastern, del. Phila.	26.135	25.63 ½	23.13 ½	21.68
Tank plates, Philadelphia	2.43 ½	2.43 ½	2.23 ½	1.99	Malleable, Valley	24.00	23.60	21.00	19.50
Tank plates, Chicago	2.30	2.30	2.10	1.85	Malleable, Chicago	24.00	23.20	21.00	19.50
Sheets, No. 10, hot rolled, Pitts.	2.40	2.35	2.15	1.85	Lake Sup., charcoal, del. Chicago	30.04	28.95	26.54	25.2528
Sheets, No. 24, hot ann., Pitts.	3.15	3.10	2.80	2.40	Gray forge, del. Pittsburgh	24.17	23.75	21.17	19.67
Sheets, No. 24, galv., Pitts.	3.80	3.70	3.40	3.10	Ferromanganese, del. Pittsburgh	99.79	90.80	84.79	80.13
Sheets, No. 10, hot rolled, Gary.	2.50	2.45	2.25	1.95					
Sheets, No. 24, hot anneal., Gary.	3.25	3.20	2.90	2.50	Scrap				
Sheets, No. 24, galvan., Gary.	3.90	3.85	3.50	3.20	Heavy melting steel, Pittsburgh	\$23.25	\$22.40	\$18.95	\$15.75
Plain wire, Pittsburgh	2.90	2.85	2.60	2.40	Heavy melt. steel, No. 2, East Pa.	19.75	18.75	16.40	12.56
Tin plate, per base box, Pitts.	\$4.85	4.85	4.85	5.25	Heavy melting steel, Chicago	21.75	20.90	18.25	14.35
Wire nails, Pittsburgh	2.75	2.70	2.25	2.10	Rail for rolling, Chicago	23.75	22.25	19.40	15.75
					Railroad steel specialties, Chicago	24.25	22.35	19.65	15.85
Semifinished Material					Coke				
Sheet bars, open-hearth, Youngs.	\$37.00	\$36.40	\$34.00	\$28.00	Connellsville, furnace, ovens.	\$4.15	\$4.05	\$4.00	\$3.50
Sheet bars, open-hearth, Pitts.	37.00	36.40	34.00	28.00	Connellsville, foundry, ovens.	4.80	4.25	4.25	4.25
Billets, open-hearth, Pittsburgh.	37.00	36.40	34.00	28.00	Chicago, by-product foundry, del.	11.00	10.25	10.25	9.75
Wire rods, No. 5 to ¾-inch, Pitts.	47.00	46.20	43.00	40.00					

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel	Tin Mill Black No. 28	Corrosion and Heat-Resistant Alloys	Structural Shapes
Prices Subject to Quantity Extras and Deductions (Except Galvanized)	Pittsburgh 3.30c	Pittsburgh base, cents per lb.	Pittsburgh 2.25c
Hot Rolled No. 10, 24-48 in.	Gary 3.40c	Chrome-Nickel	Philadelphia, del. 2.45 ½ c
Pittsburgh 2.40c	St. Louis, delivered. 3.53c	No. 302 No. 304	New York, del. 2.50 ¼ c
Gary 2.50c	Granite City, Ill. 3.50c	24.00 25.00	Boston, delivered 2.63 ½ c
Chicago, delivered 2.53c	Cold Rolled No. 10	27.00 29.00	Bethlehem 2.35c
Detroit, del. 2.60c	Pittsburgh 3.10c	Plates 34.00 36.00	Chicago 2.30c
New York, del. 2.73c	Gary 3.20c	Hot strip 21.50 23.50	Cleveland, del. 2.45c
Philadelphia, del. 2.69c	Detroit, delivered 3.30c	Cold strip 28.00 30.00	Buffalo 2.35c
Birmingham 2.55c	Philadelphia, del. 3.39c		Gulf Ports 2.65c
St. Louis, del. 2.63c	New York, del. 3.43c	Straight Chromes	Birmingham 2.40c
Granite City, Ill. 2.60c	St. Louis, del. 3.33c	No. No. No. No.	Pacific ports, f.o.b. 2.80c
Pacific ports, f.o.b. dock 2.95c	Granite City, Ill. 3.30c	410 430 442 446	St. Louis, del. 2.52c
Hot Rolled Annealed No. 24	Pacific ports, f.o.b. dock 3.70c	18.50 19.00 22.50 27.50	Bars
Pittsburgh 3.15c	Cold Rolled No. 20	21.50 22.00 25.50 30.50	Soft Steel
Gary 3.25c	Pittsburgh 3.55c	26.50 29.00 32.50 36.50	(Base, 3 to 25 tons)
Chicago, delivered 3.28c	Gary 3.65c	Hot strip. 17.00 17.50 23.00 28.00	Pittsburgh 2.45c
Detroit, delivered 3.35c	Detroit, delivered 3.75c	Cold stp. 22.00 22.50 28.50 36.50	Chicago or Gary 2.50c
New York, del. 3.48c	Philadelphia, Pa. 3.84c		Boston, delivered 2.60c
Philadelphia, del. 3.44c	New York, del. 3.88c	Steel Plate	Birmingham 2.60c
Birmingham 3.30c	St. Louis, del. 3.78c	Pittsburgh 2.25c	Cleveland 2.50c
St. Louis, del. 3.38c	Granite City, Ill. 3.75c	New York, del. 2.53c	Buffalo 2.55c
Granite City, Ill. 3.35c	Enameling Sheets	Philadelphia, del. 2.43 ½ c	Detroit, delivered 2.60c
Pacific ports, f.o.b. dock 3.80c	Pittsburgh, No. 10 2.90c	Boston, delivered 2.65c	Pacific ports, f.o.b. 2.60c
Galvanized No. 24	Pittsburgh, No. 20 3.50c	Buffalo, delivered 2.50c	cars, dock 3.00c
Pittsburgh 3.80c	Gary, No. 10 3.00c	Chicago or Gary 2.30c	Philadelphia, del. 2.74c
Gary 3.90c	Gary, No. 20 3.60c	Pitts., forg. qual. 2.80c	Boston, delivered 2.85c
Chicago, delivered 3.93c	St. Louis, No. 10 3.13c	Rail Steel	New York, del. 2.78c
Philadelphia, del. 4.09c	St. Louis, No. 20 3.73c	To Manufacturing Trade	Pitts., 2.80c
New York, delivered 4.13c	Tin and Terne Plate	Pittsburgh 2.30c	Chicago 2.35c
Birmingham 3.95c	Gary base, 10 cents higher.	Philadelphia, del. 2.44 ½ c	Moline, Ill. 2.35c
St. Louis, del. 4.03c	Tin plate, coke, (base box), Pittsburgh \$4.85	Birmingham 2.40c	Cleveland 2.35c
Granite City, Ill. 4.00c	Waste-waste, 2.75c; strip, 2.50c	Coatesville, base 2.35c	Buffalo 2.40c
Pacific ports, f.o.b. dock 4.40c	Long ternes, No. 24 unassorted, Pitts. 4.10c	Sparrows Pt., base 2.35c	
		Pacific ports, f.o.b. cars, dock 2.80c	
		St. Louis, delivered. 2.52c	

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.64c
Pittsburgh, refined.	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors	
Pittsburgh	2.55c
Chicago, Gary, Buffalo	
Cleve., Birm., Young. . .	2.60c
Gulf ports	2.65c
Pacific coast ports f.o.b.	
car docks	2.95c
Philadelphia, del.	2.54c
Rail steel, straight lengths, quoted by distributors	
Pittsburgh	2.40c
Chicago, Buffalo, Cleveland, Birm., Young. . .	2.45c
Gulf ports	2.80c

Wire Products

Prices apply to straight or mixed carloads; less carloads \$5 higher; less carloads fencing \$5 over base column.

Base Pitts.-Cleve. 100 lb. keg.	
Standard wire nails.	\$2.75
Cement coated nails (Per pound)	\$2.75
Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.20c
Galv. fence wire	3.60c
Woven wire fencing (base column, c. l.)	\$74.00
Single loop bale ties, (base column, c. l.)	63.00

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c
Anderson, Ind. (merchant products only) and Chicago up \$1; Duluth and Worcester up \$2; Birmingham up \$3.	
Spring wire, Pitts. or Cleveland	3.50c
Do., Chicago up \$1, Worc. \$2.	

Cold-Finished Carbon Bars and Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	3.00c
Alloy Diff. Alloy Diff.	
2000.....0.35 3100.....0.70	
2100.....0.75 3200.....1.35	
2300.....1.55 3300.....3.80	
2500.....2.25 3400.....3.20	
4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 150-	
2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	0.15
6100 bars	1.20
6100 spring	0.85
Cr. Ni., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70

Strip and Hoops

(Base, hot rolled, 25-1 ton)	
(Base, cold-rolled, 25-3 tons)	
Hot strip to 23 $\frac{1}{2}$ -in.	
Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.60c
Philadelphia, del.	2.69c
New York, del.	2.73c
Cooperage hoop, Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.40c
Worcester, Mass.	3.40c
Cleve. Worcester, Mass. Pitts. ter, Mass.	
Carbon 0.26-0.50. . .	3.20c 3.40c
0.51-0.75. . .	4.45c 4.65c
0.76-1.00. . .	6.30c 6.50c
Over 1.00. . .	8.50c 8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill.	\$42.50
Relay rails, Pittsburgh, 20-100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago.	\$43.00
Do., rerolling quality. . .	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	3.35c
Spikes, R. R. base	3.15c
Track bolts, base.	4.35c
Tie plates, base.	\$46.00
Base, light rails 25 to 40 lbs.; 50 to 60 lbs., inclusive up \$2; 16 and 20 lbs. up \$1; 12 lbs. up \$2; 8 and 10 lbs., up \$5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.	

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:	
Carriage and Machine	
$\frac{1}{2}$ x 6 and smaller	65-5 off
Do. larger	60-10 off
Tire bolts	50 off
Plow Bolts	
All sizes	65-5 off
Stove Bolts	
In packages with nuts attached 72 $\frac{1}{2}$ off; in packages with nuts separate 72 $\frac{1}{2}$ -5 off; in bulk 81 $\frac{1}{2}$ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Step bolts	60 off
Elevator bolts	50-10-5 off
Nuts	
S. A. E. semifinished hex.: $\frac{1}{2}$ to $\frac{3}{8}$ -inch	60-20 off
Do., $\frac{1}{2}$ to 1-inch.	60-15 off
Do., over 1-inch.	60-12 $\frac{1}{2}$ off
Hexagon Cap Screws	
Milled	50-10 off
Upset, 1-in., smaller	60 off
Square Head Set Screws	
Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago.	3.70c
$\frac{1}{2}$ -inch and smaller Pitts., Chi., Cleve.	70 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs.	\$5.75 off

Cut Nails

Cut nails, Pitts. (10% discount on size extras) ..	\$3.35
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Do., less carloads, 5 kegs or more, no discount on size extras. . . \$3.65
Do., under 5 kegs, no disc. on size extras. . . \$3.80

Pipe and Tubing

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

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2 $\frac{1}{2}$ less. Wrought pipe, Pittsburgh.

Butt Weld Steel			
In.	Blk.	Galv.	
$\frac{1}{4}$ and $\frac{3}{8}$	55	38 $\frac{1}{2}$	
$\frac{1}{2}$	59 $\frac{1}{2}$	49	
$\frac{3}{4}$	62 $\frac{1}{2}$	53	
1-3	64 $\frac{1}{2}$	55 $\frac{1}{2}$	
Iron			
$\frac{1}{2}$	20	1 $\frac{1}{2}$	
$\frac{3}{4}$	26	8	
1-1 $\frac{1}{4}$	30	14	
1 $\frac{1}{2}$	34	16 $\frac{1}{2}$	
2	33 $\frac{1}{2}$	16	
Lap Weld Steel			
2	57	47 $\frac{1}{2}$	
2 $\frac{1}{2}$ -3	60	50 $\frac{1}{2}$	
3 $\frac{1}{2}$ -6	62	52 $\frac{1}{2}$	
7 and 8	61	50 $\frac{1}{2}$	
9 and 10	60 $\frac{1}{2}$	50	
Iron			
2	26 $\frac{1}{2}$	10	
2 $\frac{1}{2}$ -3 $\frac{1}{2}$	27 $\frac{1}{2}$	12 $\frac{1}{2}$	
4	29 $\frac{1}{2}$	16	
4 $\frac{1}{2}$ -8	28 $\frac{1}{2}$	15	
9-12	24 $\frac{1}{2}$	10	

Line Pipe Steel			
$\frac{1}{2}$, butt weld	51		
$\frac{1}{2}$ and $\frac{3}{8}$, butt weld. . .	54		
$\frac{1}{2}$, butt weld	58 $\frac{1}{2}$		
$\frac{3}{4}$, butt weld	61 $\frac{1}{2}$		
1 to 3, butt weld.	63 $\frac{1}{2}$		
2, lap weld	56		
2 $\frac{1}{2}$ to 3, lap weld.	59		
3 $\frac{1}{2}$ to 6, lap weld.	61		
7 and 8, lap weld.	60		
10-inch, lap weld.	59 $\frac{1}{2}$		
12-inch, lap weld.	58 $\frac{1}{2}$		

Iron Butt			
	Black	Galv.	
$\frac{1}{2}$	19	$\frac{1}{2}$	
$\frac{3}{4}$	25	7	
1 and 1 $\frac{1}{4}$	29	13	
1 $\frac{1}{2}$	33	15 $\frac{1}{2}$	
2	32 $\frac{1}{2}$	15	
Lap			
1 $\frac{1}{4}$	18	$\frac{1}{2}$	
1 $\frac{1}{2}$	23 $\frac{1}{2}$	17	
2	25 $\frac{1}{2}$	9	
2 $\frac{1}{2}$ to 3 $\frac{1}{2}$	26 $\frac{1}{2}$	11 $\frac{1}{2}$	
4	28 $\frac{1}{2}$	15	
4 $\frac{1}{2}$ to 8	27 $\frac{1}{2}$	14	
9 to 12	23 $\frac{1}{2}$	9	

Seamless Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet, subject to usual extras for quantity, length, etc.

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	\$ 8.41	\$ 9.46
1 $\frac{1}{2}$ " OD x 13 Ga.	9.96	11.21
1 $\frac{1}{2}$ " OD x 13 Ga.	11.00	12.38
1 $\frac{1}{2}$ " OD x 13 Ga.	12.51	14.09
2" OD x 13 Ga.	14.02	15.78
2 $\frac{1}{2}$ " OD x 13 Ga.	15.63	17.60

2 $\frac{1}{2}$ " OD x 12 Ga.	17.21	19.37
2 $\frac{1}{2}$ " OD x 12 Ga.	18.85	21.22
2 $\frac{1}{2}$ " OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4 $\frac{1}{2}$ " OD x 10 Ga.	40.15	45.19
3 $\frac{1}{2}$ " OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.96
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	\$46.00-47.00
4-in., Birmingham.	49.00-50.00
4-in., Chicago	57.00-58.00
6 to 24-in., Chicago.	54.00-55.00
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00
Class A pipe \$3 over Class B	
Std. ftgs., Birm. base.	\$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton	
Pitts., Chi., Cleve., Buffalo and Young.	\$37.00
Philadelphia	42.30
Duluth	39.00

Forging Billets

6 x 6 to 9 x 9-in., base	
Pitts., Chicago, Buffalo.	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleve., Young., Sparrows Point	37.00
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Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00
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Wire Rods

Pitts., Cleve., No. 5 to $\frac{1}{2}$ -inch incl.	47.00
Do., over $\frac{1}{2}$ to $\frac{1}{4}$ -inch incl.	52.00
Chicago up \$1; Worcester up \$2	

Skelp

Pitts., Chi., Young, Buff., Coatesville, Sparrows Pt.	2.10c
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Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, fur.	\$4.10- 4.25
Connellsville, fdry.	4.75- 5.00
Connell. prem. fdry.	5.50- 5.85
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	10.17-10.60
Chi., ov., outside del.	10.25
Chicago, del.	11.00
Milwaukee, ovens.	10.25
New England, del.	12.50
St. Louis, del.	10.50-11.00
Birmingham, ovens	6.50
Indianapolis, del.	9.65
Cincinnati, del.	10.50
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.70
Philadelphia, del.	9.85

Coke By-Products

Spot. gal. Producers' Plants	
Pure and 90% benzol.	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c
Per lb. f.o.b. Frankford	
Phenol (200 lb. drums)	15.00c
Do., (450 lbs.)	14.00c
Eastern Plants, per lb.	
Naphthalene flakes and balls, in bbls., to jobbers	7.25c
Per 100-lbs. Atlantic seaboard	
Sulphate of ammonia.	\$1.35
†Western prices, $\frac{1}{4}$ -cent up.	

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	\$25.00	\$25.50	\$23.50	\$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.†	20.38	...	19.38	24.50
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	...	25.00
Erle, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Hamilton, O.	24.00	24.00	23.50	...
Jackson, O.	24.00	24.00	...	...
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	21.00	...	...	...
Sharpville, Pa.	24.00	24.00	23.50	24.50
Sparrows Point, Md.	25.00	...	24.50	...
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

†Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.26	25.26	24.76	25.76
Baltimore from Birmingham	25.58	...	24.46	...
Boston from Birmingham	26.37	...	25.87	...
Boston from Everett, Mass.	26.25	26.75	25.75	27.25
Boston from Buffalo	26.25	26.75	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.27	27.77	...	...
Brooklyn, N. Y., from Bmghm.	27.05	...	...	...
Canton, O., from Cleveland	25.26	25.26	25.76	25.76
Chicago from Birmingham	24.22	...	24.10	...
Cincinnati from Hamilton, O.	24.07	25.01	24.51	...
Cincinnati from Birmingham	23.69	...	22.69	...
Cleveland from Birmingham	24.12	...	23.62	...
Mansfield, O., from Toledo, O.	25.76	25.76	25.26	25.26
Milwaukee from Chicago	25.00	25.00	24.50	25.00
Muskegon, Mich., from Chicago, Toledo or Detroit	26.90	26.90	26.40	27.40
Newark, N. J., from Birmingham	26.01	...	...	...
Newark, N. J., from Bethlehem	26.39	26.89	...	...
Philadelphia from Birmingham	25.38	...	25.26	...
Philadelphia from Swedeland, Pa.	25.76	26.26	25.26	...
Pittsburgh district from Neville Island	...	...	...	...
Saginaw, Mich., from Detroit	26.25	26.25	25.75	25.75
St. Louis, northern	24.50	24.50	24.00	...

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis from Birmingham	24.12	...	23.82	...
St. Paul from Duluth	25.94	25.94	...	26.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., \$28.50, Phila. base, standard and copper bearing, \$29.63.

Gray Forge

		Charcoal
Valley furnace	\$23.50	Lake Superior fur. \$27.00
Pitts. dist. fur.	23.50	do., del. Chicago 30.04
		Lyles, Tenn. 26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent \$28.50; 6.51-7—\$29.00; 7-7.50—\$29.50; 7.51-8—\$30.00; 8-8.50—\$30.50; 8.51-9—\$31.00; 9-9.50—\$31.50; Buffalo \$1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus \$1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, \$1 per ton add. Each unit over 3%, add \$1 per ton.

Refractories

Per 1000 f.o.b. Works		Chester, Pa., and Baltimore bases (bags)
Fire Clay Brick		\$45.00
Super Quality		
Pa., Mo., Ky.	\$64.60	Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags) 43.00
First Quality		
Pa., Ill., Md., Mo., Ky.	51.30	Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk) 25.00
Alabama, Georgia.	51.30	
Second Quality		
Pa., Ill., Ky., Md., Mo.	46.55	Base Brick
Georgia, Alabama	41.80	Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.
Ohio		
First quality	43.70	Chrome brick \$49.00
Intermediate	39.90	Chem. bonded chrome 49.00
Second quality	35.15	Magnesite brick 69.00
Malleable Bung Brick		Chem. bonded magnesite 59.00
All bases	\$59.85	
Silica Brick		
Pennsylvania	\$51.30	Fluorspar, 85-5
Joliet, E. Chicago	59.85	Washed gravel, duty paid, tide, net ton \$23.50
Birmingham, Ala.	51.30	Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail \$19.00
Ladle Brick		Do., for barge \$20.00
(Pa., O., W. Va., Mo.)		
Dry press	\$30.00	
Wire cut	\$28.00	
Magnesite		
Imported dead-burned grains, net ton f.o.b.		

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper	Straits Tin	Lead	Alumi-	Antimony	Nickel
Electro, Lake, del. Midwest	New York	East	num	Chinese	Cath-
Conn.	Spot	N. Y.	99%	Spot, N. Y.	odes
Mar. 27 16.25	66.00	6.95	*20.00	17.00	35.00
Mar. 29 16.25	65.75	6.95	*20.00	17.00	35.00
Mar. 30 16.25	63.75	6.95	*20.00	17.00	35.00
Mar. 31 17.00	65.00	6.95	*20.00	17.00	35.00
Apr. 1 17.00	63.62 1/2	6.95	*20.00	17.00	35.00
Apr. 2 17.00	62.62 1/2	6.90	*20.00	17.00	35.00

*Nominal range 20.00 to 21.00.

MILL PRODUCTS	OLD METALS	Light Brass
F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 17.00c, Conn. copper	Deal. buying prices, cents lb.	*Chicago 7.50-7.75
	No. 1 Composition Red Brass	*Cleveland 6.75-7.00
		*St. Louis 7.25-7.75
		Lead
		New York 5.75-5.87 1/2
		Cleveland 5.75-6.00
		Chicago 5.75-6.00
		*St. Louis 5.25-5.75
		Zinc
		New York 4.00-4.12 1/2
		Cleveland 4.00-4.25
		*St. Louis 3.75-4.25
		Aluminum
		Borings, Cleveland 10.75-11.00
		Mixed, cast, Cleve. 14.00-14.25
		Clips, soft, Cleve. 15.50-15.75
		*Mixed, cast, St. L. 13.50-14.00
		SECONDARY METALS
		Brass, ingot 85-5-5-5, lcl, 17.00
		*Stand. No. 12 alum. 18.75-19.25

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty paid	\$95.00
Do., Baltimore, base	95.00
Do., del. Pittsburgh	99.79
Spiegeleisen, 19-20% dom.	
Palmerston, Pa., spot	30.00
Do., New Orleans	30.00
Ferrosilicon, 50% freight allowed, c. l.	69.50
Do., less carload	77.00
Do., 75 per cent	126-130.00
Spot, \$5 a ton higher	
Silicomanganese, 2 1/2 carbon	89.00
2% carbon, 94.00; 1%, 104.00	
Ferrochrome, 66-70 chromium, 4-6 carbon, cts.	
lb. del.	10.50
Ferrotungsten, stand., lb.	
con. del. (L.C.L.)	1.40-1.45
Ferrovandium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all, net ton	142.50
Spot, 1 ton, frt. allow., lb.	7.50c
Do., under 1 ton, lb.	8.00-8.50c
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, \$3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% \$3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80
†Carloads. Quan. diff. apply	

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore	3.85c
Boston ††	4.05c
Buffalo	3.10c
Chattanooga	3.96c
Chicago (j)	3.85c
Cincinnati	3.55c
Cleveland	3.75c
Detroit	3.93½c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.96c-4.11c
New Orleans	4.20c
New York† (d)	4.12c
Pitts. (h)	3.80c
Philadelphia	4.00c
Portland	4.45c
San Francisco	4.20c
Seattle	4.45c
St. Louis	4.09c
St. Paul	4.10c-4.25c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	3.96c
Baltimore*	3.10c
Cincinnati	3.55c
New York† (d)	3.65c
Philadelphia	4.00c
St. Louis	4.09c
Tulsa	3.35c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.96c
Cleveland (c)	2.55c
Cincinnati	3.40c
Houston	3.25c
Los Angeles, c.l.	2.45c
New Orleans*	3.14c
Pitts., plain (h)	2.55c
Pitts., twisted squares (h)	3.95c
San Francisco	2.97½c
Seattle	4.02½c
St. Louis	3.99c
Tulsa	3.25c
Young	2.30c-2.60c

SHAPES

Baltimore	3.85c
Boston††	3.92c
Buffalo	3.35c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.65c
Cleveland	3.86c
Detroit	3.95c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York† (d)	3.97c
Philadelphia	3.90c
Pittsburgh (h)	3.70c
Portland (i)	4.45c
San Francisco	4.05c
Seattle (i)	4.45c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

PLATES

Baltimore	3.80c
Boston††	3.93c
Buffalo	3.47c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.65c
Cleveland, ½-in. and over	3.86c
Detroit	3.95c
Detroit, ⅝-in.	4.15c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York† (d)	4.00c
Philadelphia	3.90c

Phila. floor	4.95c
Pittsburgh (h)	3.70c
Portland	4.25c
San Francisco	4.05c
Seattle	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

NO. 10 BLUE

Baltimore	3.80c
Boston (g)	4.00c
Buffalo	3.72c
Chattanooga	3.91c
Chicago	3.85c
Cincinnati	3.50c
Cleveland	3.91c
Det. 8-10 ga.	3.93½c
Houston	3.45c
Los Angeles	4.50c
Milwaukee	3.96c
New Orleans	4.10c
New York† (d)	4.07c
Portland	4.50c
Philadelphia	4.00c
Pittsburgh (h)	3.75c
San Francisco	4.30c
Seattle	4.50c
St. Louis	4.39c
St. Paul	4.10c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	4.50c
Boston (g)	4.75c
Buffalo	3.35c
Chattanooga*	4.06c
Chicago	4.45c-5.10c
Cincinnati	4.05c
Houston	4.66c
Detroit	4.68½c
Los Angeles	5.05c
Milwaukee	4.56c-5.21c
New York† (d)	4.82c
Philadelphia	4.65c
Pitts.** (h)	4.75c
Portland	5.35c
Seattle	5.35c
San Francisco	5.15c
St. Louis	4.84c
St. Paul	4.75c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore*†	4.70c
Buffalo	4.10c
Boston (g)	5.30c
Chattanooga*	4.76c
Chicago (h)	5.10c-5.75c
Cincinnati	4.65c
Cleveland	5.31c
Detroit	5.40c
Houston	4.50c
Los Angeles	5.55c
Milwaukee	5.21c-5.86c
New Orleans*	4.49c
New York† (d)	5.47c
Philadelphia	5.30c
Pitts.** (h)	5.40c
Portland	5.90c
San Francisco	5.85c
Seattle	5.90c
St. Louis	5.49c
St. Paul	5.40c
Tulsa	5.20c

BANDS

Baltimore	3.85c
Boston††	4.25c
Buffalo	3.52c
Chattanooga	4.16c
Cincinnati	3.75c
Cleveland	4.16c
Chicago	4.10c
Detroit, ⅝-in. and lighter	4.185c
Houston	3.35c
Los Angeles	4.50c
Milwaukee	4.21c
New Orleans	4.75c
New York† (d)	4.32c

Philadelphia	4.10c
Pittsburgh (h)	4.00c
Portland	4.95c
San Francisco	4.50c
Seattle	4.95c
St. Louis	4.34c
St. Paul	4.35c
Tulsa	3.55c

HOOPS

Baltimore	4.10c
Boston††	5.25c
Buffalo	3.52c
Chicago	4.10c
Cincinnati	3.75c
Detroit, No. 14 and lighter	4.185c
Los Angeles	6.55c
Milwaukee	4.21c
New York† (d)	4.32c
Philadelphia	4.35c
Pittsburgh (h)	4.50c
Portland	6.30c
San Francisco	6.50c
Seattle	6.30c
St. Louis	4.34c
St. Paul	4.35c

COLD FIN. STEEL

Baltimore (c)	4.50c
Boston*	4.65c
Buffalo (h)	3.70c
Chattanooga*	4.86c
Chicago (h)	4.30c
Cincinnati	4.15c
Cleveland (h)	4.30c
Detroit	4.30c
Los Ang. (f) (d)	6.85c
Milwaukee	4.41c
New Orleans	5.10c

New York† (d)	4.57c
Philadelphia	4.53c
Pittsburgh	4.15c
Portland (f) (d)	5.85c
San Fran. (f) (d)	6.80c
Seattle (f) (d)	5.85c
St. Louis	4.54c
St. Paul	4.77c
Tulsa	4.80c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up.)	
Base	
High speed	69c
High carbon, Cr.	45c
Oil hardening	26c
Special tool	24c
Extra tool	20c
Regular tool	16c
Water hardening 12¼c	
Uniform extras apply.	

BOLTS AND NUTS

(100 pounds or over)	
Discount	
Chicago (a)	55 to 60
Cleveland	60-5-5
Detroit	70-10
Milwaukee	55 to 60

New Orleans	65
Pittsburgh	65-5

(a) Under 100 lbs., 50 oft.
 (b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 0.15c higher.

On plates, shapes, bars, hot strip and blue annealed quantity extras and discounts as follows: Under 100 lbs., add \$1.50; 100 to 399 lbs., add 50c; 400 to 9999 lbs., base; 4000 to 9999 lbs., deduct 10c; over 10,000 lbs., deduct 15c. At Cleveland, under 400 lbs., add 50c, with \$1 minimum invoice.

†Domestic steel;
 *Plus quantity extras;
 **One to 9 bundles;
 †\$50 or more bundles;
 ‡New extras apply;
 ††Base 10,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, April 1

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

Description	British gross tons		Continental Channel or North Sea ports, metric tons	
	U. K. ports		Quoted in dollars at current value	
	£	s d		**Quoted in gold pounds sterling £ s d
PIG IRON				
Foundry, 2.50-3.00 Silicon	\$19.23	3 18 6*	28.22	3 9 0
Basic bessemer	19.23	3 18 6*	14.31	1 15 0
Hematite, Phos. .05-.05	21.44	4 7 6		
SEMI-FINISHED STEEL				
Billets	\$30.62	6 5 0	\$27.44	3 7 0
Wire rods, No. 5 gage	47.16	9 12 6	49.09	6 0 0
FINISHED STEEL				
Standard rails	42.88	8 15 0	\$49.09	6 0 0
Merchant bars	2.08c	9 10 0	1.85c	5 0 0
Structural shapes	2.00c	9 2 6	1.80c	4 17 6
Plates, ¼ in. or 5 mm.	2.23c	10 3 9	2.27c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.85c	13 0 0	2.87c	7 15 0††
Sheets, gal., 24 gage, corr.	3.67c	16 15 0	3.61c	9 15 0
Bands and strips	2.19c	10 0 0	2.22c	6 0 0
Plain wire, base	2.41c	11 0 0	2.77c	7 10 0
Galvanized wire, base	2.74c	12 10 0	2.96c	8 0 0
Wire nails, base	2.63c	12 0 0	3.14c	8 10 0
Tin plate, box 108 lbs.	\$ 6.51	1 2 6		

British ferromanganese \$95 delivered Atlantic seaboard, duty-paid.

Domestic Prices at Works or Furnace—Last Reported

Description	£ s d	French	Belgian	Reich				
		Francs	Francs	Marks				
Fdy. pig iron, Si. 2.5	\$19.84	4 1 0(a)	\$18.40	400	\$25.28	750	\$25.34	62
Basic bessemer pig iron	20.21	4 2 6(a)	12.65	275	14.66	435	27.96 (b)	69.50
Furnace coke	6.61	1 7 0	6.30	137	5.73	170	7.64	19
Billets	30.62	6 5 0	27.14	590	25.61	760	38.82	96.50
Standard rails	1.81c	8 5 0	1.64c	780	1.80c	1,200	2.40c	132
Merchant bars	2.08c	9 10 0	1.68c	800	1.46c	975	2.00c	110
Structural shapes	2.00c	9 3 0	1.64c	780	1.46c	975	1.95c	107
Plates, ¼ in. or 5 mm.	2.15c	9 16 9	2.12c	1,010	1.76c	1,170	2.31c	127
Sheets, black	3.07c	14 0 0‡	2.84c	1,350‡	2.19c	1,460‡	2.62c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.72c	17 0 0	4.41c	2,100	2.85c	1,900	6.73c	370
Plain wire	2.57c	11 15 0	2.73c	1,360	2.03c	1,350	3.15c	173
Bands and strips	2.24c	10 5 0	1.92c	915	1.88c	1,250	2.31c	127

*Basic. †British ship-plates. Continental, bridge plates. ‡24 ga. † to 3 mm. basic price
 ††Basic quotations are for basic open-hearth steel. Continents usually for basic-bessemer steel
 a del. Middlesbrough. b hematite. ‡Close annealed.
 **Gold pound sterling carries a premium of 67.30 per cent over paper sterling.

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham†	14.50-15.00
Bos. dock, No. 1, exp.	17.50-18.00
N. Eng. del. No. 1.	17.50
Buffalo, No. 1	20.00-21.00
Buffalo, No. 2	19.00-19.50
Chicago, No. 1	21.50-22.00
Cleveland, No. 1	21.00-21.50
Cleveland, No. 2	19.50-20.00
Detroit, No. 1	18.25-18.75
Eastern Pa., No. 1.	21.00
Eastern Pa., No. 2.	19.50-20.00
Federal, Ill.	16.25-16.75
Granite City, R. R.	18.25-18.75
Granite City, No. 2.	16.25-16.75
New York, No. 1.	17.50-18.00
N. Y. dock, No. 1 exp.	17.50-18.00
Pitts., No. 1 (R. R.)	24.00-24.50
Pitts., No. 1 (dlr.)	23.00-23.50
Pittsburgh, No. 2.	19.50-20.00
St. Louis, R. R.	18.50-19.00
St. Louis, No. 2.	16.50-17.00
Toronto, dlrs. No. 1	11.00-12.00
Toronto, No. 2	10.00-11.00
Valleys, No. 1	22.00-22.50

COMPRESSED SHEETS

Buffalo, dealers	19.00-19.50
Chicago, factory	20.50-21.00
Chicago, dealer	19.50-20.00
Cleveland	20.50-21.00
Detroit	19.50-20.00
E. Pa., new mat.	21.00
E. Pa., old mat.	17.50
Pittsburgh	24.00-24.50
St. Louis	16.00-16.50
Valleys	22.00-22.50

BUNDLED SHEETS

Buffalo	16.00-16.50
Cincinnati, del.	15.00-15.50
Cleveland	16.50-17.00
Pittsburgh	21.00-21.50
St. Louis	13.50-14.00
Toronto, dealers	8.00

SHEET CLIPPINGS, LOOSE

Chicago	14.00-14.50
Cincinnati	14.50-15.00
Detroit	14.00-14.50
St. Louis	13.50-14.00

STEEL RAILS, SHORT

Birmingham	17.00-18.00
Buffalo	24.50-25.50
Chicago (3 ft.)	23.50-24.00
Chicago (2 ft.)	25.00-25.50
Cincinnati, del.	24.00-24.50
Detroit	24.00-24.50
Pitts., 3 ft and less	26.50-27.00
St. Louis, 2 ft. & less	20.00-20.50

STEEL RAILS, SCRAP

Boston, district	†17.25-17.50
Buffalo	21.00-22.00
Chicago	22.00-22.50
Cleveland	22.00-22.50
Pittsburgh	24.50-25.00
St. Louis	20.00-20.50

STOVE PLATE

Birmingham	10.50-11.00
Boston district	†11.00-11.50
Buffalo	15.00-16.00
Chicago	12.00-12.50
Cincinnati, dealers.	12.50-13.00
Detroit, net	12.00-12.25
Eastern Pa.	17.50
New York, fdry.	†13.00-13.50
St. Louis	12.00-12.50
Toronto, deal'rs, net	9.50-10.00

SPRINGS

Buffalo	22.50-23.50
Chicago, leaf	24.50-25.00
Chicago, coil	26.00-26.50
Eastern Pa.	25.50-26.00
Pittsburgh	27.50-28.00
St. Louis	22.00-22.50

ANGLE BARS—STEEL

Buffalo	14.50-15.00
Chicago	24.00-24.50
St. Louis	19.50-20.00

RAILROAD SPECIALTIES

Chicago	24.00-24.50
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LOW PHOSPHORUS

Buffalo, billet and bloom crops	24.00-24.50
Cleveland, billet, bloom crops	25.00-26.00
Eastern Pa., crops	26.00-26.50
Pittsburgh, billet, bloom crops	27.50-28.00
Pittsburgh, sheet bar crops	26.50-27.00

FROGS, SWITCHES

Chicago	21.50-22.00
St. Louis, cut	20.00-20.50

SHOVELING STEEL

Chicago	21.50-22.00
Federal, Ill.	16.25-16.50
Granite City, Ill.	16.25-16.50
Toronto, dealers	9.00- 9.50

RAILROAD WROUGHT

Birmingham	12.00-14.00
Boston district	†10.00-10.25
Buffalo, No. 1	19.00-19.50
Buffalo, No. 2	20.00-21.00
Chicago, No. 1, net.	18.50-19.00
Chicago, No. 2	21.50-22.00
Cincinnati, No. 2.	19.00-19.50
Eastern Pa.	22.00
St. Louis, No. 1.	15.50-16.00
St. Louis, No. 2.	18.00-18.50
Toronto, No. 1 dlr.	15.00

SPECIFICATION PIPE

Eastern Pa.	18.00-18.50
New York	13.50-14.00

BUSHING

Buffalo, No. 1	19.00-19.50
Chicago, No. 1	19.50-20.00
Cincin., No. 1, deal.	16.00-16.50
Cincinnati, No. 2.	10.50-11.00
Cleveland, No. 2.	14.00-14.50
Detroit, No. 1 new.	18.00-18.50
Valleys, new, No. 1.	21.00-21.50
Toronto, dealers	9.00

MACHINE TURNINGS

Birmingham	7.00- 8.00
Buffalo	13.50-14.00
Chicago	12.00-12.50
Cincinnati, dealers.	12.50-13.00
Cleveland	13.50-14.00
Detroit	13.25-13.75
Eastern Pa.	15.00-15.50
New York	†10.00-10.25
Pittsburgh	16.00-16.50
St. Louis	10.50-11.00
Toronto, dealers	8.00- 8.50
Valleys	15.50-16.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†8.75- 9.25
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Buffalo	14.00-14.50
Cincinnati, dealers.	12.00-12.50
Cleveland	14.00-14.50
Detroit	13.50-14.00
Eastern Pa.	14.00
New York	†10.00-10.25
Pittsburgh	14.50-15.00
Toronto, dealers	8.00- 8.50

CAST IRON BORINGS

Birmingham	7.00- 7.50
Boston dist. chem.	†10.00-10.25
Boston dist. for mills	†9.50- 9.75
Buffalo	14.00-14.50
Chicago	13.50-14.00
Cincinnati, dealers.	12.00-12.50
Cleveland	14.00-14.50
Detroit	13.50-14.00
E. Pa., chemical	15.00
New York	†10.00-10.25
St. Louis	10.50-11.00
Toronto, dealers	9.00

PIPE AND FLUES

Cincinnati, dealers.	11.50-12.00
Chicago, net	14.50-15.00

RAILROAD GRATE BARS

Buffalo	15.50-16.00
Chicago, net	13.50-14.00
Cincinnati	12.50-13.00
Eastern Pa.	17.50
New York	†11.50-12.00
St. Louis	12.50-13.00

FORGE FLASHINGS

Boston district	†13.00-13.25
Buffalo	19.00-19.50
Cleveland	19.50-20.00
Detroit	16.50-17.00
Pittsburgh	19.50-20.00

FORGE SCRAP

Boston district	†6.50- 7.00
Chicago, heavy	25.50-26.00
Eastern Pa.	17.50-18.00

ARCH BARS, TRANSOMS

St. Louis	19.00-19.50
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AXLE TURNINGS

Boston district	†11.00-11.50
Buffalo	16.00-17.00
Chicago, elec. fur.	21.00-21.50
Eastern Pa.	18.50-19.50
St. Louis	12.50-13.00
Toronto	9.50

STEEL CAR AXLES

Birmingham	18.00-20.00
Buffalo	22.50-23.50
Boston district	†20.00-21.00
Chicago, net	25.50-26.00
Eastern Pa.	28.00-28.50
St. Louis	24.00-24.50

SHAFTING

Boston district	†20.00-20.50
Eastern Pa.	25.50-26.00
New York	†19.50-20.00
St. Louis	14.00-14.50

CAR WHEELS

Birmingham	16.00-17.00
Boston dist., iron	†15.00-15.25
Buffalo, iron	19.50-20.50
Buffalo, steel	23.00-24.00
Chicago, iron	21.50-22.00
Chicago, rolled steel	24.00-24.50

Cincinnati, iron	20.00-20.50
Eastern Pa., iron	22.00-22.50
Eastern Pa., steel	25.00
Pittsburgh, iron	20.50-21.00
Pittsburgh, steel	27.50-28.00
St. Louis, iron	18.00-18.50
St. Louis, steel	21.00-21.50

NO. 1 CAST SCRAP

Birmingham	13.00-14.00
Bos. dist. No. 1 mach.	†15.75-16.2
N. Eng. del. No. 2.	17.50
N. Eng. del. textile.	18.50
Buffalo, cupola	19.00-19.50
Buffalo, mach.	20.00-21.00
Chicago, agrl. net.	14.00-14.50
Chicago, auto	16.50-17.00
Chicago, mach. net.	18.00-18.50
Chicago, rail'd net.	16.50-17.00
Cincl., mach. cup.	18.00-18.50
Cleveland, mach.	20.00-20.50
Eastern Pa., cupola	22.50-23.00
E. Pa., mixed yard.	18.50-18.75
Pittsburgh, cupola.	19.50-20.00
San Francisco, del.	13.50-14.00
Seattle	12.00-13.00
St. Louis, No. 1	14.75-15.25
St. L., No. 1, mach.	16.00-16.50
Toronto, No. 1, mach., net	16.00-17.00

HEAVY CAST

Boston dist. break.	†14.75-15.00
New England, del.	17.00-17.25
Buffalo, break.	16.00-16.50
Cleveland, break.	15.50-16.00
Detroit, No. 1 mach. net	13.50-14.00
Detroit, break.	14.50-15.00
Detroit, auto net.	16.50-17.00
Eastern Pa.	20.00-20.50
New York, break.	†15.50-16.00
Pittsburgh	17.50-18.00

MALLEABLE

Birmingham, R. R.	15.00-15.50
New England, del.	20.00
Buffalo	23.00-24.00
Chicago, R. R.	23.50-24.00
Cincl., agrl. del.	18.00-18.50
Cleveland, rail.	21.50-22.00
Detroit, auto, net.	17.50-18.00
Eastern Pa., R. R.	20.00
Pittsburgh, rail	21.00-21.50
St. Louis, R. R.	20.00-20.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.50-17.00
Boston	†18.00-18.50
Buffalo	23.00-24.00
Chicago	23.50-24.00
Eastern Pa.	20.00-20.50
New York	†18.50-19.00
St. Louis	20.50-21.00

LOCOMOTIVE TIRES

Chicago (cut)	24.50-25.00
St. Louis, No. 1.	20.00-20.50

LOW PHOS. PUNCHINGS

Buffalo	23.00-23.50
Chicago	24.00-24.50
Eastern Pa.	26.00-27.00
Pittsburgh (heavy)	26.00-26.50
Pittsburgh (light)	25.00-25.50

Iron Ore

Lake Superior Ore	
Gross ton, 51 1/2 % Lower Lake Ports	
Old range bessemer	\$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore	
Cents, unit. del. E. Pa.	
Foundry and basic	
56.63% con.	9.00-10.00
Cop.-free low phos.	
58-60%	nominal
Foreign Ore	
Cents per unit, f.a.s. Atlantic ports	
Foreign manganiferous ore, 45.55%	

Iron, 6-10% man.	*16.00
No. Afr. low phos.	*16.00
Swedish low phos.	nominal
Spanish No. Africa basic, 50 to 60%	*15.50
Tungsten, spot sh. ton unit, duty pd.	\$22.00
N. F., fdy., 55%	7.00
Chrome ore, 48%	
gross ton, c.i.f.	\$24.50-25.00
*Nominal asking price.	

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	40.00-42.00
So. African, 50-52%	40.00-42.00
Indian, 50-52%	40.00-42.00

Bars

Bar Prices, Page 80

Pittsburgh—Bar producers entered second quarter with backlogs becoming heavier, pressure for deliveries increasing, and with every prospect that high rate of activity would continue well into the summer. With deliveries now ranging from six to eight weeks, ordering at new prices continues steady from practically all sources. Hot-rolled bars are 2.45c, Pittsburgh, and alloy bars, 3.00c, Pittsburgh.

Cleveland—Producers have little tonnage left for second quarter delivery. This is particularly true for rerolling billets and forging bars. New business has shown no signs of slackening despite the heavy buying preceding the price advance. Most producers have been forced to reject tonnage from other than regular customers. Alloy bar requirements are particularly active as demand from auto partsmakers and farm implement concerns continue to expand.

Philadelphia.—Commercial bar deliveries are being pushed further ahead. Six to seven weeks now appears to be average, with some sellers unable to do much under eight to nine weeks. More favorable rollings occasionally can be available but these are exceptional.

New York—Steel bar specifications are heavy with deliveries now at a minimum of about six weeks. Demands are highly diversified.

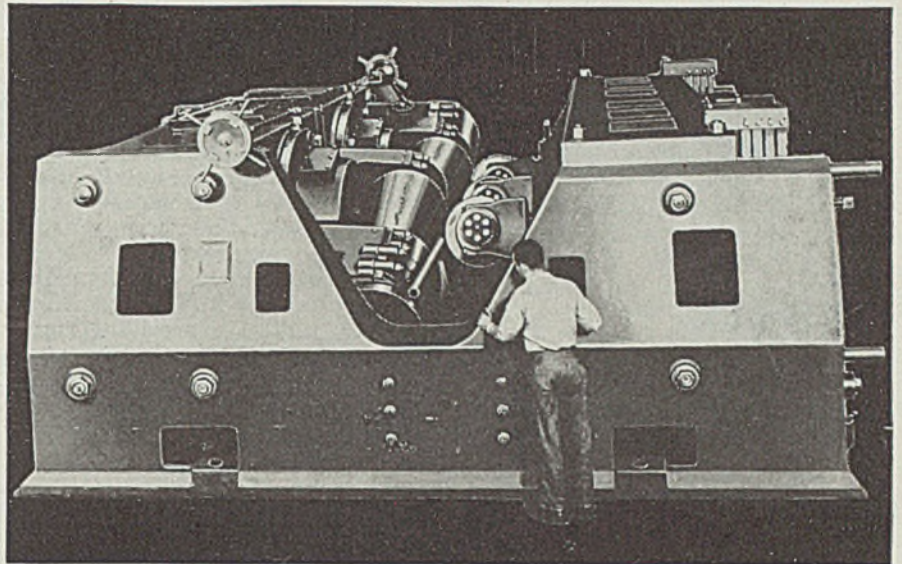
Boston—Bids close April 13 on 150 tons nickel bar steel for Boston navy yard, schedule 335, bureau of supplies and accounts. Steel bar buying continues heavy from a wide range of industrial consumers.

Chicago—Heavy sales of bars lately have filled producers' second quarter books and new business now being accepted is for delivery after June. On such tonnages, prices in effect at time of shipment will apply. Production is being pushed but mills are still under pressure for deliveries. Prices are firm.

Youngstown, O.—Bar mills, despite accelerated operating rates, have entered second quarter with heavy order books. The distinguishing feature of current business is that it is all spot and no contract business is being taken. Some bar mills are booked to the middle of May and others to June 1, or even farther.

Little Steel Imported

Philadelphia—Imports here during the week ended March 27 in-



SUTTON-BIGWOOD 5-B BAR and TUBE STRAIGHTENING MACHINE

NOTE: The compactness of this patented Sutton-Bigwood bar and tube straightener.

NOTE: Perfect visibility both for setting to size, and for the straightening operation.

NOTE: The clear passage way around the machine.

NOTE: There is no separate reduction drive.

The foregoing points may be seen in the illustration—the following facts you cannot see. The angle of rolls is adjustable to maintain full contact on all sizes at all times, while the WIDE RANGE of sizes possible to handle is due to actual end-to-end straightening which takes place in the cross rolls. These machines can be accurately set from record charts, and straightening speeds up to 500 feet per minute are entirely possible.

Sutton-Bigwood Straighteners have been constructed for each size given—AND EACH CAN BE DEMONSTRATED IN ACTUAL OPERATION.

These machines are Timken Bearing equipped throughout—they are the ONLY machines embodying patented adjustable side frame which entirely eliminates over-hang.

SUTTON-BIGWOOD OFFERS YOU THE MOST UP TO THE MINUTE ENGINEERING—THE MOST MODERN CONSTRUCTION COMMENSURATE WITH SOUND STRAIGHTENING PRACTICE.

SUTTON ENGINEERING CO.

Offices:
PARK BUILDING
PITTSBURGH



Works:
BELLEFONTE, PA.

cluded 1217 tons of chrome ore from Cuba; also 93 tons of steel forgings, 80 tons of wire rods, 56 tons of steel tubes, 22 tons of steel bars, 10 tons of steel billets and one ton of steel sheets, all from Sweden.

Sheets

Sheet Prices, Page 80

Pittsburgh—Thousands of tons of sheets for delivery in third quarter

have been offered producers each day during the past week, despite the fact that no new business has been solicited. Material accepted beyond the end of second quarter is booked subject to whatever price is in effect at that time. Current shipments are exceptionally heavy.

Chicago—With sheet mills solidly booked through the coming three months, mills are accepting future business on the basis of prices prevailing at the time of shipment. Shipments are limited only by plant capacity as consumers are pressing

for delivery. Consumption shows no slackening, with buyers interested primarily in being assured of delivery.

New York—With sheetmakers endeavoring to allot tonnage on the basis of customers' last year's requirements complications are developing rapidly. Some consumers have already specified for delivery in first half almost as much tonnage as they bought all last year. Their efforts to obtain rolling schedules on certain of their last half requirements, which are obvious, are placing sellers in a difficult position. In some cases where hot-rolled sheets are involved producers in fact have less available capacity than a year ago, due to added cold-finishing facilities and this is making for further complications. Meanwhile little sheet tonnage is available before July.

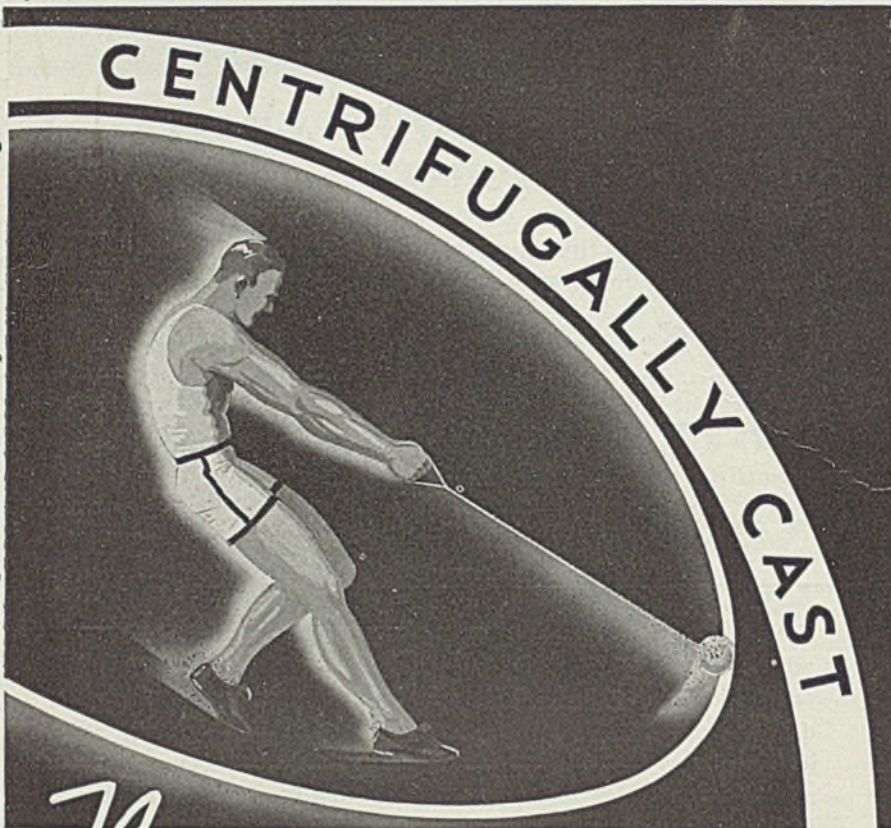
An offer to purchase 25,000 tons of galvanized sheets for shipment to the Orient, at \$10 above the domestic market has been rejected by some sellers here. Smaller inquiries for galvanized sheets at similar premiums have also been rejected. An export offer for a certain grade of cold-finished sheets at more than \$15 above the domestic market also has been rejected in some quarters.

Cleveland — Sheet sellers have been literally swamped by a steady stream of new business in spite of the heavy buying a month ago. Most mills have rejected all tonnage from other than regular customers. Even regular customers find their needs have increased materially within the last two months and are in a serious position due to lack of steel.

Important sheet producers have announced a second advance on seconds and wasters, \$4 per ton on black and galvanized, pickled and cold-rolled, and long ternes. The previous advance on seconds and wasters was made with the general advance of sheet prices \$3 to \$5 per ton. On the No. 10 black sheet wasters and seconds the price now is 1.85c, compared with 1.35c a few weeks ago, a total increase of \$10 per ton.

Youngstown, O.—Demand for steel sheets is almost overwhelming. Requirements for both common black and galvanized sheets have completely filled one important district maker to July 1, and this altogether on spot business.

St. Louis—Demand for sheets of all descriptions remains undiminished but new business is relatively light because mills are sold well into mid-summer. There have been some sales for delivery in July and August subject to quotations then prevailing. There were further re-



Nature's on our payroll

—or she *should* be. Employing the centrifugal force of nature, putting it to work in our foundries, is our method of producing a better casting of Bronze Alloy, Monel Metal, Nickel, Iron, or Semi-Steel.

ROLLS, SLEEVES, LINERS, BUSHINGS, BEARINGS and CASTINGS produced by this method find their way into the "tough spots" all over the world. Perhaps you have a place or a product that would benefit by their application?

It costs you nothing to find out. Write.



SHENANGO-PENN MOLD COMPANY

Plant, Dover, Ohio

Executive Offices: Oliver Bldg., Pittsburgh

ports of premiums offered for gages particularly difficult to obtain.

Cincinnati—Sheet demand continues heavy, even though deliveries are extended into third quarter, now that books for second quarter are practically filled.

Raleigh, N. C.—Peden Steel Co., Raleigh, has been awarded 200 tons No. 26 gage sheets for license tag stock for North Carolina.

Plates

Plate Prices, Page 80

Pittsburgh—Plate mills continue operating at an unusually high rate, with demand steady from practically all sources. Carnegie-Illinois Steel Corp., Pittsburgh, has taken 12,000 tons for Great Lakes carriers for Pittsburgh Steamship Co., Cleveland. Ingalls Iron Works Co., Birmingham, Ala., was lowest of six bidders on five to eight barges for St. Louis army engineers, bids March 30. Approximately 1200 tons are involved.

Chicago—Plate mill operations continue full and backlogs are well sustained by new business. While plate requirements of railroads and car builders are outstanding, good demand is coming from tank fabricators and miscellaneous users. The Milwaukee producer will furnish about 25,000 tons of the Panhandle Eastern Pipe Line Co.'s 65,000-ton line pipe order. Little additional business can be booked for second quarter delivery.

New York—Platemakers are confronted with continued heavy specifications, with deliveries in most cases six or seven weeks off as a minimum. Newport News Shipbuilding & Dry Dock Co. is low bidder on the United States liner, which will require about 16,000 tons of hull steel. The New York Shipbuilding Co. was the only other bidder. Bids will be opened the week of April 5 on one to three cargo-passenger boats for the Panama Railway Steamship Co., about 4500 tons of hull steel each.

Boston—Industrial and railroad buying of plates is brisk. Some of the latter attempted to specify more heavily than expected late last quarter and have difficulty in placing full requirements for wanted delivery. Shipments of plates bought outside New England for shipment into this district, to shipyards and carbuilding shops especially, are heavy.

Philadelphia—May delivery appears to be about the best offered in the local plate market. Some sellers are practically out of the market for the entire quarter. Re-

cent commitments include heavy specifications for the Pennsylvania railroad for car repair work against protections obtained at lower prices, which expired March 31. Approximately 500 tons of plates will be required for 12 locomotives placed with the Baldwin Locomotive Works, Eddystone, Pa., by the United Coastline.

Cleveland—Mills have made little headway against backlogs, which remain at eight to ten weeks. New business is principally for structural requirements and machinery equip-

ment. Additional tonnage from freight car fabricators is expected to further complicate the delivery situation. Most inquiries are in lots under 100 tons.

Seattle—Orders for small tanks and boilers continue to give a fair run of work. Shipyard activity is pronounced but a strike is pending. Work is progressing on siphons and outlets for the Roza canal, Yakima project, general contract to Guy F. Atkinson, Portland, Oreg. Shell Oil Co. announces additional units of the Seattle terminal improvement

We have the testimony of Master Mechanics and Chief Electricians who Know NON-FLUID OIL saves money.

When steel mill men ask—"How do I know NON-FLUID OIL will save me money?"—We can show them definite proof that our product is saving money right now for many plants in the field.

These plants tested samples at no cost. They found that NON-FLUID OIL did not drip or leak, but stayed in bearings outlasting liquid oil 3 to 5 times.

For this reason NON-FLUID OIL reduced oil cost and by constant, dependable lubrication assured better service from all equipment.

Send for testing sample today—prepaid—NO CHARGE!

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MODERN STEEL MILL LUBRICANT

Better Lubrication at Less Cost per Month

to include a steel boiler house, 50 x 30 feet and a 100-foot welded steel smokestack.

Plate Contracts Placed

65,000 tons, 18, 22 and 24-inch line pipe, for Panhandle Eastern Pipe Line Co.'s 285-mile line, to National Tube Co., Pittsburgh, and A. O. Smith Co., Milwaukee.

12,000 tons, Great Lakes freighters, for Pittsburgh Steamship Co., Cleveland, to Carnegie-Illinois Steel Corp., Pittsburgh.

130 tons, 30,000-barrel tank, Petroleum Heat & Power Co., Baltimore, to Chi-

cago Bridge & Iron Works, Chicago. 200 tons or more, (including shapes), tug and oil scow for Western Transportation Co., Portland, to Albina Engine & Machine Works, Portland.

100 tons, 36-inch welded steel pipe, East Bay municipal utility district, Oakland, Calif., to Steel Tank & Pipe Co., Berkeley, Calif.

Unstated tonnage, 100,000-gallon water tank, government camp, Friant, Calif., to Western Pipe & Steel Co., San Francisco; Spec. 883-D, March 3.

Unstated, siphons and outlets for Roza canal, Yakima project, Wash.; G. F. Atkinson, Portland, Oreg., general contractor.

Unstated tonnage, water tank, Charles-

ton, Ind., to W. E. Caldwell Co., Louisville, Ky., \$7896.

Plate Contracts Pending

700 tons, 30-inch water pipe line for Spokane, Wash.; bids in.

1200 tons, five to eight barges, for St. Louis army engineers; Ingalls Iron Works Co., Birmingham, Ala., low on March 30 bids.

100 tons, gas buoys of six types from 9 x 39 feet to 7 x 18 feet, bells, gongs and counter weights; superintendent of Light Houses, Staten Island, N. Y.; bids April 14.

100 tons, tank and miscellaneous requirements, veterans' hospital White River junction, Vt., bids April 6.

Unstated, plant digester for Crown-Wilamette Paper Co., Camas, Wash.; bids soon.

**Smoothing the flow of Steel
TO MAKE DESIGNS COME TRUE**

Houghton has long supplied drawing compounds that ease the stretch of metal. Today's line-up of drawing aids, approved by metaldom, has the following distinctive advantages:

1. May be diluted in oil, or water, or both.
2. Permanently stable.
3. Cleaned easily.
4. Won't stain.
5. Ease or retard the flow of steel as required.
6. Facilitate deep drawing.
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The Houghton Man is equipped to tell you which "Steel Draw" is best suited to your work.

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*Houghton's
Steel Draws*

Pipe

Pipe Prices, Page 81

Pittsburgh — Although specifications may slacken somewhat now that April is past, producers of tubular goods anticipate that mill operations will hold at their high rate to replace depleted stocks. March was the most active month in many years from the standpoint of specifications and shipments, yet considerable of the demand has not yet been satisfied. The feature last week was the 65,000-ton order for 18, 22 and 24-inch pipe for Panhandle Eastern's 285-mile line, placed with A. O. Smith Corp. and National Tube Co. Pure Oil Co. is reported to have let a contract to B. & M. Construction Co. for a 12-mile 6-inch line at Okmulgee, Okla. Continental Oil Co. is reported to have let the contract for laying 37 miles of 8-inch line pipe westward from the Genesee, Kans., field to Osage Construction Co. Numerous smaller line pipe projects are pending.

Cleveland — Requirements of standard steel pipe from jobbers is heavy. The expected lull in new business has not materialized, and in some cases the opposite has occurred. While deliveries are still good they have been further extended within the last few weeks. Most jobbers report the best first quarter in years. Cast iron pipe requirements remain unchanged, with foundries operating at high schedules.

Chicago—Cast pipe demand is slow to increase and sales continue less active than a year ago. A number of municipalities are unable to finance improvements and extensions, and little PWA work is appearing. Few large inquiries are pending and most orders lately have consisted of small lots.

New York—Cast pipe buying has declined, following purchase of large tonnage. Most current activity is

for miscellaneous lots under 100 tons each. WPA buying is less than that of last year. Utilities, however, are ordering more pipe, steel and cast iron, than during the last few years. Eastern pipe foundries are operating better than a month ago, largely on current bookings, having built up standard stocks during the lull earlier in the year.

Youngstown, O.—Growing demand for standard merchant pipe has built up comfortable backlogs for second quarter.

San Francisco—Los Angeles has just placed the largest cast iron pipe award of the year, 3500 tons of 8 and 12-inch. For the first time this year awards exceed those for the corresponding period last year. Bookings aggregate 11,623 tons, compared with 9658 tons for the same period in 1936.

Seattle—Inquiry for cast iron pipe is improving slowly. Local stocks are being replenished and some small tonnages are moving out of warehouses.

Tulsa, Okla.—Barnsdall Pipe Line Co. has contracted for a 70-mile six-inch oil line in Texas to Williams Bros. Corp. Will connect southern Texas to refinery at Corpus Christi, Tex. It will be oxyacetylene welded by the Lindeweld process.

Cast Pipe Placed

65,000 tons, 18, 22 and 24-inch line pipe, Panhandle Eastern Pipe Line Co.; 40,000 tons to National Tube Co., Pittsburgh 25,000 tons to A. O. Smith Corp., Milwaukee.

3500 tons, 8 and 12-inch, Class 150, Los Angeles, allocated as follows; 2400 tons to United States Pipe & Foundry Co., Burlington, N. J., 800 tons to American Cast Iron Pipe Co., Birmingham, Ala., and 300 tons to National Cast Iron Pipe Co., Birmingham, Ala.

500 tons, 2 to 8-inch, Tacoma, Wash., to Crane Co., Chicago.

420 tons, Albany, N. Y., to United States Pipe & Foundry Co., Burlington, N. J. 365 tons, 6 and 8-inch, Newton, Mass., to Warren Foundry & Pipe Co., Everett, Mass.

125 tons, 3 to 6-inch, Yakima, Wash., to Universal Pipe Co.

120 tons, 4 and 8-inch, Medical Lake, Wash., to Pacific States Pipe Co., Provo, Utah.

Unstated tonnage, 49,500 feet, galvanized welded steel pipe, small sizes, and 3300 feet, welded steel pipe, Panama, to Albert & Davidson Pipe Corp., Brooklyn, bids March 3.

Cast Pipe Pending

440 tons, 6 to 20-inch, East Bay municipal utility district, Oakland, Calif.; bids opened.

225 tons, 6 and 12-inch, Panama. Bids April 13; also 1070 feet wrought iron pipe, ½ to 4-inch, bids April 20, schedule 3240 on 2400 feet, 4 inch cast pipe.

192 tons, 4 and 6-inch, South Gate, Calif.; new bids April 5.

108 tons, 4 to 12-inch, South Gate, Calif.; bids April 5.

100 tons, 4 to 12-inch, Roseville, Calif.; bids April 14.

Transportation

Track Material Prices, Page 81

Railroad buying continues to bring tonnage to steel mills for cars and locomotives, though no further rail buying is in prospect for the present. Rail mills have sufficient backlogs to run to mid-year and in some cases to September.

The Pennsylvania has let 1500 box cars and 1000 gondolas to its own shops. This more than disposes of

the inquiry on which bids were taken March 24. Nothing official has been announced as to the 300 cement cars also included in these bids, but it is believed these also will be built in the company's own shops. This action is believed to be in response to requests of employes that work be provided for them. These cars are said to be part of the program for 10,000 cars inaugurated last fall.

Report that the Pennsylvania will build 11 additional electric locomotives is not officially confirmed.

Announcement!

STEEL MILL Auxiliary Equipment

For steel mills a new source of equipment. This organization is dedicated to the job of lending a helping hand on present production problems, or in a specialized engineering capacity on new mill installations.

Skilled workmen, guided by a competent engineering staff, plus the personal service rendered by principals of this organization assure you a thoroughly integrated and broadly competent type of service.

Following are our specialties:

- ROLLER LEVELERS
- SHEET SHEARS
- SHEET SCRUBBERS
- SHEET RECOILERS

and other Sheet and Strip Mill Auxiliary equipment.

We would appreciate your inquiries.

FESSLER MACHINE CO.

Sharon, Penna.

(PITTSBURGH DISTRICT)

Phone 495

Lehigh & New England has withdrawn its inquiry for bids on 100 gondolas.

Car Orders Placed

Lehigh & New England, 75 cement cars, to American Car & Foundry Co., New York.

Milwaukee, St. Paul & Sault Ste. Marie, 250 automobile and gondolas, to Pullman-Standard Car Mfg. Co., Chicago; 100 Rodger ballast, to American Car & Foundry Co., New York.

Norfolk Western, nine postal cars, to the Bethlehem Steel Co., Bethlehem, Pa.

Car Orders Pending

Grand Trunk, three baggage cars, bids asked.

Locomotives Placed

Atlantic Coastline, 12 locomotives, to Baldwin Locomotive Works, Eddystone, Pa.; 15 were originally inquired for but the remaining three will not be purchased at this time.

Youngstown & Northern, four diesel-electric engines, two going to the American Locomotive Co., New York, and two to the Electro-Motive Corp., Chicago.

Missouri-Pacific, six diesel-electric loco-

motives, to Electro-Motive Corp., Chicago.

Locomotives Pending

Youngstown & Northern, one switch engine, pending; this railroad just placed four diesel-electric engines.

Chief Engineers, U. S. Army, munitions building, Washington, one gasoline-mechanical drive locomotive for Fort Benjamin Harrison, Ind., bids April 6.

Wire

Wire Prices, Page 81

Pittsburgh—Despite heavy specifications and shipments in March, wire producers have found demand unslackened, particularly for manufacturers' products, since opening of second quarter. Mills continue to encounter great pressure for deliveries, indicating most material is required for immediate use. Shipments are most extended on high quality goods. Spring wire and specialties are active. Wire prices are firm on new business.

Cleveland—Requirements for both bright and galvanized wire are unusually heavy, with mills encountering great pressure for deliveries. Backlogs are still expanding despite record shipments. Most material is said to be moving promptly into consumption, as little speculative tonnage has been booked. Export demand continues strong, with prices well above domestic.

Chicago—Heavy backlogs assure capacity operations through this quarter. Specifications are heavy and buyers are pressing for delivery. Mills find it necessary to limit business from other than regular customers due to inability to make early shipment. Deliveries of merchant products are increasing as distributors' stocks are being acquired in larger volume than during corresponding period of last several years. Active spring buying of merchant products is anticipated in rural areas.

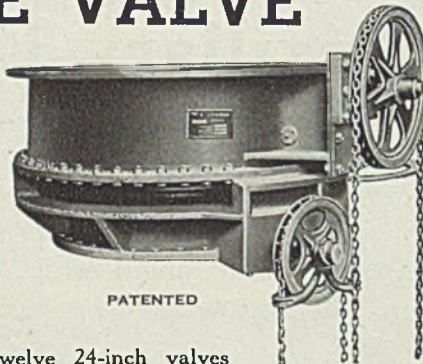
Boston—Striving to ship all first quarter orders before May 1, wire mills are operating at capacity in most departments. More tonnage booked at 3.00c, Worcester, is going out, mill drawing schedules being planned to reach the backlog of higher prices as soon as possible. Manufacturers' wire, specialties and spring material are active.

Buffalo—Wickwire Spencer Steel Co. has placed the third of its four open hearths in production at its plant in River road. This is the first time in recent years this works has expanded its ingot production to this point. A generally improving demand for rods and all wire products is given as the cause for the increase in steel output at the local works.

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Hand or Electric Motor Operated. Standard Open or Totally Enclosed Goggle Plate Type. The Ideal Valve for Gas Mains up to 60" in Diameter.



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Illustrated is one of twelve 24-inch valves furnished for operation in gas mains leading to blast furnace stove burners. Like all other American Mechanical Goggle Valve installations, they have proven quick, efficient and dependable in operation, with absolute safety for workmen.

American Mechanical Goggle Valves are designed with no moving parts, such as gears, screws or toggles inside the gas main to corrode, warp or accumulate dirt, and there are no obstructions to the gas flow. All operating parts are completely enclosed. Design is such that no expansion joints are required. Complete satisfaction in operation is guaranteed by:-

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Engineers

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PITTSBURGH, PA.

European Agents—Ashmore, Benson, Pease & Co. Ltd., Stockton-on-Tees, England

Strip

Strip Prices, Page 81

Pittsburgh—New business is steady in hot and cold-rolled strip, generally exceeding sellers' expectations. Deliveries last week became slightly more extended, further adding to mills' difficulties in satisfying urgent demands. When suspensions are lifted on automotive material producers anticipate that situation will become even tighter. Hot-rolled strip is quoted 2.40c, Pittsburgh, and cold strip, 0.25 carbon and under, 3.20c, Pittsburgh or Cleveland.

Cleveland—Strip mills have been operating close to capacity the greater part of the first quarter. Despite this high rate of activity, most mills have backlogs to continue capacity operations through this quarter. As was generally expected, sellers have been forced to carry over tonnage placed at the old prices that would normally have been shipped during first quarter.

Chicago—Strip specifications continue heavy and with second quarter books well filled, capacity operations of mills are in prospect for second quarter. Automotive consumption still is restricted by strikes but total deliveries are well sustained. Prices are firm on new business.

Philadelphia — Buying continues unabated, with mill backlogs increasingly heavy. One seller is now virtually out of the market on all grades, except for narrow strip, for third as well as second quarter. Except for narrow strip and heavy gage rolled sheets practically nothing is available for second quarter in any direction. Deliveries on galvanized sheets are especially advanced.

New York—Narrow strip is available at about seven to eight weeks, with rolling schedules generally the most favorable of all flat rolled products.

Boston—Cold strip mills are shipping more steel booked at 3.40c, Worcester, Mass., sandwiching such tonnage in rolling schedules where possible. About three-fourths of current shipments, however, is tonnage taken at lower prices. Most mills hope to clear this late this month. Meanwhile, new buying is brisk with delivery, rather than price, stressed. Demand is greatly diversified, automotive partsmakers still buying well. Delivery of hot strip is a problem with some re-rollers; four weeks is still considered good. Another price advance on cold strip this quarter is considered not improbable by some sellers.

Youngstown, O.—Considerable in-

terest awaits official announcement of production figures for March, of the wide strip mills in this locality. The expectation is that all former tonnage records will be smashed by a wide margin. Strip mills both wide and narrow are booked well through second quarter.

Tin Plate

Tin Plate Prices, Page 80

New York—Tin plate sellers are making every effort to limit cus-

tomers to tonnage of last year, with consumers urging a larger supply. As a result of the tight situation producers are forced to reject some unusually attractive foreign tonnage.

Pittsburgh—Tin plate producers are scrutinizing contracts and releases closely. Sellers report inquiries from an increasing number of occasional buyers desirous of picking up small quantities, indicating that this class of business is encountering many difficulties. With the big season for packers' cans



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ahead, shipments are expected to be increased gradually from now on. Operations hold at close to 100 per cent.

Semifinished

Semifinished Prices, Page 81

Lack of additional facilities for producing semifinished steel is being felt more keenly now than at any time in many years as producers continue to encounter urgent demands. Because of the tight situation in semifinished, some depart-

ments have been operating on unusually narrow margins. Rerolling billets, blooms, slabs, and sheet bars are quoted \$37 per gross ton, Pittsburgh: forging blooms, billets, and slabs, \$43, and skelp, 2.10c.

Cold Finished

Cold Finished Prices, Page 81

Pittsburgh—With backlogs ranging around 10 to 12 weeks in some sizes, cold-finished bar sellers find demand from most sources steady at

the higher prices and anticipate that activity will be even greater when automotive labor controversies are settled. Some difficulty is encountered obtaining tonnages promptly from hot mills. Cold-finished carbon bars are quoted 2.90c, base, Pittsburgh.

Shapes

Structural Shape Prices, Page 80

New York—Fort Pitt Bridge Works, Pittsburgh, will fabricate 3500 tons for the 6-story addition, federal building, New York, booked through the Karl Koch Erecting Co. Contracts have been more numerous as protection against specified work expired. New work developing is below the volume of recent buying.

Booking of fabricated structural steel, according to tabulations of the American Institute of Steel Construction, declined in February, bringing the total below the record for the same month last year. Shipments during the month were as large as January and 10 points higher than February of last year. Totals were: Bookings 88,946 tons, and shipments 91,848 tons.

Pittsburgh—Inquiries included 2600 tons for alterations by the Ford Motor Co., Dearborn, Mich., 1500 tons for construction work by Bridgeport Brass Co., Bridgeport, Conn., and 1500 tons for Detroit Edison Co., Detroit. Ford Motor Co. is also inquiring for 1000 tons for a factory building at Norfolk, Va. Awards last week included 1600 tons for the Potomac river bridge at Point of Rocks, Md., placed with American Bridge Co., and a number of projects between 500 and 1000 tons.

Philadelphia—While recent activity has been augmented by acceptances which expired at the end of March, fabricators look for some further good business this month as sizable projects are under active contemplation. State bridge work is one feature at this time.

Cleveland—Little headway has



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"Masterpak" protects your abrasive order from collision damage at edges and corners. Keeps out moisture and other damaging elements. When you buy JEWEL, you can use all you buy. Abrasive Products, Inc., South Braintree, Massachusetts.

Shape Awards Compared

	Tons
Week ended April 3.....	20,398
Week ended March 27.....	28,151
Week ended March 20.....	30,013
This week, 1936.....	14,900
Weekly average, 1936.....	16,332
Weekly average, 1937.....	27,274
Weekly average, March....	28,634
Total to date, 1936.....	289,237
Total to date, 1937.....	381,832

ABRASIVE PRODUCTS INC.
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been made against backlogs as new awards and inquiries continue above expectations, although limited to small tonnages. Most fabricators have orders to keep operating at a high rate for six to eight weeks, and are becoming more particular on what jobs they will submit bids. Pending work aggregates considerable tonnage from private sources.

Chicago—Activity is slow to respond to seasonal influences and both inquiries and awards show no improvement. While there is a fair volume of work involving small lots, larger projects are few. One exception is 1200 tons for a steel warehouse here. A Miami, Fla., bridge will take 1500 tons and 1000 tons will be required for Texas oil derricks.

San Francisco—Bids were taken on approximately 1500 tons for a depot supply building for the Government air depot, Sacramento, Calif., and on 2250 tons for three crossings in connection with the East Bay facilities yards of the San Francisco-Oakland bridge project in Oakland. Awards aggregated only 781 tons, bringing the total for the year to 66,240 tons, compared with 36,425 tons last year.

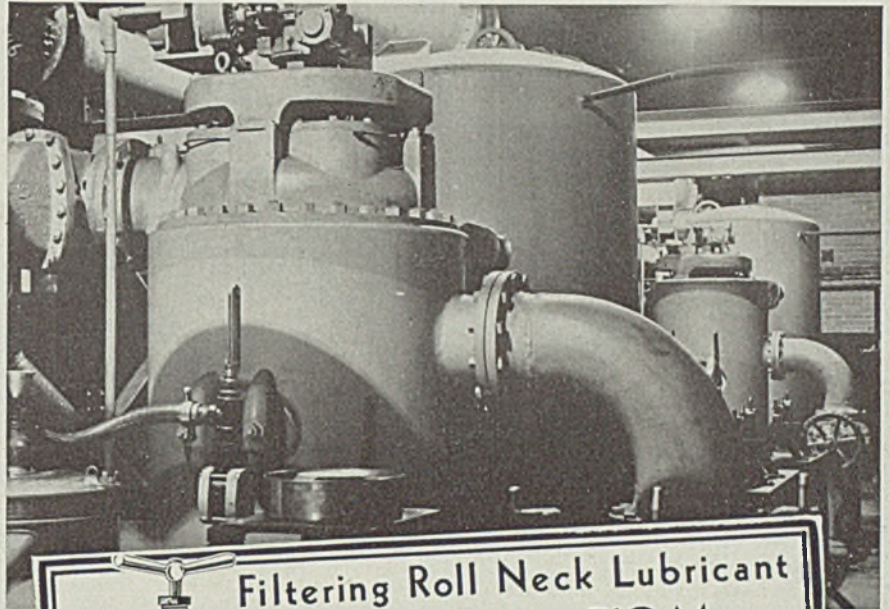
Seattle—The largest project pending totals 5500 tons for transmission towers for Seattle city light department; bids opened April 1. For a state viaduct at Tacoma, 363 tons are involved. Bids were opened March 30.


Shape Contracts Placed

- 2600 tons, sewage disposal plant, Stickney, Ill., to Bethlehem Steel Co., Bethlehem, Pa.
- 1600 tons, bridge over Potomac river, Point of Rocks, Md., to American Bridge Co., Pittsburgh.
- 1575 tons, Automotive Vocational high school, Brooklyn, N. Y., to Harris Structural Steel Co., New York; through Walter Kidde Constructors Inc., New York.
- 1525 tons, service building, Detroit Edison Co., Detroit, to R. C. Mahon Co., Detroit.
- 995 tons, bridge, Pennsylvania railroad, Silver Creek, N. Y., to Mt. Vernon Bridge Co., Mt. Vernon, O.
- 980 tons, public school No. 162, New York, to Lehigh Structural Steel Co., Allentown, Pa.
- 850 tons, buildings 40, 41, and 48, for Aluminum Co. of American, Massena, N. Y., to Bethlehem Steel Corp., Bethlehem, Pa.
- 800 tons, slab storage yard, for Republic Steel Corp., Cleveland, to Fort Pitt Bridge Works, Pittsburgh.
- 700 tons, building, Medina, N. Y., for H. J. Heinz Co., Pittsburgh, to Bethlehem Steel Co., Bethlehem, Pa.
- 670 tons, addition, Albany Felt Co., Albany, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.
- 505 tons, storage building, Olds Motor Works, Lansing, Mich., to R. C. Mahon Co., Detroit.
- 450 tons, telephone building, for Chesapeake & Potomac Telephone Co., Washington, to Barber & Ross Inc., Washington.

- 430 tons, buildings for West-Vaco Chlorine Products Corp., Newark, Calif., to Rogers Structural Steel Co., Cory, Pa.
- 350 tons, mill building, for Rustless Iron & Steel Co., Baltimore, to American Bridge Co., Pittsburgh.
- 330 tons, school addition, Camden, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.
- 300 tons, power house, for Rocky Mountain Power Co., Poison, Mont., to Kansas City Structural Steel Co., Kansas City, Mo.
- 300 tons, plant addition, Campbell Soup Co., Camden, N. J., through Thomas Gibson, Philadelphia, to the Belmont Iron Works, Eddystone, Pa.

- 280 tons, grade crossing elimination, Folsom, N. J., to American Bridge Co., Pittsburgh.
- 280 tons, hospital building, Nayview, Pa., to Levinson Steel Co., Pittsburgh.
- 275 tons, bridge, 1956, Cheyenne and Lincoln counties, Colorado, to Midwest Steel & Iron Works Co., Denver.
- 275 tons, bridge, Lycoming county, Pennsylvania, through T. N. Flannigan, Reading, Pa., to the American Bridge Co., Pittsburgh, Pa.
- 270 tons, warehouse building, for Upjohn Co., Kalamazoo, Mich., to Mississippi





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In the foreground is shown a CUNO Type SV-4 FILTER handling 550 GPM of oil 2200 S.S.U. @ 100° F. In the background another CUNO Type SV-3 FILTER handling 360 GPM of oil 2200 S.S.U. @ 100° F. These large capacity, heavy duty units have a wide range of applications. Each FILTER is motor operated and individually fabricated to the requirements of the service for which it is intended. Let us tell YOU how CUNO Auto-Klean FILTRATION can show YOU important operating economies.

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and information on your confidential engineering service.

Name

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City and State

Mississippi Valley Structural Steel Co., Decatur, Ill.
 270 tons, Delaware aqueduct, contract No. 333, New York, to Jones & Laughlin Steel Corp., Pittsburgh.
 250 tons, building, Western Printing & Lithographing Co., Poughkeepsie, N. Y., to Bethlehem Fabricators Inc., Bethlehem, Pa.
 250 tons, hoist support and electrode bus frames, for Aluminum Co. of America, Alcoa, Tenn., to Chattanooga Tank & Boiler Co.
 250 tons, science and library building, State college for Negroes, Petersburg, Va., to Richmond Structural Steel Co. and Virginia Steel Co., Richmond; through Virginia Engineering Co., New-

port News.
 235 tons, building, for Columbia Mills Inc., Minetto, N. Y., to Rogers Structural Steel Co. Corry, Pa.; through H. K. Ferguson Bros., Cleveland.
 230 tons, alterations, Hotel Statler, Detroit, to R. C. Mahon Co., Detroit.
 230 tons, bridge, Lehigh Valley railroad, Mendon, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.
 220 tons, highway bridge, Elm City, N. C., to Southern Engineering Co., Charlotte, N. C.
 195 tons, three-story building, E. R. Squibb & Sons, New Brunswick, N. J., to H. R. Goeller, Inc., Hillside, N. J.
 185 tons, Central school, Ovid, N. Y., to F. L. Heughes & Co., Rochester, N. Y.

175 tons, Hudepohl stock house, Cincinnati, to R. C. Mahon Co., Detroit.
 170 tons, bridge, Coatesville, Pa., for the Reading Co., to the Phoenix Bridge Co., Phoenixville, Pa.
 165 tons, beam spans and bridge repairs, Chicago, Milwaukee & St. Paul railroad, Minnesota, to Duffin Iron Works Co., Chicago.
 155 tons, hospital building, Ada, Okla., to Capitol Steel & Iron Co., Oklahoma City.
 155 tons, shop building, Shartle Bros., Middletown, O., to Oregonia Bridge Co., Lebanon, O.
 155 tons, public service building, Niagara Falls, N. Y., to R. S. McMannus Steel Construction Co., Inc., Buffalo.
 140 tons, two oil heaters, Heath, O., to Pittsburgh Bridge & Iron Works, Pittsburgh.
 130 tons, bridge, Yarmouth, Me., to American Bridge Co., Pittsburgh.
 118 tons, state bridge, Leominster, Mass., to Truscon Steel Co., Youngstown, O.; through G. Bonazolli & Sons, Hudson, Mass., general contractors, includes 44 tons of bars.
 Unstated tonnage, warehouse, A. P. W. Paper Co., Albany, N. Y., to James McKinney & Sons, Albany.

Behind the Scenes with STEEL

Coast Calls

MAIL sacks on a large airliner which set down at Cleveland airport the other morning with post from the coast contained a letter to our circulation department requesting rush attention to a two-year subscription to STEEL for a Columbia Steel Co. representative in San Francisco.

The order asked prompt attention because the new subscriber "finds himself considerably in need of the valuable information contained in your publication."

Things like that are what puts the old pep in our circulation department, which went into action in a flash, like the well-oiled machine that it is. Stenciling machines started to hum, record cards flew into the files, a copy of STEEL was whisked into an envelope and inside of 9½ minutes was on its way to San Francisco.

STEEL is widely read on the West Coast, our special agents inform us. As yet, though we haven't been able to crash into the select set of the movie colony, but we are mulling over the plan of making a special trip Hollywoodward to see if we can't sign up Dietrich, Garbo, and the rest.

Pals

BROWSING through the pages of that lusty Timententerprise Infant, *Life*, we came across a letter to the editor from one E. C. Barringer, former managing editor of STEEL and now editor of *Daily Metal Trade*. Mr. B. took time off from his arduous hours of interpreting developments in the metal trades for 15,000 readers, to set *Life* aright concerning some erroneously reported news developments in the steel industry.

Immediately following Mr. B.'s erudite contribution was a sprightly note from dear old Jean Harlow, curvilinear movie queen. While he didn't say so, we're sure Mr. B. felt a rich glow from the intimate association (in print) with so comely a lass.

Well, *Life's* like that!

Rod Man

WITH all the eagerness we used to show in devouring the *Rover Boys in the Wild West*, *Rover Boys at the Bottom of the Sea*, *Rover Boys in Darkest Africa*, etc., we

have been following the peregrinations of Whitey Maurath in his advertisements appearing in STEEL regularly. Whitey, in the person of a cleverly executed marionette, has sure been getting around. First it was *Whitey as Kris Kringle*, then *Whitey at the Zoo*, then *Whitey Behind the Bar*, then *Whitey at the Art Museum*.

What's going to be next we haven't the faintest idea. Pumping Creative Artist L. D. Bradbury did no good. Maybe it'll be *Whitey and His Giant Cannon*.

Latest on Squatdowns

IN THE March 31 issue of *National Petroleum News*, a leading publication in the oil industry is a comprehensive report on the labor situation in Detroit. It was prepared at the request of NPN editors by STEEL's Detroit editor who complains his typewriter keys are in a tangle these days trying to keep up with the latest in sitdown strikes.

Our Detroit man also tells us you can't buy a tin whistle anywhere in the city today. All bought up by strike organizers.

Mind Over Matter

REPRINT order for a series of articles published in these pages recently was received from Case School of Applied Science, local engineering college. The order was very official looking, but the puzzling thing about it was the printed name of the addressee: Case Metallurgical Department.

Maybe that's what the country needs, more metallurgical training. More metallurgists among metallurgists.

Buy! Buy!

INFLUX of new subscriptions to STEEL continues unabated, our sleuths in the circulation department report, with orders from all four corners of the industrial world moving up the press run to 12,000.

Accurate survey of total number of readers each week indicates the figure is approximately 63,729. Laid end to end, the copies in a week's edition would extend over 2,272,727 miles, but what a job it would be picking them up.

—SHRDLU

Shape Contracts Pending

3800 tons, viaduct, from 153rd to 160th streets, for Westside Elevated highway, New York; Poirier & McLane Corp., New York, low.

2600 tons, alterations to transfer building, Ford Motor Co., Dearborn, Mich.
 1935 tons, five Pennsylvania state bridges, opened April 9; including 480 tons for a bridge in Clearfield county, 440 and 420, respectively, for two bridges in Westmoreland county, 420 in Cameron county and 175 in McKean county.

1500 tons, bridge, Miami, Fla.
 1500 tons, rolling mill and office building, Bridgeport Brass Co., Bridgeport, Conn.
 1200 tons, warehouse, Central Steel & Wire Co., Chicago.

1200 tons, public school No. 117, Bronx, N. Y.; Psaty & Furhman Inc., New York, low.

1000 tons, factory building, for Ford Motor Co., Norfolk, Va.

1000 tons, derricks, Sinclair Refining Co., Houston, Tex.

900 tons, public school No. 253, Brooklyn, N. Y.; Reiss & Weinsler Inc. Brooklyn, low.

700 tons, manufacturing and office building, Solvay Process Co., Syracuse, N. Y.
 600 tons, warehouse, Louisville, Ky.

550 tons, gate track support towers, Guntersville dam, Alabama, for Tennessee Valley Authority.

500 tons, repairs to Manhattan bridge, New York; Taylor-Fichter Structural Steel Co., New York, low.

450 tons, bridge, Rumford-Mexico, Me.

445 tons, Roosevelt highway bridge, United States Engineers office, Los Angeles; bids April 5.

400 tons, Pine Creek bridge, near Victor, Idaho; bids opened.

380 tons, bridge, Culver boulevard, Los Angeles; bids April 12, specifications 282, to U. S. Engineer, Los Angeles.

310 tons, crossing, Green River, Wyo.; bids opened.

300 tons, addition to public school No. 169, Brooklyn, N. Y.; Tremont Subway Co., New York, low.

300 tons, manufacturing and office building, for LaChoy Food Products Co., Detroit.

250 tons, alterations, power house, Bellevue hospital, New York; bids in.

230 tons, Meyer's canon bridge No. 471.62, Malvado, Tex., for Southern Pacific Co.
 225 tons, ventilation building, tunnel, George Washington bridge approach, New York; bids April 13, Port of New York Authority.
 200 tons, bridge, Worlds Fair site, Flushing, N. Y.; bids April 27.
 200 tons, buildings, Acme Steel Co., Riverdale, Ill.
 200 tons, state highway bridge RC-3865, Ithaca, N. Y.
 200 tons, store building addition, for F. R. Jelleff, Washington.
 150 tons, Lorain street theater, Cleveland; bids in.
 100 tons alterations to Gibson dam, Sun River project, Mont.; McLaughlin Construction Co., Livingston, Mont., low. Also 75 tons of bars.

chant bars are not active, new business consisting of small lots.

Chicago — Reinforcing bar inquiries are slow to increase but shipments hold at an active rate. Orders for small lots are fairly numerous and while occasional large awards are appearing, the increase is somewhat slower than usual. Orders include 800 tons for a building in Minneapolis. State road and bridge work is relatively quiet.

Philadelphia — Reinforcing bar buying has been exceptionally light.

However, considerable work is in prospect and by the end of next week a heavy volume of public work is expected. Prices are holding steady at the new levels, with greater stability being manifested than at any time in recent years.

Buffalo—Producers have many inquiries for bridge and road projects resulting from recent floods. All producers of concrete reinforcing material are on greatly expanded production schedules, in comparison to their averages of recent years.

Reinforcing

Reinforcing Bar Prices, Page 81

Cleveland — Reinforcing bar requirements have improved during the last few weeks, particularly from private sources. While awards generally are confined to jobs under 100 tons, a few large jobs are pending. A slight extension in mill deliveries has been noted, usually at three to four weeks.

Pittsburgh—First quarter ended with tonnage awarded in projects over 100 tons definitely behind 1936, but producers believe volume of smaller jobs has been greater. Privately financed construction projects are forging ahead faster than at any time since 1929.

San Francisco—Mill backlogs are still heavy and new business continues unchecked. Awards totaled 993 tons. This brings the aggregate for the year to 20,263 tons, compared with 71,405 tons in 1936. The bureau of reclamation has taken bids, under invitation A-42, 211-A, for 2114 tons for Potholes, Calif. The requirements of the Central Valley water project in California, estimated to cost over \$170,000,000, call for over 10,000 tons of bars and 57,000 tons shapes.

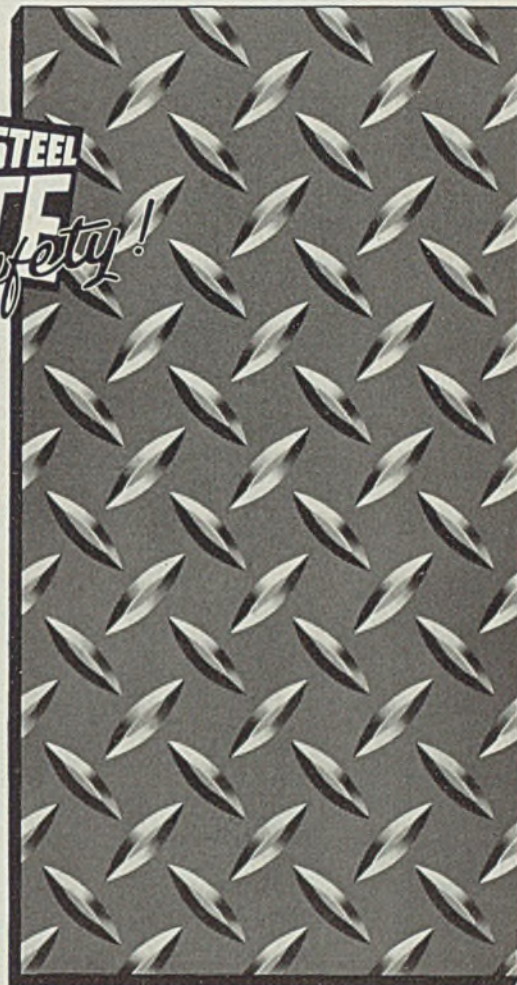
Seattle—Recent awards consist of small tonnages. Local mills are working to capacity on backlogs. The price situation is firm. Mer-

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 for Safety!

"A. W." Rolled Steel Floor Plate is, above all else, engineered for *safety*. It gives men's feet a firm, safe grip—keeps their minds free from worry over loss of balance—speeds their work—and protects management as well as men against accidents.

But, in addition, "A.W." Floor Plate makes the most sanitary flooring—it drains quickly—is easily kept clean. And it is oil proof, crack proof, heat proof. It is the toughest flooring you can install—and will lick your toughest flooring problem.

Installation is quick—and PERMANENT. First cost is low.



"A. W." Super-Diamond pattern shown half size.

There is no maintenance cost.

Write for literature giving engineering data and illustrating 5 Floor Plate patterns to meet every possible flooring problem in industry.

Concrete Awards Compared

	Tons
Week ended April 3	3,570
Week ended March 27	3,878
Week ended March 20	4,786
This week, 1936	6,443
Weekly average, 1936	6,005
Weekly average, 1937	3,949
Weekly average, March	5,402
Total to date, 1936	109,546
Total to date, 1937	55,291

ALAN WOOD STEEL CO.
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 Branches: Philadelphia, New York, Boston, Detroit, Los Angeles, San Francisco, Seattle, Houston
 111 YEARS' IRON AND STEEL MAKING EXPERIENCE

New York — Reinforcing steel buying is light, although somewhat better volume in small lots is moving from warehouses. Most tonnage on which protections were given have been bought. Meanwhile new work is coming out slowly, with the new prices not severely tested. Contractor-buyers are, however, still pressing for concessions.

Boston—Award of 530 tons for a Connecticut river bridge leads reinforcing buying in New England. Bid on this material in place was 4.05c by the contractor. Inquiry is slightly heavier. Some recently placed volume on billet and rail steel bars has moved under the higher quotations, shaded on rail steel bars materially.

Reinforcing Steel Awards

- 800 tons, building, Minneapolis, to Calumet Steel Co., Chicago.
- 530 tons, bridge, Connecticut river, Gill-Montague, Mass., to Northern Steel Co., Boston, Daniel O'Connell's Sons, Inc., Holyoke, Mass., general contractor.
- 300 tons, Illinois road work; 200 tons to Concrete Engineering Co., 100 tons to Calumet Steel Co., Chicago.
- 300 tons, North tube, Mid-town tunnel, New York, to Concrete Steel Co., New York; through Underpinning & Founda-

- tion Co., subcontractor under Mason & Hangar Co., New York.
- 260 tons, fertilizer plant, Farmers' exchange, Cambridge, Mass., to Morrison-Stevens Co., Boston; M. Spinelli & Sons, Boston, general contractor.
- 255 tons, turn tables, Northern Pacific, to American Bridge Co., Pittsburgh.
- 225 tons, plant addition, Wright Aeronautical Corp., Paterson, N. J., to Truscon Steel Co., Youngstown.
- 223 tons, addition to Lyon street approach, Golden Gate bridge, San Francisco, to Soule Steel Co., San Francisco.
- 217 tons, bureau of reclamation, invitation 42,668-A, Potholes, Calif., to Colorado Fuel & Iron Co., Pueblo, Colo.
- 200 tons, building, Keebler-Weyhl Baking Co., Philadelphia, to Bethlehem Steel Corp., Bethlehem, Pa.
- 160 tons, bureau of reclamation, invitation 42,670-A, Potholes, Calif., to Concrete Engineering Co., Omaha, Nebr.
- 100 tons, substructure and approaches, bridge, Kentucky river, Frankford, Ky., to Sheffield Steel Co., Kansas City, Mo.; Sandy Hites Co., Kansas City, general contractor.

Reinforcing Steel Pending

- 2114 tons, bureau of reclamation, invitation A-42,211-A, Potholes, Calif.; bids opened.
- 600 tons, three large highway reconstruction projects, Greenwood, N. Y.; bids in.
- 375 tons, footings for transmission towers, Seattle light department; bids in.
- 300 tons, four lane concrete highway, from Nelson to Oakville, Canada, for highway dept., Ontario; bids in.

- 225 tons, Warsaw-Perry Center, N. Y., highway; bids soon.
- 200 tons, hospital for chronic diseases, Welfare Island, N. Y.; Cauldwell-Wingate Co., New York, low.
- 160 tons, crossing, East Bay facilities yards, San Francisco-Oakland bridge project, Oakland, Calif.; bids opened.
- 150 tons, chapel and residence, Darlington, N. Y.
- 100 tons, bars and miscellaneous steel requirements, Tabor Overpass, Vt., over Central Vermont railroad; bids April 9 to state highway department, Montpelier, Vt.
- 100 tons, for Perry Center—Moscow N. Y., highway; bids soon.
- Unstated, 102 foot state concrete span, Lewis county, Idaho; bids at Boise, April 6.

Pig Iron

Pig Iron Prices, Page 82

Pittsburgh—Producers entered second quarter with stocks badly depleted after extremely heavy shipments in March and with bookings exceptionally large for second quarter. Good-sized domestic and foreign inquiries have been numerous, but some unusually high prices reported commanded for export material from this district have not been substantiated. Melt by domestic open hearths and foundries shows no sign of slackening. Prices are steady.

Philadelphia — Several thousand tons of pig iron for Japan have been booked by an eastern Pennsylvania merchant furnace, the second in this district to have participated in this Japanese business. Premiums are being paid for export, although foreign buyers apparently are not yet willing to pay the price of \$30, f.a.s., or more than \$4 above the delivered Philadelphia price for No. 2 foundry iron, which is being asked by some furnaces. Domestic buying is featureless but with shipments heavy.

Boston—Paying substantial premium prices, Japan has bought approximately 35,000 tons of basic and foundry pig iron from Mystic Iron Works, Everett, Mass. A good part of the purchase includes basic. Some of the order is forward buying for later delivery. Mystic furnace is still awaiting ore arrivals from three sources, expecting to go into blast about April 20. While most larger consumers are covered substantially for second quarter, domestic buying in limited lots by smaller melters for early delivery is fairly active. Prices are firm on the basis of \$25.75, No. 2 foundry, Everett.

Buffalo—Sales of pig iron have dropped off because of the wholesale covering of last month. Practically all consumers of importance have placed most of their second quarter business and a quiet period is indi-

**Full Finished
 MEANS
 FINISHED ALL
 OVER-HEAD
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cated, so far as new business is concerned. Steelworks are using all available basic iron in open hearth mixtures because of high prices on scrap and shortage of some grades.

New York—Pig iron shipments continue heavy, although new domestic orders are rather spotty. Consumers generally have contracted for their requirements over second quarter.

Cleveland—Producers report the lull in buying following the price advance was considerably less than expected. New business is coming from smaller consumers as most of the larger melters are well covered. Little tonnage remains open for second quarter delivery. March shipments were well ahead of February and no lessening is expected. Prices are firm with a possibility of another advance rumored.

Chicago—First quarter pig iron shipments were more than double those of corresponding 1936 period and with second quarter production already taken care of by orders, brisk deliveries are in prospect for ensuing three months. Foundry operations are steady in most directions though labor troubles occasionally are restricting production. Most foundries now have covered second quarter needs, with market firm at \$24, furnace, for No. 2 foundry and malleable.

Cincinnati—Shipments of pig iron during March ranked with the heaviest in district history as melters took tonnage on contracts made at lower prices. Books of furnaces are fairly well cleared of this iron and, with melters supplied for a few weeks, new business is dull.

St. Louis—Buying of pig iron is confined to small lots for prompt shipment as consumers are nearly covered for second quarter and producers have little to dispose of for that period. All old contract tonnages have been specified, but despite the large movement in March, not all shipments were completed by April 1. According to leading distributors of both northern and southern iron March shipments will represent the highest total for the year to date, and the heaviest March aggregate since 1929.

Nashville, Tenn.—Tennessee Products Corp. has booked an order for 1500 tons of charcoal pig iron from South Africa. This is the first purchase of pig iron from that continent in many years.

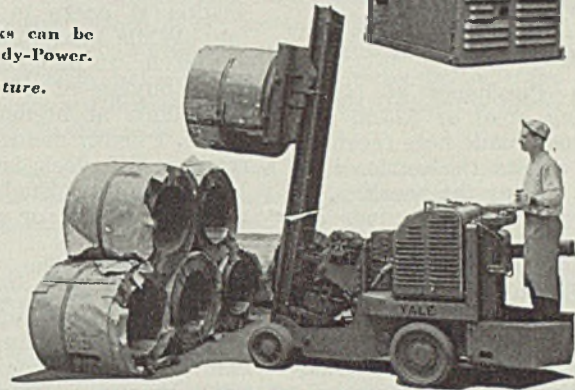
Toronto, Ont.—While there was a minor decline in business as a result of the Easter holidays, there was a general return of interest. Demand for pig iron continues active and inquiries are increasing. A number of melters have covered second quarter needs and others are

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falling in line. Spot sales are heavy with awards for the past week around 1500 tons. The recent advance in price tended to stimulate demand and melters are inquiring rather than just placing orders as was the case for several years. Competition from United States producers is becoming keener and Canadian melters now are taking larger tonnages from across the border. Production is increasing and prices are firm at levels announced last week.

Scrap

Scrap Prices, Page 84

Pittsburgh—Purchases of No. 1 heavy melting steel at \$23.50 and \$24 having been made here recently, the market awaits the outcome of railroad lists closing this week. The district's largest mill consumer obtained scrap at \$23.50 last week after the market had been inactive for several days. Speculation immediately became rife over whether dealers were having trouble covering at a profit. Two factors, the automotive labor situation and the proposals for an embargo on export scrap,

were being studied closely for their probable effect.

Philadelphia—Scrap prices have again advanced, No. 1 and No. 2 steel and machinery and heavy cast grades among the principal items affected. Export scrap is again being quoted at \$20 and \$19, local dock, for No. 1 and No. 2 steel, respectively, with higher prices indicated, especially in view of agitation for restriction of exports. At Baltimore \$21 and \$20, respectively, have been done on these grades and even higher prices are reliably reported.

Boston—Still curtailed by partial embargoes, export demand for scrap continues the dominant factor. Congestion at docks is gradually easing. While heavy melting steel for export is unchanged at \$18, dock, some buying of other grades has been done at higher prices. Sale of No. 1 heavy melting steel to Germany at \$19, dock, is reported. No. 1 cast for New England delivery is stronger at \$17 or slightly better, f.o.b. cars.

New York—The upward price trend for all active grades of scrap continues in spite of relatively uncertain sentiment and less feverish demand for both domestic and export supply. Material is coming out freely and the lull probably is

due to heavy buying earlier in the month. No. 1 heavy melting steel is up 50 cents, dock delivery or car loading. For domestic shipment the spread between No. 1 and No. 2 steel is widening.

Buffalo—Buying of No. 1 heavy steel is active although some dealers have retired from the market after booking all the tonnage they felt free to sell at current offers. Belief is that from 15,000 to 25,000 tons of material was sold at \$20 to \$20.50 for No. 1 steel with \$21 now asked by most dealers. Borings and turnings and many other materials which sell at differentials under No. 1 steel have been advanced. As high as \$24 is now asked for low phosphorus scrap.

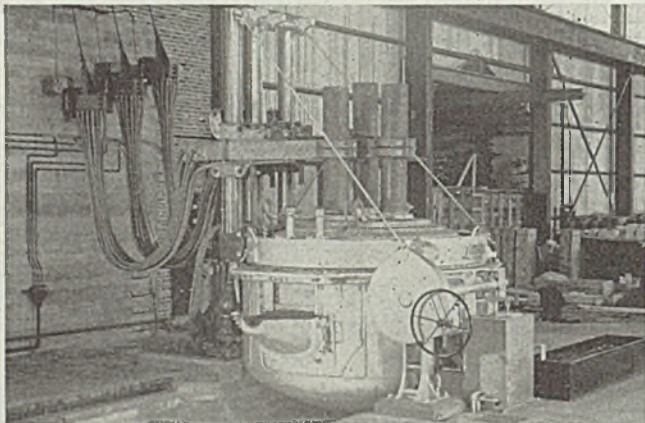
Detroit—Prices of steel and iron scrap are unchanged except for an increase in compressed sheets which are now \$19.50 to \$20. The melt is high in this district.

Chicago—While mill buying of steel scrap was quieter the past week, prices continue strong. Offerings are heavy under the stimulus of high prices but no weakness is apparent in bids of dealers and brokers. No. 1 heavy melting steel continues at \$21.50 to \$22, with sellers generally unable to pick up this grade at less than \$21.50. Railroad lists have attracted bids as high as \$22.65. Steel foundry grades continue strong.

Cincinnati—Heavy grades of iron and steel scrap have advanced 50 cents, with sheet clippings joining in the advance. Quiet purchasing is in comparatively small tonnages as dealers and brokers avoid a short position.

St. Louis—Symptoms of congestion are beginning to appear in the market for scrap iron and steel, particularly on No. 2 heavy melting steel and mixed scrap. Large quantities of dealers scrap is appearing, and with lack of adequate unloading facilities at some industries and with storage space filled, embargoes are threatened. These conditions, however, do not apply to No. 1 heavy melting steel and railroad specialties, for which demand is as strong as ever, and prices higher. Heavy melting railroad steel for Granite City delivery was advanced 25 cents per ton to a range of \$18.25 to \$18.75, a new peak on the present upward movement. No. 2 heavy melting for St. Louis delivery was reduced 25 cents per ton.

San Francisco—Activity of Japanese scrap buyers on the Pacific Coast has been pronounced during the past few weeks and high prices have been paid for No. 1 and No. 2 scrap, \$18 and higher per ton. It is estimated that at least 45,000 tons is awaiting bottoms, especially hard to secure at present. Coast mills



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display little interest in present quotations as they have large stocks. In event of an embargo considerably lower prices are looked for. The Japanese are now loading old steamers with scrap and these vessels will go to the scrap pile with the scrap.

Seattle — The market continues firm and active. Domestic demand is steady, mills and foundries buying in sustained volume. Japanese interests are hesitating, after supplying their immediate needs following the maritime strike. New price levels are more than the Oriental market will pay for forward business but it is expected they will be able to adjust themselves shortly and business will be resumed.

Toronto, Ont. — Scrap markets showed little change for the past week. There is shortage of materials and difficulty in obtaining supplies for current needs. Mills are pushing dealers for steel grades and foundries and electric furnace operators are in the market for iron scrap. Dealers state that yard holdings are disappearing rapidly and little scrap is coming in. Heavy melting steel, turnings and other steel grades have a persistent call, both in the Toronto and Montreal markets and dealers in the former area are making all possible shipments to the Hamilton area.

Warehouse

Warehouse Prices, Page 83

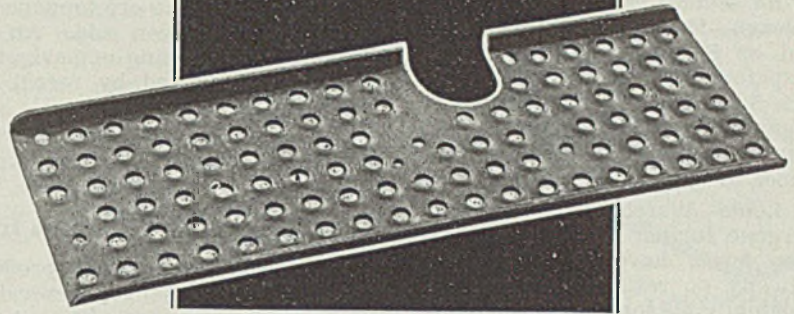
New York—Demand for steel out of warehouse continues brisk following the heaviest tonnage in many months moved in March by most jobbers. Buying is diversified with only structurals inclined to lag. Deliveries continue the major problem, some products being further extended.

Pittsburgh — Warehouse buying continues to exceed expectations. Sheets, structurals, bolts and nuts, bars, bands and most other products are active as the result of extended mill delivery conditions. In some lines it is difficult for distributors to keep stocks up to par. Prices are steady.

Philadelphia—Indications point to the best monthly volume of warehouse business here in several years in March. Distributors look for continued high rate of activity in April.

Cleveland — Warehouse distributors report continued high rate of demand, due to mill delivery conditions. Up to a month ago the greatest portion of miscellaneous requirements were for lighter gage flat rolled material. To a certain extent this still is true but a rather

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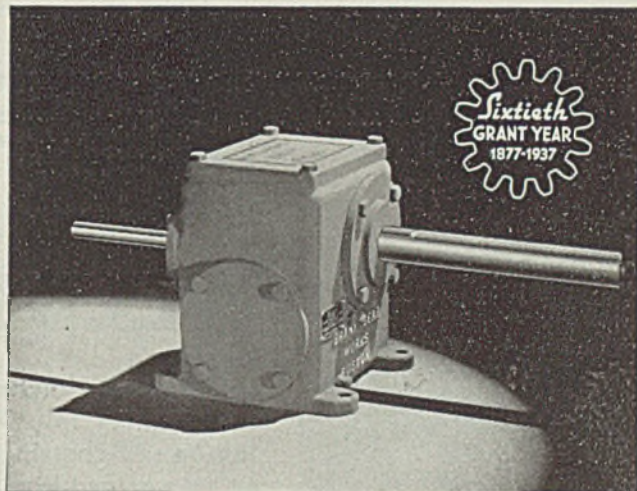
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marked improvement in demand for structural material has been noted. Orders have been more diversified than for several years.

Chicago—March sales are well ahead of February, due partly to anticipatory buying before the March 8 advance. Some letdown is thought likely in April with a generally steady trend during the remainder of the second quarter.

St. Louis—Warehouse prices have undergone further revision and the higher levels have thus far met practically no resistance. Demand for virtually all commodities continues brisk with sheets, plates and other rolled materials still leading in current volume. March sales exceeded those of February by a fair margin.

Seattle — Business is reasonably active, buyers having adjusted themselves to new price levels. Schedules are being generally supported, Oregon and Washington working on identical tariffs. Portland and Seattle jobbers met this week and sentiment was unanimous to adhere to the new prices. Stocks are short and deliveries are uncertain.

Iron Ore

Iron Ore Prices, Page 84

Cleveland — Cleveland-Cliffs Iron Co. chartered the steamer GEORGE H. INGALLS for the coming season, from the Automotive Trades Steamship Co., Buffalo, which purchased her last summer with the intention of converting her into an automobile

carrier. Capt. A. J. Rathbun of the Cleveland-Cliffs fleet will be in charge.

All available lake ore tonnage for this season has been sold. An unusually early opening of navigation has been prevented by recent adverse weather.

Coke By-Products

Coke By-Product Prices, Page 81

New York—Coke oven by-products are firm and unchanged, several being more active, including phenol and sulphate of ammonia. Current high production of distillates is being absorbed by industrial consumers, notably lacquer-makers. Phenol shipments for the plastic industry are heavy. Seasonal specifications from the fertilizer trade for sulphate of ammonia are resulting in heavy shipments. The upturn in naphthalene holds steady.

Ferroalloys

Ferroalloy Prices, Page 82

New York—The market for manganese ore is exceptionally strong, with supplies now scarcer than in many years, and premium price being paid for practically all that is available. Substantial sales were noted in the week at 40c to 42c, per unit, in cargo lots, not including duty, for Caucasian, South African and Indian ore, 50 to 52 per cent grade. In some quarters no supplies of ore are available for de-

livery in 1937. In this situation the market is entirely nominal and as high as 45 to 46 cents per unit has been quoted.

Reasons for the apparent shortage are that steel production both in the United States and Europe is virtually at capacity, and there has been a heavy accumulation of reserve stocks along with other basic commodities.

Observers in the market believe that if this shortage continues and the price of ore should reach 50 cents per unit or more, ferromanganese also will be advanced.

Steel in Europe

Foreign Steel Prices, Page 83

London—(By Cable)—Shortage of pig iron, scrap and semifinished steel continues acute in Great Britain and is hampering booking of new business. Steelworks are operating at capacity and the Easter recess scarcely interrupts production.

The Continent reports active conditions and works books are filled for five to six months. High premiums still are offered for reasonably prompt deliveries. The British and Indian markets are particularly active.

Bolts, Nuts, Rivets

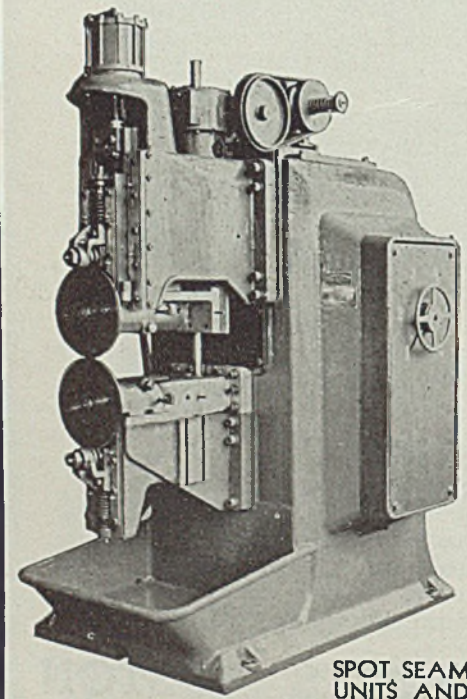
Bolt, Nut, Rivet Prices, Page 81

Specifications for bolts, nuts and rivets indicate continuation of heavy shipments during April. Railroads and freight car builders maintain active operations and schedules of farm implement and tractor manufacturers continue near capacity. Specifications from jobbers reflect heavy demand from miscellaneous users. A more thorough test of higher prices on bolts and nuts is looked for this month.

Metallurgical Coke

Coke Prices, Page 81

Coke and coal operators in the Connellsville, Pa., region proceeded under the assumption last week that there would be no protracted layoff due to contract negotiations in New York. April 1, of course, was observed as a holiday, but it was believed that production otherwise would not suffer greatly. New contracts contain protective clauses in the event pay raises were granted. Additional coke ovens are being fired as the heavy demand shows no sign of slackening. Fay-West Coal & Coke Co. is reported to have



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leased 100 ovens at York Run, Pa., from the Frick Coke Co. Borts Coal Co. is reported to have fired 40 more ovens at Acme, near Smithfield, Pa.

By-product foundry coke has been advanced 75 cents a ton at Chicago to \$10.25, ovens, for outside delivery and \$11, delivered Chicago. Higher wages and prospective advances in coal prices as a result of a new contract with the mine union are responsible for the increase. Current prices are the highest since 1926. Shipments continue heavy, March deliveries being the largest so far this year.

Navy Steel Is Awarded

Boston — Carpenter Steel Co., Reading, Pa., at \$6994.30, delivered, has been awarded a contract for corrosion-resisting steel tubing for Portsmouth, N. H., and Mare Island, Calif., navy yards, bids March 12.

Struthers-Wells-Titusville Corp., Titusville, Pa., has booked steel shafts for the same points, mostly Portsmouth, at \$33,490; bids March 2. Bethlehem Steel Corp. took turbine blades for various eastern yards at \$46,636.56.

Washington—The navy department has announced an award of 3,830,779 pounds of steel plates to Central Iron & Steel Co., Harrisburg, Pa., at \$106,852.75.

The department has also awarded a contract for 150,000 pounds of special tees to Bethlehem Steel Co., San Francisco, at \$5,311.25. The same company will also furnish 525,400 pounds of steel shapes for stock at \$20,680.67 and the Carnegie-Illinois Steel Corp. will furnish 911,918 pounds of the same at \$30,252.33.

Nonferrous Metals

Nonferrous Metal Prices, Page 82

New York — Despite an advance of \$15 per ton in electrolytic copper on Wednesday, the general undertone of all nonferrous metals weakened last week. Tin eased from around 66.00c for Straits spot to around 62.75c while American Smelting & Refining lowered its quotation for lead to 6.90c, New York.

Lead — American Smelting & Refining Co. lowered prices \$1 per ton to the basis of 6.90c, New York, but St. Joseph Lead Co. held unchanged at 7.00c, New York, and continued to ask \$1 premium for certain brands. Buying was generally light as April requirements are more than 80 per cent covered and May bookings have attracted little interest.

Copper — Private consumers are ready to absorb practically all of

ferings so the possible withdrawal of further heavy buying by the government is not considered a depressing market factor. Supplies of nearby metal continue tight. Export copper slumped to 16.00c, c.i.f. European ports, following the advance in prices here to 17.00c, Connecticut. Weakness in the foreign market caused a freer flow of copper and brass scrap.

Zinc — Activity continued dull but prices held firm at 7.50c, East St. Louis, on scarcity of supplies. Sellers generally are sold out well ahead so have welcomed the letup in fresh demand.

Tin — Straights spot tin slipped to 62.62½c on the sharp decline in prices on the London Metal Exchange. The lower levels have attracted somewhat heavier buying from consumers.

Japanese Steel Prices In Spectacular Rise

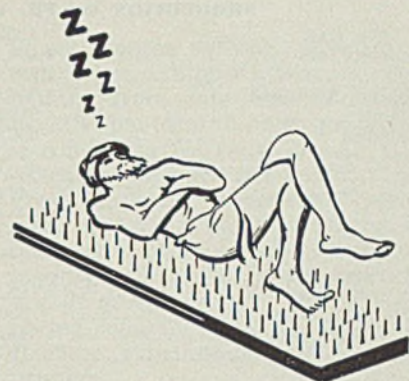
Quotations for iron and steel products in the Japanese market have registered a sharp increase since the latter part of October, according to a report received in the bureau of foreign and domestic commerce from American Trade Commissioner Paul P. Steintorf, Tokyo.

Peak levels were reached in the middle of January when quotations for leading items were approximately double those which prevailed early in November 1936. For example, the highest price quoted for ½-inch round steel bars per metric ton during the week ended Nov. 7, 1936 was approximately \$29. During the week closed Jan. 15, 1937, it had risen to approximately \$62, the report states.

The marked shortage of pig iron and scrap has been the outstanding contributor to the existing condition, and this has been accentuated further by anticipation of inflation based on the large government budget for the coming fiscal year.

Other factors include the reported certainty of a strong consumption increase in connection with the military replenishment program, and the upward price trend throughout the world.

Based on various local opinions, it is stated that there is little question that a considerable part of the price advance has been speculative, and this appears to have been borne out to some extent when, in the latter part of January, a fairly substantial decline in iron and steel quotations was recorded, owing to reports of a contemplated reduction in the government budget for the coming year.



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(All Figures Are Gross Tons)
PRODUCTION OF PIG IRON AND FERROALLOYS

Pig Iron	1932	1933	1934	1935	1936
Pennsylvania	2,103,180	3,728,839	4,244,566	5,479,792	9,102,875
Ohio	2,387,028	3,918,723	4,207,944	5,634,530	7,206,655
Indiana, Michigan	1,034,801	1,469,783	2,184,546	2,898,478	4,168,299
Illinois	919,280	1,012,676	1,269,154	2,003,388	2,917,016
Alabama	652,898	900,170	1,171,650	1,297,960	1,998,212
Mass., New York	624,141	665,928	1,053,257	1,415,755	2,220,522
Md., Va., West Va., Ky., Tenn.	680,774	1,143,600	1,318,964	1,781,171	2,102,106
Minn., Iowa, Colo., Utah	147,562	161,000	226,808	269,686	500,862
Total	8,549,664	13,000,719	15,676,889	20,780,760	30,216,547
Ferroalloys					
Pennsylvania	85,194	163,798	164,776	219,947	330,463
New York, New Jersey	85,875	98,857	140,711	195,281	243,176
Ohio, Ill., Iowa, Colo.	41,510	63,386	116,402	113,147	164,173
Va., West Va., Ala., Tenn.	19,210	18,842	39,795	63,564	74,828
Total	231,789	344,883	461,684	591,939	812,640
Grand total	8,781,453	13,345,602	16,138,573	21,372,699	31,029,187

PIG IRON MADE FOR SALE IN 1936

States	Bess. and		Malle-		All	Total
	Basic	low phos.	foundry	able		
Mass., New York	242,999	67,913	387,721	321,611	1,451	1,021,695
Pennsylvania	540,801	278,778	161,878	81,872	32,220	1,095,549
Md., W. Va., Ky., Ala., Tenn.	174,494	7,216	897,554		34,017	1,113,281
Ohio	241,110	12,662	163,299	612,721		1,029,792
Indiana, Illinois	215,205	10,251	49,432	413,221		688,109
Mich., Minn., Iowa, Colo., Utah	2,206		104,430	73,560	5,177	185,373
Total	1,416,815	376,820	1,764,314	1,502,985	33,671	5,133,799

PRODUCTION OF PIG IRON AND FERROALLOYS IN 1936
 (For sale and for maker's use)

Pig Iron	For maker's		Total
	For sale	use	
Basic	1,416,815	19,060,106	20,476,921
Bessemer and low-phosphorus	376,820	5,499,942	5,876,762
Foundry	1,764,314	266,677	2,030,991
Malleable	1,502,985	214,072	1,717,057
Forge or mill	33,671		33,671
White and mottled, direct castings etc.	39,194	41,951	81,145
Total	5,133,799	25,082,748	30,216,547
Ferroalloys			
Ferromanganese and spiegel	143,247	251,872	395,119
Ferrosilicon	352,175	8,315	360,490
Other ferroalloys	56,686	345	57,031
Total	552,108	260,532	812,640
Grand total	5,685,907	25,343,280	31,029,187

Pig Iron Output Shows Accelerating Recovery

Of the 30,216,547 gross tons of pig iron produced in 1936, makers used 25,082,748 tons, 83 per cent of the total. The remaining 5,133,799 tons entered the market as merchant iron. This compares with 82 per cent of the 1935 tonnage for maker's use, indicating an increased integration in the steel industry.

In 1913, nonmerchant iron accounted for only 69.2 per cent of the total and merchant iron for 30.8 per cent.

In 1936, the first six months accounted for 13,367,785 gross tons and second half 16,848,762 tons.

The accompanying detailed figures are from the American Iron and Steel institute and supplement the summary in STEEL, March 22, page 23.

Argentine Nearly Doubles Mineral Export Tonnage

An increase of approximately 90 per cent in the exports of mineral products from Argentina in 1936 compared with 1935 marked that country's foreign trade in that year, American Trade Commissioner A. Cyril Crilley, Buenos Aires, reports to the department of commerce.

Of the total of 16,924 metric tons of mineral products exported last year the United States absorbed the largest share, 7795 tons. American buyers purchased onyx marble, tin, antimony, and mica.

Mineral production in Argentina is increasing so rapidly that the government now maintains a minerals bureau which is making a complete geological study of the country's mineral possibilities. The bureau will place special emphasis on geological studies relating to iron and will study tariffs on implement and tool imports, with a view to furthering the local manufacture of these commodities.

Hanna Geologists Explore Arizona Manganese Fields

Arizona manganese fields are being explored by geologists for the M. A. Hanna Co., Cleveland, which has acquired control of claims of the Chapin Exploration Co., the Arizona Manganese Corp. and several smaller companies. These are considered among the most promising properties in the Mojave county district where the National Resources board estimates there are 100,000,000 tons of ore averaging 6 to 10 per cent manganese, and from 11,000,000 to 22,000,000 tons, between 15 and 30 per cent.

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African Ferromanganese Production Resumed

Production of ferromanganese at the New Castle, Natal, works of the Union Steel Corp. is to commence about July 1, according to an official announcement at Johannesburg reported to the department of commerce.

The Newcastle foundry has been closed for five years following the opening of the works at Pretoria. Recent advances in ferromanganese quotations, coupled with the fact that South African manganese ore is now in regular production, have made possible the export of locally-made ferromanganese at a profit, the report states.

A reduction in railway rates on ferromanganese from Newcastle to the coast ports has been made to assist the new industry. The foundry will not resume the manufacture of pig iron, but will confine its activities to ferromanganese.

Equipment

Boston—Continued heavy buying of machine tools has extended deliveries further as current orders more than equal output. Demand is widely spread. Theoretically at capacity, most machine building shops actually are below rated output, due to lack of skilled labor. Parts and materials generally are available for greater assembly, labor being the bottle-neck of production. In Providence, R. I., organizers are reported campaigning for CIO memberships, carrying campaign even into men's homes. Most shops already have gone on 40-hour week.

New York—Covering a broad range, machinery buying continues active. Large backlogs are being maintained despite high production. Most buying is confined to one or two machines per order. Deliveries are extended further. More price advances appear likely, notably in heavy equipment. Drop forging hammers already have been increased approximately 15 per cent.

Chicago—A buying rush preceded the April 1 advances on a number of machine tools. Inquiries have continued active, however, pointing to a marked decrease in sales this month. Railroad participation is more general, a large list having appeared from the Chicago & North Western and smaller inquiries from the Burlington and Louisville & Nashville. Increased operations at railroad car shops account for the better tool demand. The question of delivery still is important. Machine tool builders made little prog-

ress last quarter in reducing backlogs.

Cleveland — Equipment inquiries and sales continue in fair volume with small orders predominant. Ford Motor Co. is reported to have placed orders for several hundred presses for use in manufacture of automobile tires. Price increases generally went into effect April 1. Deliveries are extended further. One builder of lathes in the Cincinnati district has notified trade no new orders will be promised before five

to six months delivery; also prices on lathes shipped beyond four months from date will be subject to 12½ per cent higher quotations if conditions warrant.

Seattle—Spring construction has given impetus to electrical equipment and road building machinery markets. Mining equipment and logging and lumber machinery also are in good demand. Bids are expected soon for additions to Seattle tideflats substation, \$55,500 appropriated.

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Construction and Enterprise

Ohio

ATHENS, O.—City is taking bids, due April 8, for furnishing three vertical shaft, deep well turbine pumps with motors and control units. John W. Dowler is city engineer.

BLUFFTON, O.—Central Ohio Light & Power Co., Findlay, O., is considering erection of high pressure steam generating plant, 10,000-kilowatt capacity, at an estimated cost of \$1,200,000. Arch Robinson, Findlay, is president and general manager.

CINCINNATI—Bruckmann Brewing Co., Ludlow avenue and Central parkway, plans erection of power plant. Fosdick & Hilmer, Union Trust building, are engineers.

CLEVELAND—Werner G. Smith Co., 2191 West 110th street, will rebuild kettle house damaged by fire recently. O. N. Chamberlin, 1368 Kenilworth road, architect, is completing plans.

DAYTON, O.—Joyce-Cridland Co., 519 North Findlay avenue, manufacturer of lifting jacks, plans erection of factory building. J. M. Switzer is president and treasurer; Geyer & Neuffer, Ludlow Arcade building, are architects.

DAYTON, O.—Moraine Products Co., 329 East First street, subsidiary of General Motors Corp., plans construction of factory building. James H. Davis is president.

DAYTON, O.—Reynolds & Reynolds Co., 931 Washington street, manufacturer of stationery and printer, is completing plans for construction of 2-story factory building. Schencke & Williams, 1406 Third National Bank building, are architects. E. S. Reynolds Jr. is president of the company.

DAYTON, O.—Office of contracting officer, war department, air corps, Wright field, will receive bids until April 15 for miscellaneous quantities of mild carbon sheet steel, circular 37-640, for delivery various air depots. R. W. Propst is contracting officer.

DILLONVALE, O.—Village is preparing plans, to be ready in May, for construction of waterworks system estimated to cost \$100,000. Paul W. Elwell, 5005 Euclid avenue, Cleveland, is consulting engineer.

GALION, O.—Perfection Vault Co. is taking bids on construction of 1-story factory addition.

MIDDLETOWN, O.—Shartle Brothers Co., 601 Clark street, is constructing machine shop at an estimated cost of \$40,000. F. K. Vaughn Building Co., First National Bank building, Hamilton, O., is general contractor.

NAPOLEON, O.—Village is taking bids, due April 15, on equipment for light plant and waterworks. Froelich & Emery, Second National Bank building, Toledo, are consulting engineers. (Noted March 22).

NEW BOSTON, O.—Village is taking bids, due April 20, on materials and equipment for pumping station, including two large electric pumps, motors, cables, etc. Cost is estimated at \$32,000. Harry Earl is service director.

PAINESVILLE, O.—City plans extensions and improvements to municipal power plant, including steam turbine installation. Cost is estimated at \$80,000. F. O. Wallene, 17114 Ernadales avenue, Cleveland, is consulting engineer.

SPRINGFIELD, O.—Ohio Edison Co., William Giffels, 47 East Main street, Akron, in charge of construction, is taking bids for construction of plant addi-

tion at the Mad river power plant, near here. Cost is estimated at \$1,500,000 including equipment.

UHRICHSVILLE, O.—Owner plans construction of combination waterworks and electric light plant. Wm. C. Kammerer & Associates, 823 Prospect avenue, Cleveland, are consulting engineers. J. Wesley Lytle is mayor.

WEST MANSFIELD, O.—Village will vote in special election, April 7, on bond issue of \$9000 to finance construction of electric light plant. J. E. Bechtel is mayor.

Michigan

ALLEGAN, MICH.—City council has engaged engineering firm to prepare plans for construction of sewage disposal system estimated to cost \$125,000.

BATTLE CREEK, MICH.—Franklin Iron & Metal Co. Inc. has been incorporated to deal in iron and other metals by Norman Franklin, 200 Broadway street.

CADILLAC, MICH.—Kysor Heating Co. is erecting an addition to its plant, to be used for shipping and storage.

DEARBORN, MICH.—LeMaire Tool Mfg. Co., 2657 South Telegraph road, has started construction of its plant addition estimated to cost \$30,000. Equipment for the new plant will cost about \$40,000.

DETROIT—Buhl Stamping Co., 2730 Scotten avenue, has awarded contract for construction of two-story plant addition to Kriehoff Co., Detroit. Smith, Hinchman & Grylls are architects.

DETROIT—Atlas Waste Paper Co., 1321 Monroe avenue, has been incorporated by Carl Pearl, Detroit, to deal in scrap iron.

DETROIT—Circle Tool & Die Corp. has been formed by Michael Muner, 3204 Gladstone avenue, to manufacture tools.

DETROIT—Trippensee Mfg. Co., 2620 Elmwood avenue, has been incorporated by Frank J. Trippensee, R. R. No. 1, Walled Lake, Mich., to deal in tools.

DETROIT—Machine Products Corp. has been formed by Edward J. Swink, 6765 East McNichols road, to manufacture tools and dies.

DETROIT—Midland Screw Products & Mfg. Co., 2160 Hendrick avenue, has been incorporated by Albert C. Jeffries, Detroit, to deal in screw machine products.

DETROIT—Detroit Steel Products Co., 2250 East Grand boulevard, has awarded contract for construction of plant addition to W. E. Wood Co., 4649 Humboldt avenue. Smith, Hinchman and Grylls, 800 Marquette building, are architects.

DETROIT—Evans Products Co., Union Guarantee building, is having plans prepared by Harley & Ellington, architects, for factory building, 200 x 250 feet, to be erected on Greenfield avenue.

FERNDALE, MICH.—Beck-Koller Co. will build an addition to its plant here. Giffels & Vallet and L. Rossetti, 606 Marquette building, Detroit, are associated architects and engineers.

MONROE, MICH.—City plans construction of \$39,600 garbage disposal plant. Shoecraft, Drury & McNamee, Ann Arbor, are engineers. PWA funds will be applied for.

WILLIAMSTOWN, MICH.—Voters have approved plans for purchase and installation of waterworks system at an estimated cost of \$46,000.

Massachusetts

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205 School street, plans construction of enameling plant on Sanborn street at a cost of \$40,000 or more. Chase Engineering Co., 307 Michigan avenue, Chicago, Ill., is engineer.

LYNN, MASS.—J. B. Epps, 137 Newberry street, Boston, is architect taking bids for Walter Pyme, 214 Union street, on 2-story warehouse. Sears-Roebuck & Co., 201 Brookline avenue, Boston, is lessee.

SPRINGFIELD, MASS.—City has applied to PWA for funds to finance construction of sewage disposal plant, including pumphouses, backwater gate chambers, etc., at an estimated cost of \$1,158,000. Metcalf & Eddy, 1300 Statler building, Boston, are engineers. C. W. Phillips, City Hall, is superintendent, department of streets and engineering.

New York

BROOKLYN, N. Y.—Thomas Thames Trading Corp., 56 Bogart street, will take bids in May or later for construction of 4-story factory at 248 McKibben street, to cost approximately \$125,000. S. Goldsmith, care the owner, is architect.

BUFFALO—General Motors Corp., Detroit, plans to spend approximately \$4,000,000 on construction of Chevrolet axle plant, to be erected on River road near Wickwire Spencer steel plant. Albert Kahn, New Center building, Detroit, is architect and has plans nearing completion.

LOCKPORT, N. Y.—E. H. Ferre Co., 57 Richmond avenue, will take bids soon on construction of factory estimated to cost \$40,000. J. M. Tully, Bewley building, is architect.

MIDDLETOWN, N. Y.—City plans construction of two additional filter tanks at municipal waterworks with an estimated expenditure of \$20,000. WPA grant has been applied for.

ROCHESTER, N. Y.—Rochester Gas & Electric Co., 89 East avenue, will take bids soon for furnishing boilers, condensers and other equipment for steam generating plant on Mill street at Genesee river. E. M. Gilbert, 512 Washington street, Reading, Pa., is engineer.

ROCHESTER, N. Y.—Rochester Gas & Electric Co., 89 East avenue, has plans for construction of rural transmission lines in Monroe, Wayne and Cayuga counties, with substation and service facilities, at an estimated cost of about \$300,000.

Pennsylvania

BRADDOCK, PA.—Bids are being received until April 6 for pumping equipment in connection with filtration and softening plant and appurtenances. Borough of Braddock is receiving proposals; PWA Docket No. 1575-D.

STATE COLLEGE, PA.—Borough is taking bids until April 19 for construction of sewage disposal plant, consisting of screen chamber, primary settling tanks, digestion tanks, aeration tanks, secondary settling tanks, pump station, detention tank, sludge beds, piping, etc. Chester Engineers, 1050 Century building, Pittsburgh, are preparing plans and specifications.

Illinois

MARSEILLES, ILL.—National Biscuit Carton Co., Marselles and 449 West Fourteenth street, New York, N. Y., plans construction of additions to fibre

box mill and purchase of new equipment at an estimated total expense of \$1,000,000.

Indiana

ANDERSON, IND.—Board of public works has preliminary plans for construction of sewage disposal plant and intercepting sewers at an estimated cost of \$1,200,000. C. Brossman, 1009 Chamber of Commerce building, Indianapolis, is consulting engineer. A. Gwennings, City Hall, is city engineer.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will re-

ceive bids until April 9 for furnishing miscellaneous copper nickel alloy plungers and forgings, schedule 283, for delivery Washington; one motor-driven flange facing machine, schedule 290, for delivery Mare Island, Calif.; one universal motor-driven bench saw, schedule 318, for delivery Philadelphia; one heavy duty engine lathe and ammeter, schedule 320, for delivery Norfolk, Va.; one motor-driven metal sawing machine, schedule 323, for delivery Yorktown, Va.; until April 13 for miscellaneous alloy steel forgings, schedule 319, for delivery Newport, R. I.; and until April 16 for one heavy duty motor-driven engine lathe, schedule 312 for delivery various east and west coast points; and miscellaneous motor-generator sets with control and voltage regulator appliances and spare

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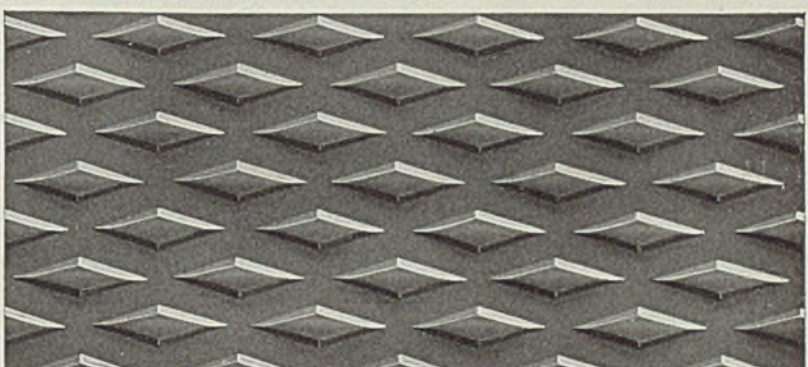
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parts schedule 329, for delivery Ports-mouth, N. H., and Mare Island, Calif.

Georgia

ELBERTON, GA.—Georgia Power Co., Atlanta, plans extensions and improvements to Beaver Dam substation here, including installation of transformers, switchgears, etc. to double present capacity. Cost is estimated at \$50,000.

Kentucky

DANVILLE, KY. — The Goodall Co., Thirty-first street and Robertson avenue, Cincinnati, has awarded general contract for construction of factory building here, to Geo. H. Rommel, 954 Logan street, Louisville, Ky. E. C. and G. T.

Landberg, 114 Garfield place, Cincinnati, are architects. Elmer L. Ward is president.

Louisiana

AMITE, LA.—Town is planning to spend \$54,000 for waterworks improvements. Charles G. Welshaar is town clerk; E. G. Freller, Hammond, La., is engineer.

INDEPENDENCE, LA.—Town receives bids April 12 for construction of sewage pumping station. Edward Freller, Hammond, La., is engineer, Charles Singra is town clerk.

Mississippi

AMORY, MISS.—Monroe county electric power association has received second installment of \$48,200 from REA for construction of 58 miles transmission lines to utilize TVA power.

BROOKHAVEN, MISS.—City receives bids April 20 for furnishing horizontal sewer pump of 150-g.p.m. capacity. Eben M. Bee is city clerk.

CLARKSDALE, MISS.—Wonder Bread Baking Co. plans expansion of plant here at an estimated cost of \$50,000.

LUCEDALE, MISS. — Board of aldermen receives bids April 6 for furnishing complete rotary pump with hose, couplings, etc.

North Carolina

DUNN, N. C.—City has plans for construction of sewage disposal system and has applied to WPA for financial aid. Herbert Taylor is mayor.

South Carolina

SPARTANBURG, S. C. — Spartanburg Iron Works acquired property and plant of Mountain City Foundry & Machine Works on Union avenue. W. E. Dye is president of the iron works.

Virginia

BOONE MILL, VA.—City plans construction of waterworks system at an estimated cost of \$25,000. J. B. McCrary Co., 705 Rosenberg building, Roanoke, Va., is engineer.

GATE CITY, VA.—City plans to extend waterworks system at an estimated expense of \$26,000. WPA funds will be applied for. J. B. McCrary Co., 705 Rosenberg building, Roanoke, Va., is consulting engineer.

RURAL RETREAT, VA.—City has voted in favor of \$14,000 bond issue to finance proposed sewerage system. J. B. McCrary Co., 705 Rosenberg building, Roanoke, Va., is consulting engineer preparing plans.

Missouri

KANSAS CITY, MO.—Marley Co., 1915 Walnut street, has leased 1-story building at 930-940 West Eighth street and will manufacture air-conditioning equipment.

KANSAS CITY, MO.—Sheffield Steel Corp., subsidiary of American Rolling Mill Co., Middletown, O., plans to construct additional open-hearth furnaces at its plant here.

Oklahoma

BLACKWELL, OKLA.—City receives bids April 13 for furnishing steam generating unit, including boiler, base, fan, stack, gas burners and accessory equipment. Black & Veatch, 4706 Broadway,

Kansas City, Mo., are consulting engineers.

Texas

DALLAS, TEX.—Sealy Mattress Co. will reopen its plant here, move headquarters from Houston to Dallas, and re-equip with modern machinery to manufacture mattresses, studio couches and divans.

ELDORADO, TEX.—City is considering construction of waterworks and sewer system; \$120,000 bonds are available. A. T. Wright is mayor.

MIDLAND, TEX.—City plans waterworks improvements, including reservoir, pumps and pumphouse at an estimated cost of \$18,000. H. N. Roberts, Lubbock, Tex., is engineer. M. C. Ulmer is mayor.

ROXTON, TEX.—Lamar county water control and improvement district No. 1 receives bids April 16 for construction of sewer system at an estimated cost of \$40,000. W. P. Clark is receiving bids; Hawley, Freese & Nichols, Capps building, Ft. Worth, Tex., are engineers.

SONORA, TEX.—City voted in favor of issuing \$90,000 bonds for construction or purchase of waterworks system.

SULPHUR SPRINGS, TEX.—City receives new bids April 10 for construction of light and power plant and distribution system. Bids received March 24 were rejected. Broad & Flint, Burt building, Dallas, Tex., are architects.

WILLIS, TEX.—Town votes April 24 on incorporation in order to construct municipal waterworks. The project includes deep well with pump and motor, 50,000-gallon elevated tank, hydrants, and distribution system. Cost is estimated at \$30,000. Garrett Engineering Co., P. O. Box 1726, Houston, Tex., is consulting engineer.

Wisconsin

EAU CLAIRE, WIS.—City council plans installation of new water wheel and generating equipment in city waterworks. A. R. Garnock is city engineer.

GREEN BAY, WIS. — Northwestern Boiler & Welding Co., 323 South Pearl street, has broken ground for one-story shop building, 60 x 100 feet.

MADISON, WIS. — Crown Can Co., Philadelphia, Pa., has leased idle plant of Fuller & Johnson Co., here, and will install machinery valued at \$250,000 for production of metal containers. Harvey Burr has been appointed general manager.

MADISON, WIS.—Madison Gas & Electric Co. has been authorized by state public service commission to make plant improvements, including generating facilities and boiler house additions at Blount street plant, alterations to generator building, purchase of boiler, piping and additions, and turbine, etc., at main plant. Entire cost is estimated at \$1,466,000.

MILWAUKEE — Cutler-Hammer Inc., 315 North Twelfth street, has let contract for addition to enameling room, 35 x 52 feet, at its West Orchard street plant in West Milwaukee.

NEILLSVILLE, WIS.—Willard electric co-operative has been allotted REA funds of \$850,000 for construction of 1000-kilowatt generating unit and 674 miles of transmission lines in Clark and Marathon counties.

STEVENS POINT, WIS.—City council has applied for PWA funds of \$261,900 toward construction of sewage disposal plant and intercepting system estimated

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STEVENS POINT, WIS.—Minneapolis, St. Paul & Sault Ste. Marie railway has announced appropriation of \$440,000 for improvements to Stevens Point division, including 44 miles of new rail, round-house enlargement, etc.

SURING, WIS.—Oconto county electric co-operative association has plans under way for construction of about 300 miles of rural electric transmission lines in parts of Oconoto and Marinette counties. Federal aid is being sought to finance the \$290,000 project. E. B. Ways, Capitol building, Madison, Wis., is engineer. Otto Schreiber, Suring, is president.

Minnesota

FERGUS FALLS, MINN.—Plant of Barrett Roller Mill Co., Barrett, Minn., was severely damaged by fire recently.

MINNEAPOLIS—Harriet Woodworking Co. has started construction of 1-story woodworking plant, 38 x 80 feet, and will install new machinery and equipment. David R. Anderson is secretary.

MONTEVIDEO, MINN. — City plans construction of waterworks system at an estimated cost of over \$15,000. B. O. Bonn is city clerk; A. S. Millnowski, Stillwater, Minn., is engineer.

NEW ULM, MINN.—City plans installation of new boiler and other equipment in municipal light and power plant. A. C. Sannwald is city clerk; Ralph Thomas & Associates, 1200 Second avenue South, Minneapolis, are engineers.

PRESTON, MINN.—Fillmore county co-operative electric association, Oliver Haslerud, president, has been allotted \$167,000 REA funds for construction of 175 miles transmission lines in Fillmore county.

WILLMAR, MINN.—City plans installation of generating unit in municipal water and light plant. Burlingame, Hitchcock & Estabrook, Sexton building, Minneapolis, are engineers.

South Dakota

CUSTER, S. DAK.—State legislature has passed bill appropriating \$15,000 for electric generator at state sanatorium. D. W. Loucks is state engineer.

FLANDREAU, S. DAK.—Voters approved \$169,000 bond issue at recent election for construction of proposed municipal light and power plant. Carl Hanson is city engineer. (Noted March 22.)

SPEARFISH, S. DAK.—City is making a survey of the cost of constructing municipal sewage disposal plant. M. Driskill is in charge of the project.

STURGIS, S. DAK.—City has applied to PWA for funds to aid in construction of waterworks system estimated to cost \$40,000. M. J. Kerper is city auditor.

Iowa

CEDAR RAPIDS, IOWA—Linn county Farm Bureau has plans approved by REA for construction of 163 miles rural transmission lines. Funds will be available June 15. G. Stoner is chairman.

VINTON, IOWA—Benton county electric co-operative has been allotted \$200,000 for construction of 200 miles of rural transmission lines in that county.

PELLA, IOWA—City will receive bids April 15 for construction of improvements and furnishing equipment for municipal light and power plant, includ-

ing 1000-kilowatt steam turbogenerator, surface condenser with circulating pumps and auxiliary equipment. A. C. Kuyper is city clerk; Young & Stanley Inc., Muscatine, Iowa, are engineers.

PRESTON, IOWA—Jones county rural electric co-operative association has been allotted \$95,000 additional funds from REA to build about 98 miles of transmission lines. Under previous allotment, \$210,000 is already available for construction of 220 miles of lines. A. P. Ogden is secretary.

Nebraska

GERING, NEBR.—City has filed application with PWA for grant of \$9823 toward construction of sewage disposal plant estimated to cost \$20,830. Roy Butler is mayor.

SILVER CREEK, NEBR.—City has filed application with PWA for grant of \$3843 toward construction of sewage disposal plant estimated to cost about \$9000. H. H. Henningsen Engineering Co., 326 Union State Bank building, Omaha, is consulting engineer.

Idaho

GRANGEVILLE, IDAHO—City plans construction of sewage disposal plant at an estimated cost of \$27,000.

Arizona

PHOENIX, ARIZ. — Central Arizona Light & Power Co., plans to spend about \$815,000 on extensions and improvements to present facilities. E. H. Coe, Phoenix, is president.

Pacific Coast

BELLINGHAM, WASH.—City officials are studying plans by John M. Adams, engineer, for proposed sewer system, estimated to cost \$1,373,600.

DAYTON, WASH.—City will open bids April 6 for deep well turbine and other pumping equipment.

HOQUIAM, WASH.—American Door & Mfg. Co. will rebuild three dry kilns recently damaged by fire. Herman Snider is superintendent.

KENNEWICK, WASH. — Kennewick Canning Co. is building warehouse, 50 x 100 feet, for machinery storage.

LONGVIEW, WASH. — Pleasant Hill water users have formed local district and have secured franchise for municipal water system.

MONTESANO, WASH.—Oscar Klasell announces plans for construction of cold storage plant. Cost is estimated at \$10,000.

SEATTLE — Murphy Shipyards Inc., 5350 Twenty-eighth avenue N. W., is building frame machine shop, 91 x 32 feet.

SEATTLE — Puget Sound Power & Light Co. is building an incinerator at 700 Eighth avenue North. J. M. Nicholson is contractor.

SEATTLE—Work is scheduled to begin at once on proposed addition to plant of Boeing Airplane Co. Two units will be built to form a sub-assembly plant. Austin Co. is general contractor.

SOUTH BEND, WASH.—City proposes to purchase local water system from Puget Sound Power & Light Co. for \$75,000. Construction of extensions and improvements is planned if deal is closed.

TACOMA, WASH.—City has \$55,000 available for proposed enlargement of East Eleventh street power substation.

Capacity of present equipment will be doubled.

ZILLAH, WASH.—City has authorized G. D. Hall, Yakima, engineer, to prepare plans and specifications for proposed sewage disposal plant.

Canada

LEASIDE, ONT. — Canada Wire & Cable Co. Ltd., Laird drive, is making plans for construction of plant addition on Wickstead avenue, at an estimated cost of \$50,000.

OTTAWA, ONT.—Ottawa Electric Co. Ltd., Sparks street, plans erection of substation on Holmwood avenue near Bank street at a cost of about \$80,000.

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New Britain, Conn.
Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co.,
Brown Marx Bldg.,
Birmingham, Ala.

BAR BENDERS

Kardong Bros., 346 Buchanan St.,
Minneapolis, Minn.

BARGES (Steel)

American Bridge Co.,
Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co.,
Bethlehem, Pa.
Federal Shipbuilding & Dry Dock
Co., Kearney, N. J.
Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.

BARRELS (Plating)

Udylite Co., The, 1651 E. Grand
Blvd., Detroit, Mich.

BARRELS (Steel)

Petroleum Iron Works Co.,
Sharon, Pa.
Pressed Steel Tank Co.,
Milwaukee, Wis.

BARS (Alloy)

Ampco Metal, Inc., 3831 W. Burn-
ham St., Milwaukee, Wis.
Bethlehem Steel Co.,
Bethlehem, Pa.
Bliss & Laughlin, Inc.,
Harvey, Ill.
Carnegie-Illinois Steel Corp.,
Pittsburgh-Chicago.
Columbia Steel Co.,
San Francisco, Calif.
Firth-Sterling Steel Co.,
McKeesport, Pa.
LaSalle Steel Co., P. O. Box 6800-A,
Chicago, Ill.

Midvale Co., The,
Nictown, Philadelphia, Pa.
Republic Steel Corp.,
Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts.,
Chicago, Ill.
Tennessee Coal, Iron & Railroad Co.,
Brown Marx Bldg.,
Birmingham, Ala.
Timken Steel & Tube Co.,
Canton, O.

BARS (Concrete Reinforcing)

Carnegie-Illinois Steel Corp.,
Pittsburgh-Chicago.
Columbia Steel Co.,
San Francisco, Calif.
Inland Steel Co.,
38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.
Republic Steel Corp.,
Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts.,
Chicago, Ill.
Tennessee Coal, Iron & Railroad Co.,
Brown Marx Bldg.,
Birmingham, Ala.
Youngstown Sheet & Tube Co.,
Youngstown, O.

BARS (Iron)—See IRON (Bar)

BARS (Reinforcing)

Foster, L. B., Co., Inc.,
P. O. Box 1647, Pittsburgh Pa.

BARS (Steel)

(*Also Stainless)
*Bethlehem Steel Co.,
Bethlehem, Pa.
Carnegie-Illinois Steel Corp.,
Pittsburgh-Chicago.
Columbia Steel Co.,
San Francisco, Calif.
Inland Steel Co.,
38 So. Dearborn St., Chicago, Ill.
*Jessop Steel Co.,
Washington, Pa.
Laclede Steel Co.,
Arcade Bldg., St. Louis, Mo.
*Ludlum Steel Co.,
Watervliet, N. Y.
*Midvale Co., The,
Nictown, Philadelphia, Pa.
*Republic Steel Corp.,
Dept. ST, Cleveland, O.
*Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts.,
Chicago, Ill.
The Stanley Works,
New Britain, Conn.
Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co.,
Brown Marx Bldg.,
Birmingham, Ala.
Timken Roller Bearing Co., The,
Canton, O.
Weirton Steel Co.,
Weirton, W. Va.
Youngstown Sheet & Tube Co.,
Youngstown, O.

BATHS (Heat Treating, High Speed)

Holden, A. F., Co.,
New Haven, Conn.

BATTERIES (Storage)

Edison, Thomas A., Inc.,
Orange, N. J.
Electric Storage Battery Co., The,
19th St. & Allegheny Ave.,
Philadelphia, Pa.

BEAMS CHANNELS, ANGLES, ETC.

(*Also Stainless)
Bethlehem Steel Co.,
Bethlehem, Pa.
Carnegie-Illinois Steel Corp.,
Pittsburgh-Chicago.

Columbia Steel Co.,
San Francisco, Calif.
Inland Steel Co.,
38 So. Dearborn St., Chicago, Ill.
*Jessop Steel Co.,
Washington, Pa.
*Jones & Laughlin Steel Corp.,
Jones & Laughlin Bldg.,
Pittsburgh, Pa.
*Ludlum Steel Co.,
Watervliet, N. Y.
*Ryerson, Jos. T., & Son, Inc.,
16th and Rockwell Sts.,
Chicago, Ill.
Tennessee Coal, Iron & Railroad Co.,
Brown Marx Bldg.,
Birmingham, Ala.
Weirton Steel Co.,
Weirton, W. Va.
Youngstown Sheet & Tube Co.,
Youngstown, O.

BEARINGS (Ball)

Bantam Bearings Corp.,
South Bend, Ind.
Boston Gear Works, Inc.,
North Quincy, Mass.
Fafnir Bearing Co.,
New Britain, Conn.
Hoover Ball & Bearing Co.,
Ann Arbor, Mich.
New Departure Mfg. Co.,
Bristol, Conn.
Norma Hoffmann Bearings Corp.,
Stamford, Conn.
SKF Industries, Inc., Front St. and
Erle Ave., Philadelphia, Pa.

BEARINGS (Bronze)

Ampco Metal, Inc., 3831 W. Burn-
ham St., Milwaukee, Wis.
Cadman, A. W., Mfg. Co.,
2816 Smallman St.,
Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co.,
Paschall Sta., Philadelphia, Pa.
Lawrenceville Bronze Co.,
Bessemer Bldg., Pittsburgh, Pa.
National Bearing Metals Corp.,
928 Shore Ave., Pittsburgh, Pa.
Shenango-Penn Mold Co.,
Dover, O.
Shoop Bronze Co., The,
344-360 W. Sixth St.,
Tarentum, Pa.

BEARINGS (Journal)

Bantam Bearings Corp.,
South Bend, Ind.
Fafnir Bearing Co.,
New Britain, Conn.
Hyatt Roller Bearing Co.,
P. O. Box 476, Newark, N. J.
Link-Belt Co.,
300 W. Pershing Rd., Chicago, Ill.
National Bearing Metals Corp.,
928 Shore Ave., Pittsburgh, Pa.
Shafer Bearing Corp.,
35 E. Wacker Drive, Chicago, Ill.
SKF Industries, Inc., Front St. and
Erle Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The,
Canton, O.

BEARINGS (Oilless)

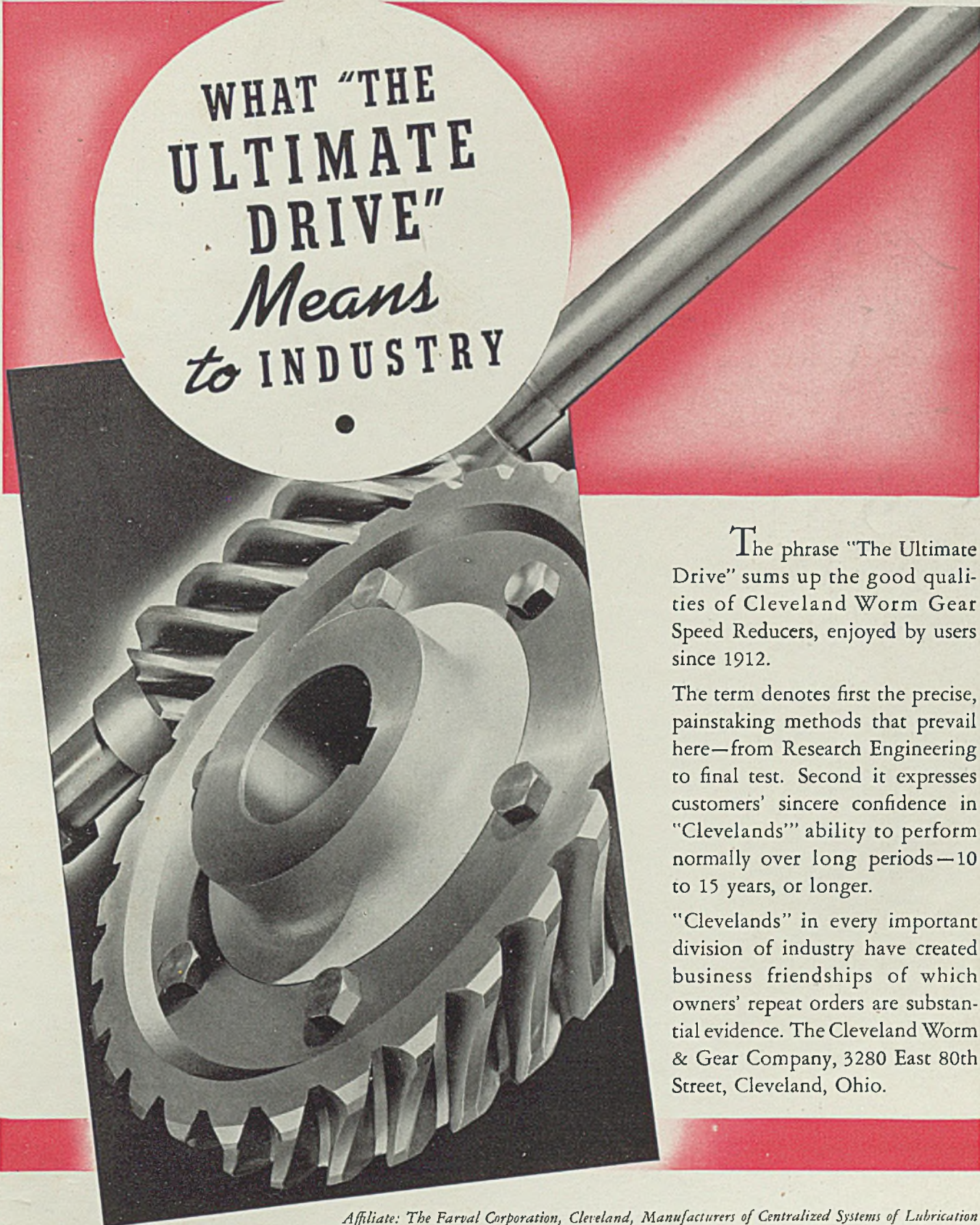
Rhoades, R. W., Metaline Co.,
50 3rd St., Long Island City, N. Y.

BEARINGS (Quill)

Bantam Bearings Corp.,
South Bend, Ind.

BEARINGS (Radial)

Bantam Bearings Corp.,
South Bend, Ind.
Fafnir Bearing Co.,
New Britain, Conn.
Hoover Ball & Bearing Co.,
Ann Arbor, Mich.
Hyatt Roller Bearing Co.,
P. O. Box 476, Newark, N. J.
New Departure Mfg. Co.,
Bristol, Conn.
Shafer Bearing Corp.,
35 E. Wacker Drive, Chicago, Ill.
SKF Industries, Inc., Front St. and
Erle Ave., Philadelphia, Pa.
Timken Roller Bearing Co.,
Canton, O.



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The phrase "The Ultimate Drive" sums up the good qualities of Cleveland Worm Gear Speed Reducers, enjoyed by users since 1912.

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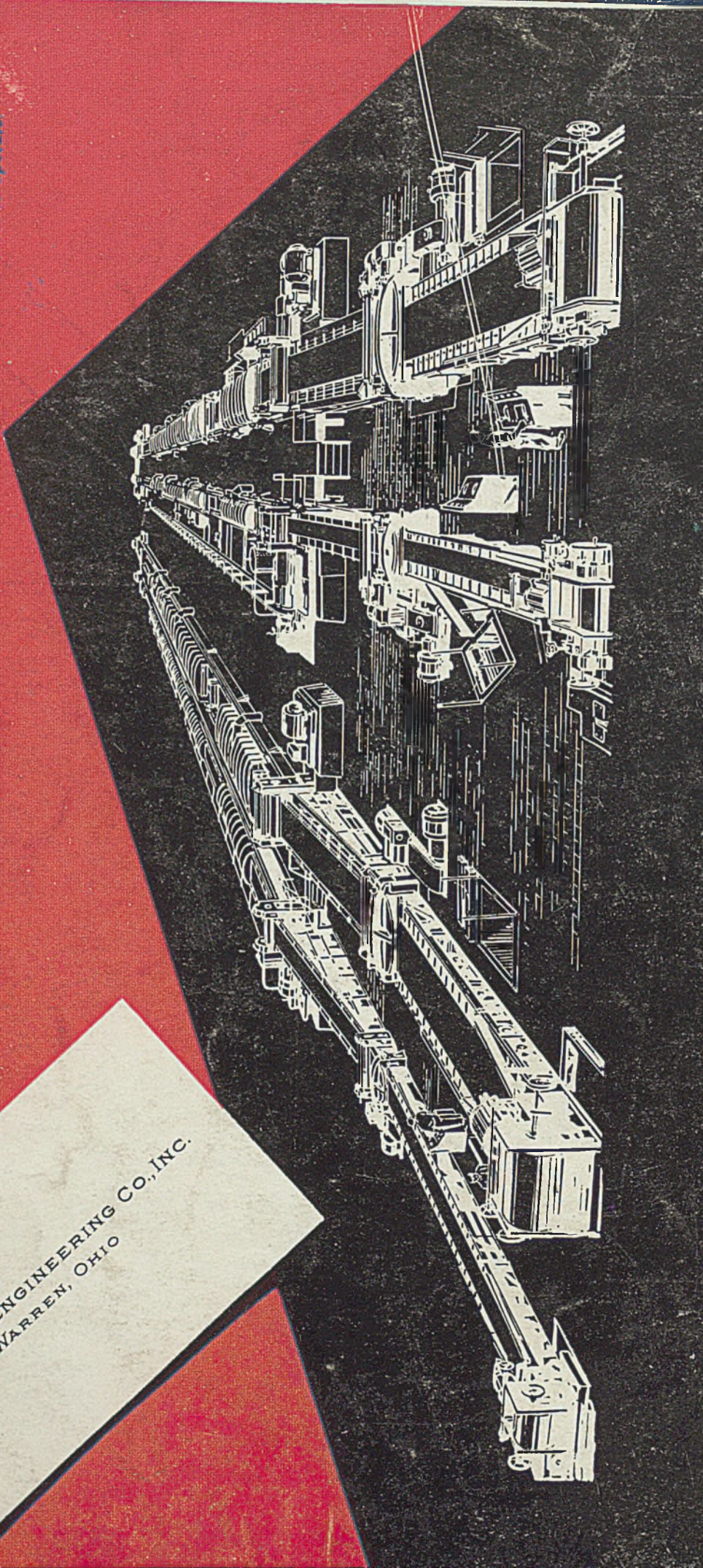
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HIGHER speeds and greater tonnage inevitably result with the use of the Wean Continuous Strip Pickler. The strip, slitted automatically coil to coil, moves evenly through the pickling bath and comes out the finest quality of pickled material.

A COMPLETE Wean installation includes machinery for every operation from handling of the hot-strip coil to the finished product. Wean equipment is perfectly synchronized, automatically controlled, scientifically arranged, and economical to operate.

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