

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

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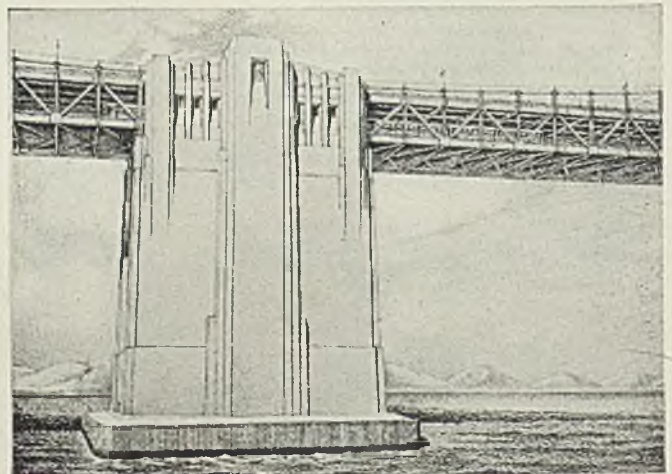


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● The greater strength-weight ratio of the Nickel Alloy Steels has been a great boon to the automobile industry. By eliminating dead weight they have helped to reduce the price of motor vehicles and their cost of operation. By greatly reducing breakage and wear in highly stressed parts, they have contributed materially to safe operation. What they are doing for the automotive industry, they can do for you in scores of machinery applications.

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NICKEL ALLOY STEELS

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As the Editor Views the News

GOOD news and bad issued from the labor front last week. In Detroit a state of near anarchy prevailed when strikers, intoxicated by the newly-recognized power of the sit-down technique, ran rough shod over constituted state and local authority. The courts, whose prestige already had been sorely buffeted by disparaging remarks issued to the public from a microphone in the White House (p. 31), were defied by 5000 unruly occupants of nine Chrysler plants in Detroit. The reckless abandon with which the law is being flouted in motordom impels thoughts of incorporation of unions, of fascism and dictators. It is a sinister outlook.

In marked contrast to the sobering news from Detroit was the announcement of the terms of the contract negotiated by U. S. Steel with CIO (p. 15) for the union employes of five subsidiary companies. Outstanding in this pact is a provision (p. 16) that no cessation of work will occur during the period of the contract, which expires March 1, 1938. This is an important condition and one that assures added significance in view of the widespread evidence of irresponsibility on the part of CIO units in so many instances. If CIO adheres to this feature of its contract, U. S. Steel has gained something that motordom has muffed.

**No Strikes
For One Year!**

An encouraging development of the week was the entry of government officials into the ranks of those courageous souls who "view with alarm." Heretofore the economic storm signals have been hoisted only by persons upon whom the politicians could pin the disparaging label of "economic royalist." But last week several new dealers began to issue notes of warning against some of the impending dangers. The sound advice uttered by Governor Eccles of the Federal Reserve board (p. 32) ranks as one of the most sig-

nificant statements issued from Washington in several years. His remarks about budget balancing and the futility of wage advances which restrict production should prove salutary. Also Senator Robinson's statement in regard to respect for the law was highly encouraging. It is refreshing to know that the administration is beginning to recognize danger signals which industry has been noticing for many months.

**Near Record
For Steel Ingots**

Absence of serious labor trouble in the primary steel industry may permit producers to establish a new record in ingot output. If steelworks operations continue throughout March at the present rate (p. 17), production of ingots for the first quarter will total 14,264,000 tons. This would exceed the output of the highest previous first quarter—13,800,000 tons in 1929—and would fall short of the all-time record of 15,139,000 tons in the second quarter of 1929 by about 875,000 tons. . . . Committees of the American Society for Testing Materials have approved certain new specifications and tests, subject to final action at the annual meeting in June. Industrialists will be interested particularly in some of the proposals (p. 63) of Committees A-1 on Steel and A-5 on Corrosion of Iron and Steel.

**Is Third of
Steel Welded?**

Manufacturers of metal products and articles requiring attractive finishes are confronted with new problems due to the fact that consumers are more color-conscious than in previous years. A method of coloring metals has been introduced (p. 56) which involves a new principle. The metal article becomes the cathode in an electroplating bath which produces a thin film of metal showing interference colors. The color depends upon the thickness of the film at the time the plating process is arrested. No pigments are used. . . . Robert E. Kinkead (p. 52) estimates that in 1936 manufacturers sold 110,000,000 pounds of steel welding rod and from these figures calculates that about 3,600,000 tons of steel was arc welded. Allowing for welding by other processes, he thinks more than a third of the finished steel tonnage was welded.

E. L. Shaner

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● You can cut the "going" cost of steel-constructed portable machinery and haulage equipment with Hi-Steel. Twice the yield strength of ordinary carbon steel makes possible the cutting of structural weight in some cases as much as 50%.

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Inland Metallurgists will be pleased to cooperate with you in the application of Hi-Steel. Write today for the Hi-Steel Bulletin No. 10.



TIN PLATE • BARS • RAILS • PILING • REINFORCING BARS • PLATES • STRUCTURAL

AND STEEL CO.

Same Wages, Peace Terms, in All Districts

For Five U. S. Steel Subsidiaries

AFTER the Steel Workers Organizing committee and five subsidiaries of the United States Steel Corp. had completed one-year contracts last week, the spotlight on the steel labor situation shifted to the large independent steel producers, most of whom had refrained from publicly revealing their probable future course.

Although much disturbed by the corporation's action, spokesmen for some of the independent companies indicated late last week that preliminary conferences, at least, probably will be granted to SWOC officials in cases where they are known to represent employees.

The SWOC is understood to be sending to many steel companies blank contracts similar to those signed with the Steel corporation subsidiaries. An accompanying letter states that undoubtedly the company will want to follow the lead of the corporation.

On all sides, the degree to which the industry will continue to pay the overtime scale is considered one of the most important questions. Already in mill towns merchants are marking up their prices.

No Provision for Revisions

Under the contract between the five corporation subsidiaries and the SWOC, acting for the Amalgamated Association of Iron, Steel and Tin Workers, wages apparently are held at their established levels until Feb. 28, 1938, and revisions are not provided for. Whether an "unwritten understanding" has been reached concerning pay revisions is a matter of conjecture.

The effect on labor rates in the South is another highly important question. J. L. Perry, president, Tennessee Coal, Iron & Railroad Co., was one of the five signers with the SWOC. Heretofore, southern labor rates usually have been under the northern scale.

So far no provision appears to have been made for casting of bal-

lots to determine the number of Amalgamated members working in the plants.

John L. Lewis' men did not gain larger pensions, nor insurance and several other adjustments which they desired.

Many persons, recalling that the corporation last fall had offered contracts to its employe representatives, expect the future to answer the question of whether the employes would have been better off under some such arrangement as the "cost of living index."

Recognition, wages, hours of work, vacations, holidays, arbitration and many other issues are taken up in the contract completed

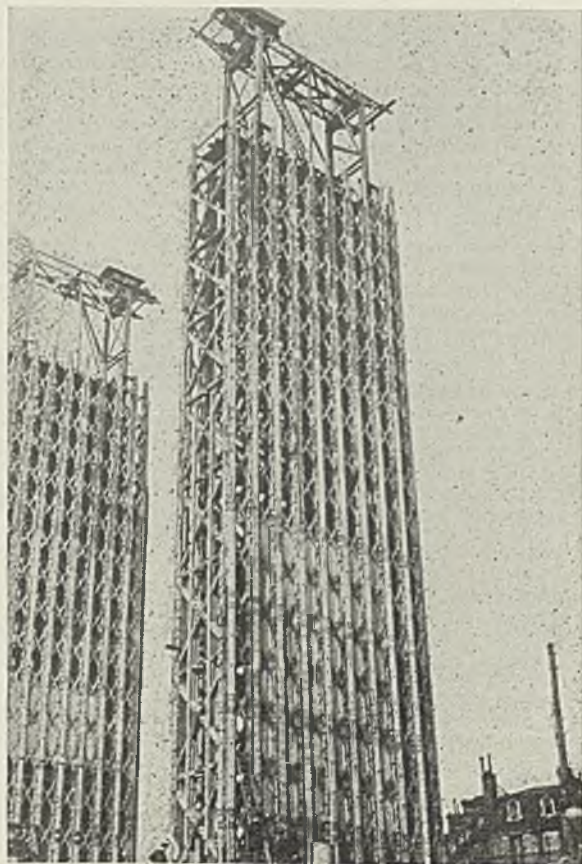
last week, which was between the SWOC and Carnegie-Illinois Steel Corp., Tennessee Coal, Iron & Railroad Co., American Steel & Wire Co., National Tube Co., and Columbia Steel Corp., five firms accounting for around one-third of the nation's annual steel output and employing approximately 160,000.

However, the most widely-hailed part was the so-called "peace treaty":

"Should differences arise between the corporation and the union or its members employed by the corporation as to the meaning and application of the provisions of this agreement, or should any local

As France Builds an Exposition

THIS massive network of steel girders forms the "gates," or main entrance, to the 1937 exposition in Paris. Some idea of the great height of the towers may be obtained by comparing them with the workmen at the bottom of the picture. Wide World photo



trouble of any kind arise in any plant, there shall be no suspension of work on account of such differences, but an earnest effort shall be made to settle such differences immediately in the following manner, etc."

The agreement is supplementary to that between Carnegie-Illinois and SWOC of March 2 and extends to Feb. 28, 1938. It provides that on Feb. 7, 1938, a joint conference shall be held to negotiate another agreement.

Basic Rates Established

Wages and hours of work agreed upon in earlier contract are included in the agreement of March 17. These provide for basic rates of 52½ cents an hour, minimum \$5 daily wage for 8-hour day and a 40-hour week with time and a half for overtime. Skilled and semiskilled workers were advanced 10 cents an hour with tonnage and piece workers' rates adjusted accordingly.

One observer points out that many previously established policies of the United States Steel Corp. were in the agreement.

No mention of the employe representation plan was made in the contract. The SWOC adopted a motion to withdraw all its men from company unions in all plants cov-

ered by the contracts. It explained that it was seeking by this means to "help bury the company union."

"We are going ahead with our plan of asking conferences with the major independents," said Philip Murray, SWOC chairman. "Whether we will take a few days breathing spell or not, I cannot say at this time."

By agreement of both sides, negotiations over the agreement with the American Bridge Co., another subsidiary, were put over until this week. The postponement was said to be necessitated by the fact that American Bridge has many men on its payrolls who are not doing the same type of work as the other subsidiaries.

Carnegie-Illinois employe representatives last week struggled to perfect their organization.

"ERP will stand on its own hind legs," said Elmer Glover, one of its leaders. "The committee believes that the plan will be the start of a labor organization such as the United States has never had before. The new ERP will be free from domination, intimidation and coercion. It is a plan, of, by and for the employe."

More companies last week announced increases in wages, including Allegheny Steel Co., Apollo Steel Co., Spang, Chalfant & Co., Oliver

Iron & Steel Co., Blaw-Knox Co., Walworth Co., Mesta Machine Co., United Engineering & Foundry Co., Ludlum Steel Co., and others.

The Steel Workers Organizing committee announced that "union contracts have been signed with Hunter Steel Co., Neville Island, Pa., Henry Disston & Sons Co., Philadelphia, and Tippet & Woods Co., Phillipsburg, N. J." It also announced that the Blaw-Knox Co. had signed an agreement covering workers represented by SWOC, similar to the Carnegie-Illinois pact of March 2. It claimed to have held conferences with officials of the Wrought Iron Co. of America and Lebanon Rod & Iron Co., both of Lebanon, Pa., and that conferences had been scheduled for later in the week with the Allegheny Steel Co. and Spang, Chalfant & Co.

WESTINGHOUSE EMPLOYEES TO RECEIVE \$1,000,000 BONUS

Westinghouse Electric & Mfg. Co.'s 46,000 employes will receive nearly \$1,000,000 in bonuses during March, company executives have announced.

A 14 per cent bonus will be paid in addition to the basic wage, it was disclosed at a joint parley between company officials and employe representatives (company union) and Local Union 601, United Electrical

Full Text of Contract Between Five U.S. Steel Subsidiaries and Organized Labor

THIS agreement, dated March 17, 1937, between Carnegie-Illinois Steel Corp. (hereinafter referred to as the "corporation") and the Steel Workers Organizing committee on behalf of the members of the Amalgamated Association of Iron, Steel and Tin Workers of North America, or its successor, (hereinafter referred to as the "union") employed by the corporation, made pursuant to and in supplement of Sec. 4 of the Agreement of March 2, 1937, between said parties.

SECTION 1. It is the intent and purpose of the parties hereto that this agreement will promote and improve industrial and economic relationships between those employes who are members of the union and the corporation, and to set forth herein the basic agreement covering rates of pay, hours of work and conditions of employment to be observed between the parties hereto.

It is understood and agreed that this agreement pertains only to members of the union employed in the corporation's steel manufacturing and by-product coke plants.

The term "employe," as used in this agreement shall not include foremen, assistant foremen or supervisors in charge of any classes of labor, or watchmen, or any salaried employes.

SECTION 2—RECOGNITION. The corporation recognizes the union as the collective bargaining agency for those employes of the corporation who are members of the union. The corporation recognizes and will not interfere with the right of its employes to become members of the union. There shall be no discrimination, interference, restraint or coercion by the corporation or any of

its agents against any members because of membership in the union. The union agrees not to intimidate or coerce employes into membership and also not to solicit membership on corporation time or plant property.

SECTION 3—WAGES. Effective March 16, 1937, there shall be an increase in wages of 10 cents an hour on all rates which are at present \$4.20 a day, or a minimum for this classification of \$5.00 a day of eight hours. Such classifications now receiving less than \$4.20 a day or less than 52½c per hour, shall be increased 10 cents per hour. There shall be an increase of 10 cents per hour in all other hourly rates, and an equivalent increase in all tonnage and piece-work rates which will net under normal expected earnings an increase of not less than 80 cents per day of eight hours.

SECTION 4—HOURS OF WORK. Effective March 16, 1937, there shall be established an eight hour day and a 40 hour week. Time and one-half shall be paid for all overtime in excess of eight hours in any one day or for all overtime in excess of 40 hours in any one week.

A day may be a calendar day or any 24-hour period, and a week may be a calendar week or any five regular 8-hour turns on consecutive days, followed by a 48-hour rest period at the option of the corporation.

An employe, who is a member of the union, shall not be paid both daily and weekly overtime for the same hours so worked.

SECTION 5—VACATIONS. Each employe, who is a member of the union, and who, prior to July 1, 1937, was continuously in the service of the corpo-

ration five years or more (continuity of service to be based on United States Steel and Carnegie pension fund rules for service continuity) shall receive one week's vacation with pay, such vacation to be taken in a single period. Those who are granted vacations will be paid on their average rate of earnings per hour for the two pay periods immediately preceding their vacation. The total hours of vacation pay will be the average hours they worked per week during that period, but not less than 40 hours nor more than 48 hours.

Vacations will, so far as possible, be granted at times most desired by employes, but the final right to allotment of vacation period is exclusively reserved to the corporation in order to insure the orderly operation of the plants.

SECTION 6—SENIORITY. It is understood and agreed, however, that in all cases of promotion or increase, or decrease of forces, the following factors shall be considered, and where factors (b), (c), (d), and (e) are relatively equal, length of continuous service shall govern. (a) length of continuous service; (b) knowledge, training, ability, skill and efficiency; (c) physical fitness; (d) family status; number of dependents, etc.; (e) place of residence.

SECTION 7—ADJUSTMENT OF GRIEVANCES. Should difference arise between the corporation and the union or its members employed by the corporation as to the meaning and application of the provisions of this agreement, or should any local trouble of any kind arise in any plant, there shall be no suspension of work on account of such

(Please turn to Page 96)

and Radio Workers of America, an affiliate of John L. Lewis' CIO.

Unionists had demanded a 20 per cent pay increase but it was indicated they probably would be satisfied with pay increases "similar to those now being granted in the steel industry," which have averaged 10 cents an hour.

A spokesman for Westinghouse said the March bonus, under terms of the company's profit-sharing plan instituted last May, would add 70 cents a day to the pay of a man earning \$5 a day.

Falk Appropriation to Steel Study \$33,500

The Falk foundation of Pittsburgh, whose funds helped finance a recent study of the steel industry, has issued its report for 1935 and 1936. It states:

"The first interest of the Falk foundation has been in the extension of the frontiers of economic knowledge through research."

"The Falk foundation does not itself conduct research. It confines itself to granting to reputable outside organizations financial support.

"Once the foundation makes a grant, it refrains completely from exercising control over the conduct of the study.

"The iron and steel study was financed in part by the Brookings institution and in part by the Falk foundation. The Falk foundation's appropriations for the study totaled \$33,500."

Steel Output Setting All-Time Record for First Quarter

STEEL ingot production in the first three months this year apparently has established an all-time record for a first quarter.

With the steelworks operating rate close to 90 per cent, and with strong prospects for this rate to be sustained over the remainder of the month output for March should exceed 5,000,000 tons. The closest estimate that can be made at this time indicates a figure of 5,102,900 tons for March, which should net the first quarter 14,264,000 tons.

This would top the former first quarter record of 13,800,000 tons in 1929 and would fall short by about 875,000 tons of the highest quarterly record of all time, 15,139,000 tons in the second three-month period in 1929. The current quarter should come close to the third quarter of 1929, when 14,317,000 tons were produced. The quarter's output of 14,264,000 tons compares with 13,322,800 tons produced in all 1932.

In the record-breaking months of 1929 the per cent of operation exceeded 99 upon three occasions, with the peak in May, 99.59. March in that year reached 99.20 per cent.

It would take no such high percentages to establish a production record this year, for capacity has ex-

panded to 68,290,862 gross tons annually for open-hearth and bessemer ingots, compared with 60,990,810 in 1929.

Hence, if close to 90 per cent can be averaged over any future quarterly period this year a new production record may be established. From present indications there is a possibility of this in the coming quarter.

Some producers have already become booked to virtual capacity for the greater part of the second quarter, with the beginning still 10 days off. Certain sheet producers are booked well into the third quarter on certain grades, and in practically all instances, producers are selecting their tonnage with care

Demand Continues Strong

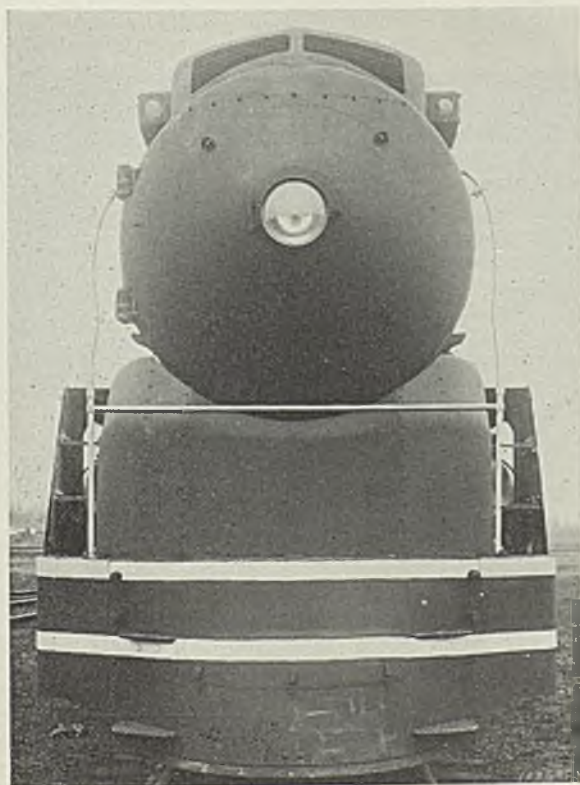
Notwithstanding recent sharp price increases there is still strong pressure for steel, and literally thousands of tons are being turned down throughout the industry, but with most of the domestic tonnage finding takers sooner or later. Foreign demands are the more likely to go unsatisfied, despite increasing willingness to pay good premiums where shipments can be arranged.

How long such a situation will continue is questionable, but the fact remains that mills have heavy backlogs including much low price tonnage, which they will endeavor to work off as fast as possible, since labor costs have been stepped up sharply.

Road and bridge work and building construction will be stimulated seasonally. Perhaps a third of this year's freight car buying, or about 27,000 cars has already been completed, but much of the necessary steel remains to be rolled in the second quarter, and at present inquiries are pending for several thousand additional cars. Orders for several hundred thousand tons of rails probably will be filled in the second quarter, and suspensions due to recent labor trouble in the Detroit district may result in extra heavy rolling of automobile steel.

Moreover, there is the buying momentum which has effected all lines and which may continue under the existing trend of further inflation.

Meanwhile, the menace of a major steel strike this spring has been removed, so while there is no definite assurance of a new all-time record, indications point to a heavy second quarter production. This appears true to steelmakers, notwithstanding



350 Tons of Steel Streamlined

FIRST of ten steam locomotives built for passenger service on the New York, New Haven & Hartford railroad by the Baldwin Locomotive Works, Philadelphia. It has wheelbase of nearly 85 feet for engine and tender, weight 697,300 pounds

ing the substantial anticipatory buying which may serve as a damper on new purchases as second quarter gets under way, and despite various uncertainties originating from legislative proposals in Washington.

WASHINGTON CONCERNED BY RISE IN COMMODITY PRICES

Government officials in Washington are much concerned over the increased commodity prices.

Secretary of Commerce Roper at a press conference last week again called attention to "unguarded business booms." In this connection he said that "I now appeal to business groups to assume their proper responsibilities for safeguarding and protecting our future economic progress."

Dealing with the present business situation Mr. Roper said that "despite industrial disturbances and some rather important sectional hindrances, floods and storms, business progress continues. Industrial production today is more than 20 per cent ahead of a year ago. Business, the country over, is at least 15 per cent better than it was last year at this time.

"Perhaps the most encouraging thing of all is that the last year's progress was on a sound basis. The durable goods industries, which lagged so long, are now showing marked improvement."

Properties of Newton Steel Sold for \$302,000

Real estate and personal property of the Newton Steel Co., Newton Falls, O., was sold last week at sheriff's sale for \$302,000, to the Central National Bank of Cleveland and H. R. Harris, trustees for the bondholders.

Sale of the property, valued at \$450,000, followed an action in foreclosure filed by the trustees last July resulting in a judgment against Newton and issuance of an order of sale last November.

Purchase was made with \$302,000 principal amount of the \$2,866,000 of 7 per cent first mortgage gold bonds pledged under the general mortgage of Republic Steel Corp. to the Chemical Bank & Trust Co., New York, and Howard B. Smith, trustees. The bonds are owned by Republic, subject to the pledge.

The defaulted bonds are part of an original issue of \$4,000,000 issued in January, 1932, which matured in January, 1933. Included in the total is \$1,000,000 of bonds acquired by Corrigan, McKinney Steel when it merged with Newton in July, 1932. These came into possession of Republic following its merger with Corrigan, McKinney.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended		Same week	
	March 20	Change	1936	1935
Pittsburgh . . .	91	+ 2	18	35
Chicago . . .	82½	None	63½	47
Eastern Pa. . .	58	+½	38	28
Youngstown . .	85	None	74	60
Wheeling . . .	97	+ 1	55	92
Cleveland . . .	82	+ 4	79	70
Buffalo	87	- 3	47	37
Birmingham . .	80	+ 3	69	55½
New England . .	97	None	56	51
Detroit	100	+ 5	94	88
Cincinnati . . .	72	+ 4	76	†
St. Louis	82	None	†	†
Average	89	+ 2	50	46

†Not reported.

Production

STEELMAKING advanced 2 points last week to 89 per cent. This was the seventh successive weekly gain since the end of January. This compares with 50, 46 and 94½ per cent, respectively, in the same weeks of 1936, 1935 and 1929. Details follow:

Cleveland-Lorain—Gained 4 points to 82 per cent, as Corrigan, McKinney division of Republic Steel Corp. resumed with an additional open hearth to operate 13. Otis Steel Co. and National Tube Co., Lorain, operated 8 and 11 units respectively.

Detroit—Up 5 to 100 per cent, following resumption of one idle open hearth.

Youngstown—Unchanged at 85 per cent.

Central eastern seaboard—Up fractionally, to 58 per cent, with little variation in this rate expected over the immediate future.

Pittsburgh—Up 2 points to 91 per cent, with the leading interest operating at around 93 per cent, the leading independent at approximately 88 per cent, and other producers at correspondingly high levels which had not been attained for many years. Another blast furnace has been added by Carnegie-Illinois Steel Corp. at its Duquesne works, making six active there for the first time since 1929.

Wheeling—Up 1 point to 97 per cent, highest level reached in some time.

New England—Held at 97 per cent for fourth consecutive week. A few points will be lost this week, as one small furnace goes down for repairs and cleaning.

Cincinnati—Rose 4 points to 72 per cent, with lighting of two open hearths by Andrews Steel Co., Newport, Ky.

Chicago—Held at 82½ per cent

but additional open hearth capacity is being readied for operation in the near future. Most mills continue at capacity. Thirty of 39 blast furnace stacks are active.

Birmingham—Up 3 points to 80 per cent, as one open hearth was added to the active list. Of the 24 open hearths in the district, all but four will be melting this week.

Buffalo—Off 3 points to 87 per cent, as two open hearths were taken off for repairs. If present plans are followed, 40 open hearths will be in production this week, establishing an all-time high of 93 per cent.

St. Louis—Remained at 82 per cent.

Machinery Exports Larger; January Gain 19 Per Cent

A gain of 19 per cent in exports of machinery from the United States in January over January, 1936, is shown by statistics of the machinery division, department of commerce. Value of machinery exports in January this year was \$17,273,870, the highest monthly value since 1930. In the corresponding month of 1936 it was \$14,545,297.

Power-driven metalworking machinery gained 9 per cent from \$3,947,706 to \$4,314,629; other metalworking machinery declined 63 per cent from \$729,901 to \$270,877; mining, well and pumping machinery, made the greatest increase, 72 per cent, from \$2,652,222 to \$4,565,500; construction and conveying machinery gains 32 per cent from \$660,934 to \$1,201,130; power-generating machinery, except electric and automotive, gained 28 per cent, from \$937,519 to \$1,200,987; textile, sewing and shoe machinery dropped 25 per cent, from \$2,022,789 to \$1,521,518.

Greatly enlarged exports of locomotives and parts accounted for most of the gain in power generating machinery. In metalworking machinery, turret lathes led in increased shipments, with milling machines, vertical drilling machines and sheet and plate working machinery showing considerably larger volume.

300 Brown & Sharpe "Graduates" in Reunion

Brown & Sharpe Mfg. Co., Providence, R. I., entertained 300 of its graduate apprentices at the Biltmore hotel, Providence, recently. More than 100 are located away from the Brown & Sharpe plants and attended from Massachusetts, Connecticut, Vermont, New York, New Jersey and Illinois. Many hold executive positions, own their plants, or are principal partners.

United States naval torpedo station at Newport, R. I., was represented by 20 graduates.

At the banquet, David Arnott, a graduate of 1903, now in charge of Brown & Sharpe estimating, presided, Benjamin J. Graves, another graduate, now director of design, was toastmaster, and Ralph E. Flanders, president of the Jones & Lamson Machine Co., Springfield, Vt., was the principal speaker. Other addresses were made by Henry D. Sharpe, president and treasurer of the company, and Judge Ira Lloyd Letts.

The company has printed a list of its graduates, with their present positions and copies are available on application.

Foundry Equipment Orders Increase in February

After a sharp drop in January from December the index of foundry equipment orders for February made a partial comeback. From 283.3 in December the index receded to 190.9 in January and bounded to 248.5 in February. This compares with 110.4 in February, 1936. Shipments in February were 201.8, compared with 177.2 in January and with 114.5 in February, 1936. Index of unfilled orders for February was 380, compared with 333.3 in January and 130.4 in February, 1936.

Indexes are based on the averages of 1922-24 as 100.

Carnegie Alters Clairton Plan; Buys New Site for Strip Mill

LAST January as Carnegie-Illinois Steel Corp. dedicated its \$10,000,000 semicontinuous plate mill at Homestead, Pa., it also announced a \$60,000,000 expansion program. This was to include new construction and modernization at its Clairton, Pa., plant and Edgar Thomson mills, Braddock, Pa.

The plan then called for a hot strip and a cold strip mill at Clairton, with annual capacity for 600,000 tons of sheets and tin plate. Also, a slabbing mill at Edgar Thomson, with annual capacity for 1,000,000 tons, chiefly to supply the new Clairton mill.

Last week it announced a revision of this plan. Instead of altering operations at Clairton, it has purchased 600 acres of land in the Monongahela river valley, exact location not yet disclosed, and will build thereon a sheet and strip mill to be named the Irvin works in honor of William A. Irvin, president, United States Steel Corp.

However, part of the Clairton plant will be reconditioned, operations continued, and ingot production will be increased by lighting three open hearth furnaces idle since 1930.

The new program does not alter

the plan for a slabbing mill at Edgar Thomson works.

The new mill will be supplied with steel from the Edgar Thomson works by way of the Union railroad, another Steel corporation subsidiary.

GREAT LAKES TO BUILD OPEN HEARTH, SLAB MILL

Great Lakes Steel Corp. subsidiary of National Steel Corp. is making large additions to its productive capacity and with others to be made by Weirton Steel Co., another subsidiary, National Steel Corp. shortly will have 3,250,000 tons annual capacity for producing steel ingots.

Great Lakes Steel is now adding four open-hearth furnaces, which will increase its ingot capacity one-third. This follows construction of four open hearths late in 1936, which added 50 per cent to its ingot capacity. Other additions planned for 1937 include 130 by-product coke ovens with facilities for recovering all by-products, and a slabbing mill. A third blast furnace is now under construction for Great Lakes, with capacity of about 1000 tons per day, bringing the company's hot metal

When a Twisted Rail Pleases Rail and Steel Chiefs—It's News



A 112-pound Brunorized rail, 19 feet long, containing 0.79 per cent carbon, more than average and hence likely to be more brittle, was twisted cold through three complete turns without showing signs of fracture. The demonstration of ductility and toughness featured the dedication of Carnegie-Illinois Steel Corp.'s Brunorized rail mill at Gary, Ind. (see STEEL, March 15, p. 74).

Further, it was shown that the rails are considerably tougher at zero Fahr., while at 50 degrees below zero, the difference is very striking. This feature is expected to be of

outstanding benefit in track maintenance in cold weather.

Attending were, left to right: R. E. Zimmerman, metallurgy and research vice president, United States Steel Corp.; Irving S. Olds, a director of United States Steel; G. C. Kimball, executive vice president, Carnegie-Illinois; Paul Shoup, vice chairman, Southern Pacific railroad; B. F. Fairless, president, Carnegie-Illinois; C. E. Denney, president, Erie railroad; William A. Irvin, president, United States Steel; and F. E. Williamson, president, New York Central railroad. The rail photo is superposed on the group photo.

capacity to about 2500 tons per day.

Weirton Steel Co. has completed a modernization program in its 48-inch strip mill and its tin mills, which will largely increase output of tin plate and strip. The 48-inch mill capacity has been increased about 25 per cent. Tin mill improvements include new-type annealing, cold-rolling and tinning equipment.

During 1936, Great Lakes Steel greatly expanded its hot-rolled strip capacity by building new continuous mills, including a 96-inch continuous strip sheet mill, the largest yet built. The new hot mills have a capacity of 720,000 tons and to further finish this product cold-rolled strip sheet mills with a capacity of 500,000 tons were built.

Through its improvement program, National Steel has increased potential plate production to 600,000 tons per year, and merchant bar production to 500,000 tons. By adjustment of production schedules, the company will be able at any time to utilize its full capacity for 250,000 tons of structural material. There are only two major steel commodities—pipe and wire—which the company does not produce at present.

Earnings Are Reported

In reporting net earnings for 1936 of \$12,541,841.84, equal to \$5.80 per share of capital stock, National Steel points out that all taxes amounted to \$5,399,505.04, equal to \$2.49 per share of capital stock, and representing approximately \$270 for each of the 19,936 employees. Dividends disbursed during the year totaled \$6,749,503.13, equal to \$3.12½ per share.

The funded debt was increased to \$60,000,000 during 1936 by sale at par of \$10,000,000 first mortgage bonds with 3½ per cent coupon. This was taken to partially reimburse expenditures made or to be made in connection with the improvement program. Through a sinking fund payment the funded debt was reduced to \$59,000,000. Working capital at the year-end was \$40,610,529.08.

ARMCO PARTICIPATING IN NEW AUSTRALIAN MILL

American Rolling Mill Co. will ask authorization of an issue of \$60,000,000 convertible preferred stock, of which only \$45,000,000 will be issued, at its annual meeting April 15 in Middletown, O. Proceeds would be used to retire practically all indebtedness and provide new capital.

Twenty million dollars of the new capital will be used to participate in establishing a plant in Australia for special grades of sheets, capital additions to plants of Sheffield Steel Corp., subsidiary, replacements and

additions to plants of the parent company, and other purposes.

Though details have not been disclosed it is understood the Australian project will be a continuous mill of the type in which American Rolling Mill has pioneered. Similar mills, under its rights, have been built in Germany and England.

Proposed readjustment also involves refunding of the outstanding \$21,625,000 principal amount of 5 per cent sinking fund gold debentures, due 1948, and the outstanding \$1,931,000 par value cumulative preferred stock, 6 per cent, series B. In anticipation series B has been called for redemption April 15.

Working Out Details of McKeesport Merger

Merger of the McKeesport Tin Plate Co. into its subsidiary, National Can Co., is expected to be completed shortly. McKeesport Tin Plate stockholders approved the plan last week.

The name of the merged companies will be McKeesport Tin Plate Corp., a Delaware corporation. It is understood two shares in this corporation will be issued in exchange for each outstanding share of the merging companies. Since

1929 McKeesport Tin Plate has owned 66 per cent of National's stock.

J. Paul Fife, Pittsburgh attorney, will be chairman of the board. He has been counsel for McKeesport Tin Plate since 1901 and became a director in 1925.

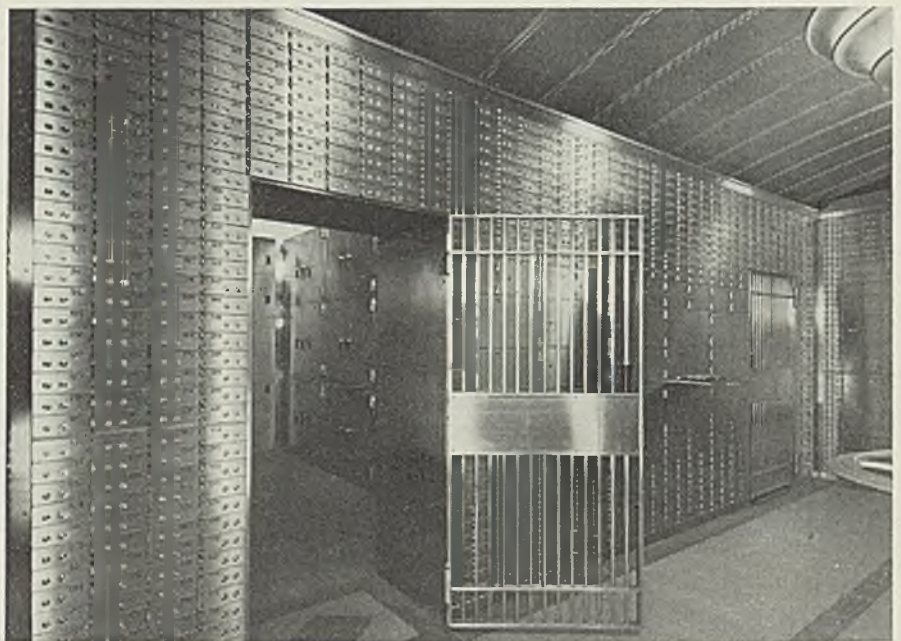
H. A. Roemer To Be Empire Steel Chairman

Stockholders of Empire Sheet & Tin Plate Co., Mansfield, O., last week created the post of chairman for Henry A. Roemer. He is president, Pittsburgh Steel Co.; president and chairman, Sharon Steel Corp., and president, Niles Rolling Mill Co., a subsidiary of Sharon. Mr. Roemer was given option to buy 9000 shares of Empire unissued common stock at \$10 a share. His formal election was left to a new board of directors.

New board members are B. E. Kibbee, vice president of Sharon; A. E. Walker, vice president of Pittsburgh Steel, and James M. Hill, Empire's general manager.

C. H. Henkel, president, reported \$3.195 profit for Empire in the last quarter of 1936, against a \$380,240 loss in the first nine months. The company reports more than \$42,000 profits for January and February this year.

New Bank Vault Uses 15 Tons Stainless Steel



LUSTROUS beauty, as well as safety, has been attained through use of stainless steel for exterior and interior finish of this safe deposit vault in the Farmers Deposit National Bank, Pittsburgh. Fifteen tons of No. 11 gage sheets and ½-inch plates were required. The vault door weighs 54 tons. York Safe & Lock Co., York, Pa., was the fabricator. Photo courtesy Allegheny Steel Co., Brackenridge, Pa.

Feature Oil Burners, Air Conditioners in Joint Show

Approximately 80 companies had displays at the oil burner and air-conditioning exposition at Convention hall, Philadelphia, March 15-19. Though this was the fourteenth annual exposition for the oil burner manufacturers, it was the first joint exhibit of oil burners and air conditioning equipment and came close to setting an attendance record.

The program featured sessions devoted to business, marketing, and technical problems. A highlight of the show was an address by Willis H. Carrier, of the Carrier Engineering Corp., Newark, a pioneer in air-conditioning, on the technical aspects of this equipment.

The exposition revealed steady improvement in the design of oil burners and air-conditioning equipment. Some units were said to be radically different from any in use heretofore. The General Electric Co., Schenectady, N. Y., for example, displayed a new oil-fired warm air conditioner of especially unique design.

Scrap Dealers Advised To Adjust Wage Schedules

Scrap dealers in Chicago were advised to correct promptly any defects in wage schedules without pressure of labor organizations, by Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, at a meeting of the Chicago chapter

last week. Arthur M. Price, of Price-Watson Co., president of the chapter, urged a more enlightened approach to labor relations.

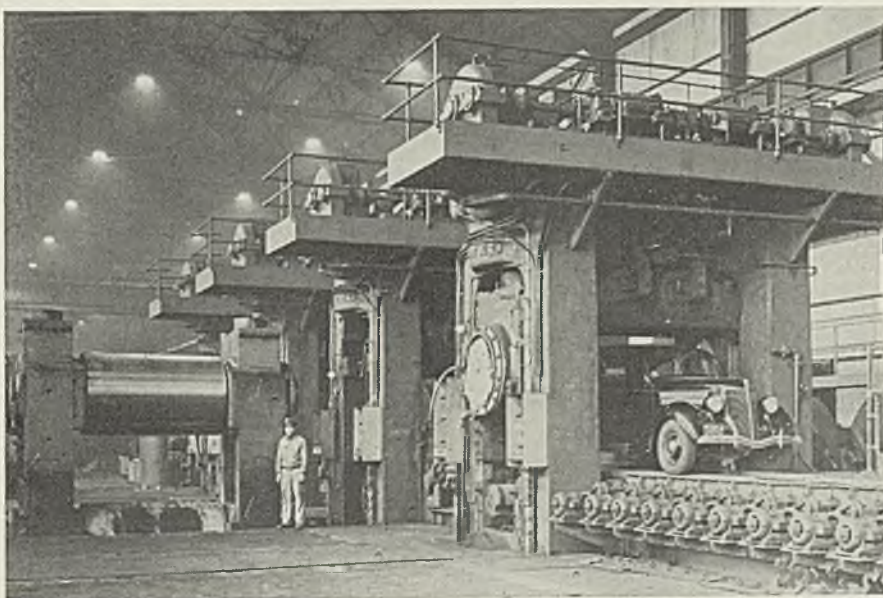
"Issues of one industrial union in the steel industry, the closed shop and the check off," declared Mr. Schwartz, "have not been settled by the recent agreements. These issues will ultimately be faced by, and affect the scrap industry. Although most scrap dealers are paying fair wages, those who have failed to meet the situation should promptly remedy any discrepancies, without compulsion of labor organizations. This is not only a matter of good business management, but also an intelligent move in the eyes of public opinion."

World Tin Consumption Up; America Uszs Nearly Half

World apparent consumption of tin increased 10.3 per cent from 142,478 tons in 1935 to 157,182 tons in 1936, according to figures of the International Tin Research and Development council. The United States used 75,643 tons last year, an increase of 21 per cent over 1935. The United Kingdom increased consumption 2 per cent to 21,860 tons, highest recorded since 1930. Gains were noted in all countries except Germany, India and Sweden while Russia and Japan established new records for consumption.

World production increased 22.2 per cent to 171,888 tons in 1936, compared to 140,652 in 1935. Output for 1936 was highest since 1929.

Automobile a Dwarf in Mill That Rolls Its Steel



SIZE of the rolls and housings used in making steel plates and sheets is emphasized in this photo, taken in the new continuous rolling mill of the Granite City Steel Co., Granite City, Ill. This mill was completed recently as part of a large improvement program

Meetings

INSTITUTE SETS MAY 27 AS DATE FOR 1937 MEETING

AMERICAN IRON AND STEEL institute has announced Thursday, May 27, as the date of its forty-sixth general meeting in New York. Headquarters will be at the Waldorf-Astoria. Details of the program are to be given out soon. Walter S. Tower, 1829 Empire State building, 350 Fifth avenue, New York, is executive secretary.

CHICAGO POWER SHOW IS TO HAVE NEW MANAGEMENT

A new power shop for the Midwest, the Chicago Exposition of Power and Mechanical Engineering, has just been announced. It will be held in the new International Amphitheater Oct. 4-9, and will be under the same management which over a long period of years has conducted the National Exposition of Power and Mechanical Engineering at Grand Central Palace, New York.

The new exposition is not intended to supplant the New York show, nor to interrupt its sequence. The next one, the thirteenth, will be held in New York, Dec. 5-10, 1938. The new sponsor, the International Exposition Co., states it is undertaking management of the Chicago show upon insistence of leading exhibitors in the New York show.

OPEN HEARTH COMMITTEE TO MEET IN BIRMINGHAM

Twentieth national conference of the Open Hearth committee of the American Institute of Mining and Metallurgical Engineers will be held at the Tutwiler hotel, Birmingham, Ala., April 7-9. The institute's Committee on Blast Furnaces and Raw Materials will hold a one-day meeting at the same time, with half of the day given over to a joint session of the two groups. L. F. Reinartz, works manager, American Rolling Mill Co., Middletown, O., is chairman of the Open Hearth committee, and John T. Breunich, 29 West Thirty-ninth street, New York, is executive secretary.

Firth-Sterling To Build Warehouse in Detroit

Firth-Sterling Steel Co., McKeesport, Pa., has completed plans for the construction of a new warehouse in Detroit, which will double its facilities for supplying steel to automobile manufacturers and other industries in the Detroit area. The new building, in addition to warehousing, will provide facilities for local treatment of sintered carbides and will also house the company's Detroit offices.

Men of Industry

RC. KLEMM has been appointed manager of sales, bolt and nut division, Republic Steel Corp., Cleveland, to succeed C. F. Newpher, who has joined the National Screw & Mfg. Co. Mr. Klemm has been with Republic and its predecessor companies 25 years. Harry W. Schrenk has been appointed manager of sales, tool steel department, succeeding the late Frank J. Bauman. Mr. Schrenk has been associated with the tool steel department a number of years.

John S. Humble has been appointed arc welding consultant by the Lincoln Electric Co., Cleveland, for its Boston office.

Elwood H. Koontz has been added to the sales staff, Philadelphia office, Reliance Electric & Engineering Co., Cleveland.

R. B. Hill, representing the Lewis Bolt & Nut Co., Minneapolis, has opened an office at 516 Railway Exchange building, Chicago.

Ralph K. Ulrich and Howard S. Marts have been named manager and assistant manager, respectively, Cash Register division, Ohmer Register Co., Dayton, O.

C. H. Joy has been appointed representative in the Pittsburgh district for Wheelco Instruments Co., Chicago. He was associated with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., since 1929.

H. P. Mee, vice president in charge of sales, Caterpillar Tractor Co., Peoria, Ill., has resigned, effective June 1, to devote his time to extensive citrus holdings in southern California.

Ben MacDermott has joined the furnace building staff, Ferro Enamel Corp., Cleveland. He has had wide experience in engineering, and is a graduate of the University of Minnesota.

H. A. Plusch has resigned as vice president and technical director, Precision Grinding Wheel Co. Inc., Philadelphia. After a short rest he plans to re-enter the abrasive engineering field.

L. K. Everitt has been appointed a director of Edgar Allen & Co. Ltd., Sheffield, 9, England. He joined the company as a member of the crucible steel melting department in 1924 and in 1928 was appointed manager of the steel department. He is a

member, British Iron and Steel institute.

L. W. Moore, managing director of Cie, Crane, Paris, and formerly correspondent in Paris for STEEL, has received the order of Chevalier of the Legion of Honor from the French government.

James Inglis, chairman of National Bank of Detroit, was elected a director, Eaton Mfg. Co., Cleveland, at its annual meeting last week. He



William A. Purtell

Elected president of Billings & Spencer Co., Hartford, Conn., as noted in STEEL, March 15, page 33. He is also president, Holo-Krome Screw Corp., Hartford, Conn.

succeeds C. W. Miller. Other directors were re-elected.

Charles E. McQuigg, director of research, Union Carbide & Carbon Corp., New York, has been made dean, college of engineering, Ohio State university, Columbus, O., effective July 1.

William W. Coleman, president, Bucyrus-Erie Co., South Milwaukee, Wis., sailed from New York March 19 with Mrs. Coleman for a cruise to Sicily that will be followed by a trip to England for the coronation ceremonies in May.

Charles F. Langer, assistant superintendent, cold strip department at the Warren, O., works, Republic Steel Corp., Cleveland, has been appointed superintendent of the 98-inch cold strip mill now under construction in Cleveland.

Vincent P. Marran has been elected president and general manager, Wash Holyoke Steam Boiler Works Inc., Holyoke, Mass. Harlan I. Den-

nett and Clifford S. Lyon have been elected treasurer and vice president, respectively.

David A. Rosoff, for the past year and a half first vice president, Amtorg Trading Corp., New York, has been elected chairman of the board and president, succeeding Ivan V. Boyeff, who will return shortly to the Soviet Union.

Paul W. K. Menard has been appointed chief metallurgist, Wood works, McKeesport, Pa., Carnegie-Illinois Steel Corp. Other appointments by Carnegie-Illinois are: A. Montgomery Jr. as plant industrial engineer, Duquesne, Pa., and John W. Young Jr. as plant industrial engineer at the Vandergrift works.

J. W. Reavis, a member of the firm of Tolles, Hogsett & Ginn, Cleveland, was elected to the board of directors, Midland Steel Products Co., Cleveland, at its annual meeting last week. He succeeds Otto Miller, resigned. All other directors and corporate officers were re-elected.

J. Lawrence Buell Jr. has been named district manager, Detroit office, Reliance Electric & Engineering Co. Associated with Mr. Buell are Z. A. Reader and Frank J. Denison. H. H. Howard, who has been in ill health, has been granted a leave of absence so that he may spend a few months in the South.

Charles F. Rohleder has been appointed chief chemist of Maas & Waldstein Co., maker of industrial finishes, Newark, N. J. He has spent all his professional life in the industrial finishing field and his experience includes research, production control and supervision of production.

Ralph L. Manier, industrial heat engineer, Syracuse Lighting Co. Inc., Syracuse, N. Y., has been appointed to the central division staff of Niagara Hudson Power Co., for coordinating all promotional activities in commercial and industrial heating and air conditioning sales. S. W. French, of the Syracuse Lighting Co., succeeds Mr. Manier.

D. W. MacDonald has been elected to the board, Erie Foundry Co., Erie, Pa., to fill the vacancy caused by the death of John R. MacDonald. L. F. Walker has been elected assistant secretary, C. D. Pinney, assistant treasurer, and D. A. Currie, in addition to his duties as president and general manager, has been elected treasurer.

F. J. Staroba, associated with the Chicago office of Carboly Co. Inc., Detroit, manufacturer of cemented carbide tools, dies and wheel dress-

ers, for the past five years, has been named a district representative and will cover the territory comprising southern Illinois, Missouri and Kansas. He replaces Mr. Deeds who has been assigned to Indiana and Kentucky.

Charles R. Hook, president American Rolling Mill Co., Middletown, O., has been elected a director, Rustless Iron & Steel Corp., Baltimore. American Rolling Mill, which recently acquired an interest of approximately 48 per cent in the Rustless corporation, is also represented on the board by Calvin Verity, executive vice president, and W. W. Seibald, vice president.

Frank Day, E. J. Ramaley and Howard L. Womochel have been appointed to the technical staff of Battelle Memorial institute, Columbus, O. Mr. Day has been assigned to a project in chemical engineering. Mr. Ramaley has been assigned to a research project dealing with the magnetic properties of alloys, and Mr. Womochel has been assigned to the metallurgical division.

E. G. Akridge has been appointed direct factory representative in the Detroit territory by Foote Bros. Gear & Machine Corp., Chicago. He succeeds Thomas Lord, resigned. Heretofore he handled the territory on the north side of Chicago. F. A. Emmons Jr. has been named to take over the territory vacated by Mr. Akridge, and Harry Harrison has been appointed sales engineer in the central territory in Chicago.

Sydney Buckley, president, Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y., was elected chairman, Electric Hoist Manufacturers association at its twentieth annual meeting in New York, March 12. He succeeds C. A. Moore, Shaw-Box Crane & Hoist Co. J. F. Cooke, electric hoist sales manager, American Engineering Co., Philadelphia, was elected vice chairman.

J. P. Morrissey has been named head of the weld rod sales division, Harnischfeger Corp., Milwaukee. Besides his experience in Russia as supervisor of the welding of locomotives and parts in Voronezh, his former connections also include six years as special representative on weld rods with the Crucible Steel Co. of America, and some time with the Fusion Welding Corp. as its Philadelphia district manager.

Howard E. Marshall, purchasing agent, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y. has retired from active service. He started with the company in a cler-

ical position in the original plant at Pemberwick, Conn. He has been purchasing agent for 36 years and director since 1901, which position he will still retain.

P. M. Culyer, assistant purchasing agent since 1917, has been elected purchasing agent to succeed Mr. Marshall. He became identified with the company in 1910.

Robert G. Silbar has been appointed assistant advertising manager, Covered Wagon Co., Mt. Clemens, Mich., trailer manufacturer. He previously was director of publicity for Klau-Van Pietersom-Dunlap Associates Inc., Milwaukee, advertising agency.

B. F. Maddux, formerly general manager, Burnd-Trux Co. division of Keeshin Transcontinental Freight Lines, has been named traffic manager of the Covered Wagon Co.

Col. N. T. Belaiew and Monsieur Aloyse Meyer have been awarded the Bessemer gold medals for 1937 by the council of the British Iron and Steel institute. Colonel Belaiew, of Paris, during the past 25 years has published a number of papers of outstanding importance on metallurgy, and Monsieur Aloyse Meyer, of Luxemburg, an honorary vice president of the institute, is head of the Societe Anonyme Arbed, second largest iron and steel company in Europe.

Dr. W. D. Coolidge and Dr. Irving Langmuir, director and associate director, respectively, General Electric Co.'s research laboratory, Schenectady, N. Y., were recipients of the John Scott 1937 awards granted by the City Trusts of Philadelphia at a dinner of the American Philosophical society, March 5. With each award went a certificate, a copper medal and \$1000 in cash. The award to Dr. Coolidge was based on his application of a new principle in X-ray tubes; to Dr. Langmuir for his physical and chemical discoveries resulting in improved gas-filled incandescent lamps.

Darwin S. Luntz, president, Institute of Scrap Iron and Steel Inc., New York, announces the appointment of the following chairmen of standing committees for 1937: Arbitration committee, Edward L. Solomon, Max Solomon Co., Pittsburgh; chapter welfare committee, Ben G. Kaplan, M. S. Kaplan Co., Chicago; export committee, David J. Joseph, David J. Joseph Co., Cincinnati; finance committee, Herman D. Moskowitz, Schiavone-Bonomo Corp., New York; legislative committee, Louis J. Borinstein, A. Borinstein, Indianapolis; public relations committee, Philip W. Frieder, Philip W.

Frieder Co., Cleveland; yard dealers' committee, David Pollock, Mayer Pollock, Pottstown, Pa.; traffic committee, Joseph Wilkoff, Wilkoff Co., Youngstown, O.; industrial relations committee, Harry S. Grant, Grant Iron & Metal Co., Detroit; brokers' committee and railroad scrap committee, William J. Ross, Hyman-Michaels Co., Chicago.

All of the above comprise the executive committee of the institute, with Joel Claster, Lurla Bros. & Co. Inc., Philadelphia, as chairman.

Died:

PROF. ELIHU THOMSON, 83, originator of the resistance method of electric welding, pioneer in many electrical developments, inventor and scientist, at his home in Swampscott, Mass., March 13. Professor Thomson, Thomas A. Edison, James J. Wood and Charles F. Brush were considered to be the great leaders in the modern electrical industry. In 1883 he helped organize the Thomson-Houston Electric Co., which merged with Edison General Electric Co. in 1892 to form the present General Electric Co. At the time of his death he was dean of that company's staff of scientists. Professor Thomson was the only man to receive all three of England's highest scientific honors—the Hughes, the Lord Kelvin and the Faraday medals. He also was the recipient of numerous other engineering and scientific medals.

Louis Wolff II, vice president and Chicago representative, Crane Enamelware Co., Chattanooga, Tenn., in Chicago, March 12.

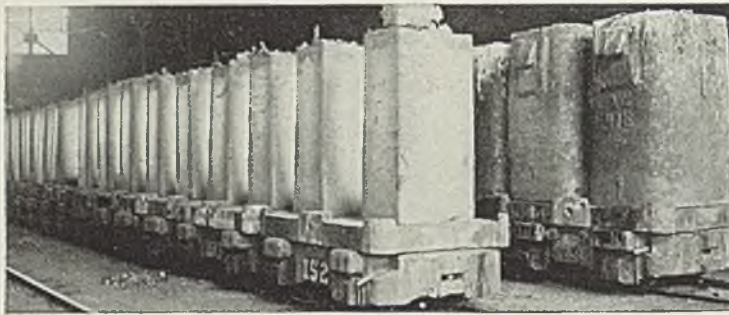
Dr. Alfred Douglas Flinn, 67, director, Engineering Foundation, New York, and long a leader in organized engineering, in Scarsdale, N. Y., March 14.

Edward J. Horn, 56, a director, A. C. Horn Co., Long Island City, N. Y., in Miami, Fla., March 6. He developed a process for the wood graining of metal furniture, cash registers and wallboards.

Stephen Fuguet, 60, president, Dallett Co., manufacturer of pneumatic tools, Philadelphia, in Jacksonville, Fla., recently, as he was returning to his home in Devon, near Philadelphia.

Leslie Wheeler, 44, formerly treasurer of Pickands, Brown & Co., Chicago, at Boca Grande, Fla., Feb. 27. He retired in 1930. His brother, Seymour Wheeler, is vice president of Interlake Iron Corp., Chicago.

WHEN BUYING INGOT CARS — Consider These Facts!



Photographs show installations at Youngstown Sheet and Tube, Inland Steel, and Granite City Steel Plants.

HYATT

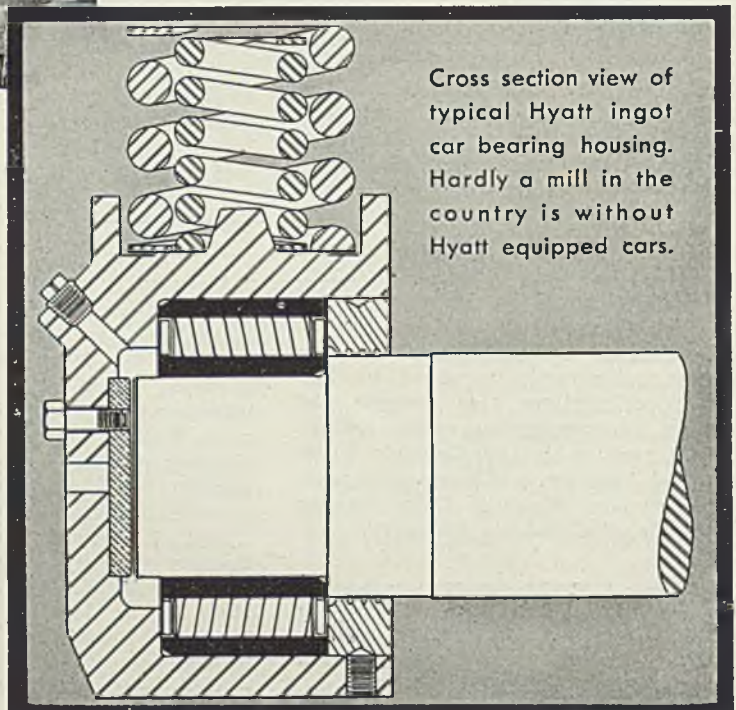
ROLLER BEARINGS

EVERY leading producer of steel, by open hearth and Bessemer processes, operates ingot mold and charging box cars on Hyatt Roller Bearings.

Over 9000 such cars are Hyatt equipped, carrying wheel loads up to 52,000 lbs. on each bearing.

There is reason for such universal use. Investigate!

Hyatt Bearings Division, General Motors Corporation, Newark, Detroit, San Francisco. Hyatt Roller Bearing Sales Company, Chicago and Pittsburgh.



Cross section view of typical Hyatt ingot car bearing housing. Hardly a mill in the country is without Hyatt equipped cars.



MIRRORS OF MOTORDOM

NOW bedridden for nearly three months with sitdown fever, this city's temperature steadily climbs higher and inhabitants are viewing the patient's condition with mixed feelings of grave concern and smoldering anger. Inspired by disregard of law started by the automotive sitdowners, organizers are swarming over the city, infesting every business place from hotels to outlying beauty parlors.

Perplexed Chrysler officials, finding their plants seized by militant and over-emotionalized union members, their offices sealed against them, their records beyond reach, turned to the courts for redress, at the same time stating their case in no uncertain terms to their dealers and the public.

Governor Hints Action

Usual procedure was followed by the court in issuing a writ against occupants of the plant to show cause why they should not be evicted, but, as in the case of General Motors at Flint, the trespassers merely mocked and hooted. A ray of hope was seen in Governor Murphy's statement that "the constitutional authority of the courts must be respected if we are to have orderly government and an orderly, peaceful society, with security for persons and property and freedom from arbitrary action and coercion."

At a later meeting of a special committee of 23 called together by the governor for a "law and order" conference, he issued a lengthy statement urging an attempt to set up machinery which would make sitdown strikes unnecessary. In this statement, he observed: "We have means to enforce respect for public authority and we propose to use them with proper vigor if need be."

UAW representatives were invited to participate in this committee's deliberations, but refused to take part.

The governor has yet to show he will uphold the authority of the

courts by force and his course of action in the Chrysler controversy is being watched closely. He would vindicate himself in the eyes of many if he backed up his word and forcibly ejected the men who have seized the plants. Assuming he did this, however, it is difficult to see how any resumption of Chrysler production could eventuate. The UAW would immediately reinforce heavy picket lines around the plants, refuse admission to suppliers and intimidate anyone wishing to enter the plant.

WHAT is the answer? If you can figure one out, your fortune is made in Detroit today. Somewhere, sometime, someone may develop a bold course of action which will rout completely the paralyzing effect of the sitdown.

In the case of Chrysler, it is not beyond belief Walter P. Chrysler himself, a former union man and always a close friend of his men, may put in a dramatic appearance and work out a solution to the trouble. Mr. Chrysler always has had a flair for the dramatic, for many years used to good advantage, and he may well be the Moses to lead his children out of the wilderness and back to their jobs.

Unbelievable events were daily occurrences here last week. Strikers at the Chrysler plants not only sealed the property tightly, but also assumed control of traffic on nearby streets. One intrepid salesman who attempted to deliver several thousand printed forms used in clerical work at Jefferson plant, when about two blocks from his destination in his car, was stopped by two union bruisers and told to turn around and keep going if he knew what was good for him.

Early in the week, all intercity trucking was suspended by a walk-out, causing untold inconvenience and loss to automobile plants and suppliers who ship by truck. Hard on the heels of this disturbance came a sitdown strike in Hotel Stat-

ler, then closing of four other downtown hotels after failure of negotiations between the management and the A. F. of L. unions.

Hundreds of salesmen calling on the automobile and parts plants here were forced to climb down long flights of stairs and seek accommodations elsewhere. To cap the climax, Tuesday afternoon, 30 union organizers crashed a rear door at the Book-Cadillac hotel, one of those affected, overpowered two uniformed police and a guard, forced their way into the kitchen, distributed food to hotel help which had remained on the scene, and then called a mass meeting of strikers in the fashionable Casino.

A police superintendent rushed to the scene and declared (for the newspapers): "This situation has gone too far. The act of breaking into the hotel is an absolute violation of the law." Reporters smiled at these familiar words. Later in the day, however, the hotel difficulty was settled temporarily and operations resumed.

Attack Retail Stores

A picket line around Hotel Statler, following the start of a sitdown strike there, seriously congested traffic and interfered with pedestrians, until a determined police lieutenant told organizers to keep the line within certain boundaries and permit unobstructed passage. In the picket line, it is reported, were a number of UAW members from automobile plants.

After one large department store was closed successfully by a sitdown, a second and even larger store barricaded all entrances except two, and at these stationed squads of detectives who were familiar with union organizers. These guards were prepared to throw out to the street any organizers who attempted to enter the store and call a strike. The technique in store strikes is for the organizers to walk in, blow a whistle a few times and then rush through the aisles shouting "Strike! Strike!"



MIRRORS OF MOTORDOM

Police were on hand outside the store to arrest ejected organizers on the grounds of disturbing the peace.

At the moment public opinion probably would be in sympathy with an employer who locks up his plant and suspends operations entirely rather than be subjected to the harassment of sitdown strikes. This calls to mind the persistent rumors to the effect Ford recently placed notices in pay envelopes which pointed out the company was well equipped to "sit down" for an indefinite period, and which pointedly asked the men whether they were likewise equipped.

EXTENSIVE equipment programs which Chrysler had under way have been halted necessarily by the closing of all departments, and the inability of management to devote any time to consideration of appropriations. Some of these plans, which included Canadian divisions and the Plymouth plant, may be scaled down when the time comes for reintroducing them, as a result of losses incurred by the strike tie-up.

Ford is continuing to purchase new machinery steadily, and has readied plans for a new tool and die shop. The latter will handle a considerable variety of die work, and represents a consolidation and expansion of two former tool and die shops in department B and in the pressed metal department. More floor space will be required, and numerous new machine tools.

Observers are still looking to Ford to come out with something starting in the way of wages and hours. The time is just about ripe, with the UAW turning eyes toward Dearborn as the next siege scene.

The story is told, in this connection, of a visit which Edsel Ford paid to a local radio repair shop. The proprietor jokingly asked him if the plant had experienced any sitdown strikes. To which Mr. Ford replied in the negative, but added "we have our fingers crossed." Many familiar with Ford labor and plant policies will tell you crossing of fingers by the management is a needless precaution.

Ford is coming to find himself in the enviable position of producing on his own a major share of necessary materials and parts, thereby

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	*352,750
March....	447,894	438,992	.....
April.....	477,059	527,726	.....
May.....	381,809	480,371	.....
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:	
Feb. 20.....	95,698
Feb. 27.....	111,915
March 6.....	126,975
March 13.....	101,684
March 20.....	99,013

being in a more favorable position currently than other car builders who of necessity are forced to pay higher prices on all materials and parts. The integration which Ford has built up over recent years was an expensive load to carry during depression years, but the shoe is now on the other foot.

Nearly everything from steel to tires is now or will soon be produced in Ford operated or Ford controlled plants, sufficient to supply a reported 18,000 cars per week. Of course, at present production rates of 33,000 per week, some outside suppliers are required, but Ford appears to be in a perfect spot to resist higher retail prices for cars which are being talked of for fall models.

The new Ford tire plant which is now nearing completion will be operated by Firestone, it is understood, on a cost-plus basis. Firestone now supplies about half of Ford's tire requirements, and has been close to the organization through the personal friendship of Harvey Firestone and Mr. Ford.

ANALYSIS of the agreement reached between the UAW and General Motors shows the union to have gained no great advantages, although union leaders hailed the

pact as the usual "signal victory." According to the grievance procedure set up by the settlement, the lot of the plant foreman is going to be anything but happy. Difficulty of maintaining control over workmen by foremen is apparent when any man with a grievance can go beyond the foreman to the superintendent, the employment manager, a shop committee, the local management and up to the vice president of the corporation in charge, if he cannot get a satisfactory adjustment.

Complicated seniority rights were set up by the agreement, and local managements will have their hands full keeping these records straight, handling time studies to determine production speeds, figuring out wage payment plans and meeting other situations over which they have authority.

WITH automobile plants well stocked on steel, by the end of this month they should have sufficient to carry them into June or July. Buying pressure has eased to a certain extent, especially buying of a speculative nature. Although mills report ample bookings at the new price schedule, it is a little early for the new quotations to have had a fair test.

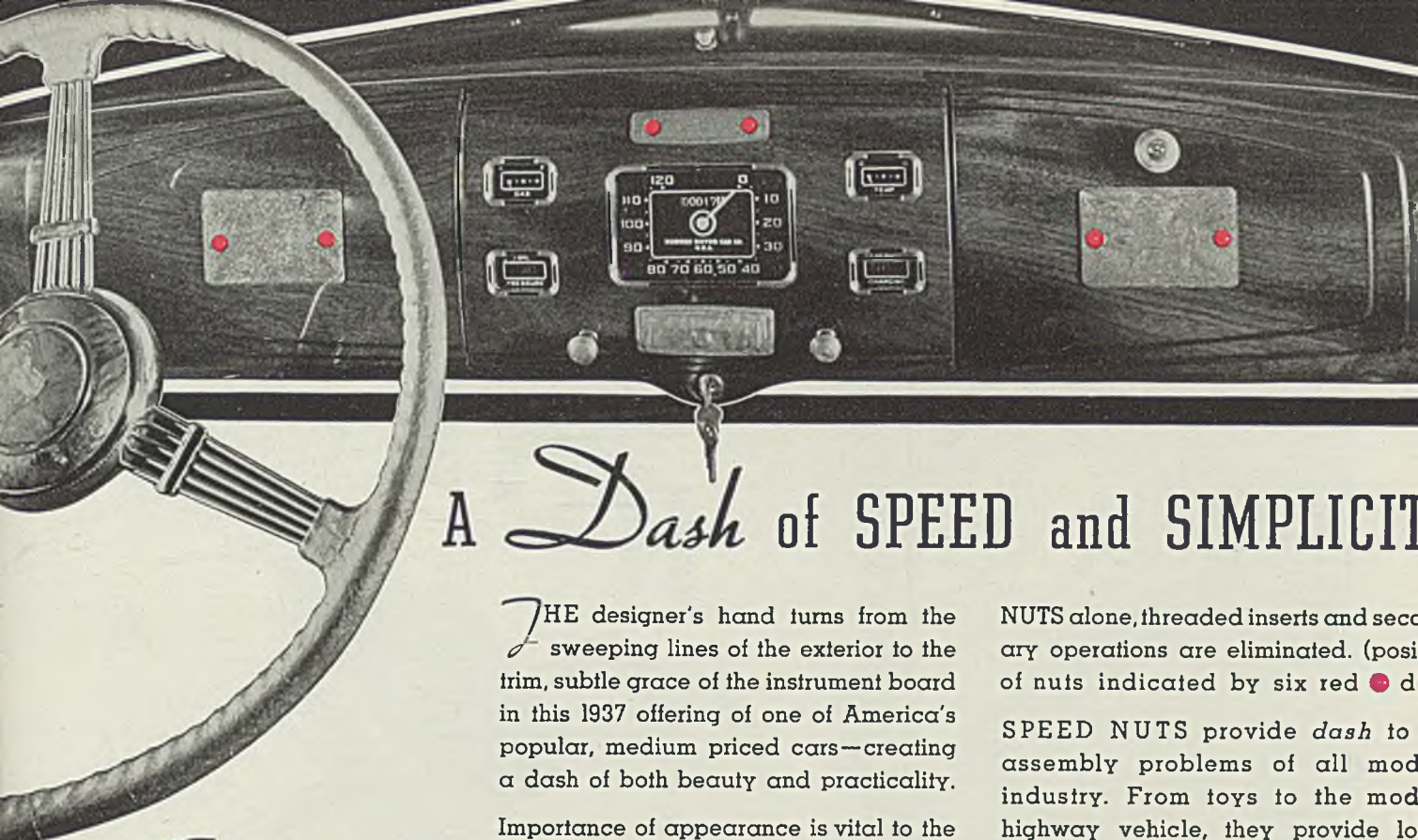
Some scattered protests over the sharp increase in price are heard, but generally steel consumers are not haggling over price if they need the material.

Car production eased further last week, following complete drying up of Chrysler, Hudson and Reo output. General Motors divisions nearly all were working forces at the rate of 45 hours per week, paying 5 hours overtime, and accounted for 52,605 cars out of the week's total of 99,013. Ford assembly lines turned out 34,800, picking up a little over the pace of recent weeks.

Early estimates of 550,000 cars for March are now being revised in view of current strike tieups; the figure probably will be somewhere near 450,000 or possibly less.

SUSPENSION at Chrysler plants has had far-reaching effects upon suppliers; for example the Jamestown Metal Equipment Co., Jamestown, N. Y., supplying radiators, was forced to close, putting 300 men out of work and on a minimum pay allowance of \$10 weekly while the plant is down. . . . Net earnings of Hudson for 1936 were in the neighborhood of \$12,000,000 after all charges. Net working capital exceeds \$12,000,000; surplus also exceeds \$12,000,000. . . . Pontiac is planning to introduce a station wagon model on the 1937

(Please turn to Page 95)



A Dash of SPEED and SIMPLICITY

THE designer's hand turns from the sweeping lines of the exterior to the trim, subtle grace of the instrument board in this 1937 offering of one of America's popular, medium priced cars—creating a dash of both beauty and practicality.

Importance of appearance is vital to the buyer, but to the builder—production methods predominate. In assembling the molded plastic decorative panels on the glove, radio and central compartments of this dash, the manufacturer sought a simple, quick and permanent means of fastening...all accomplished with SPEED

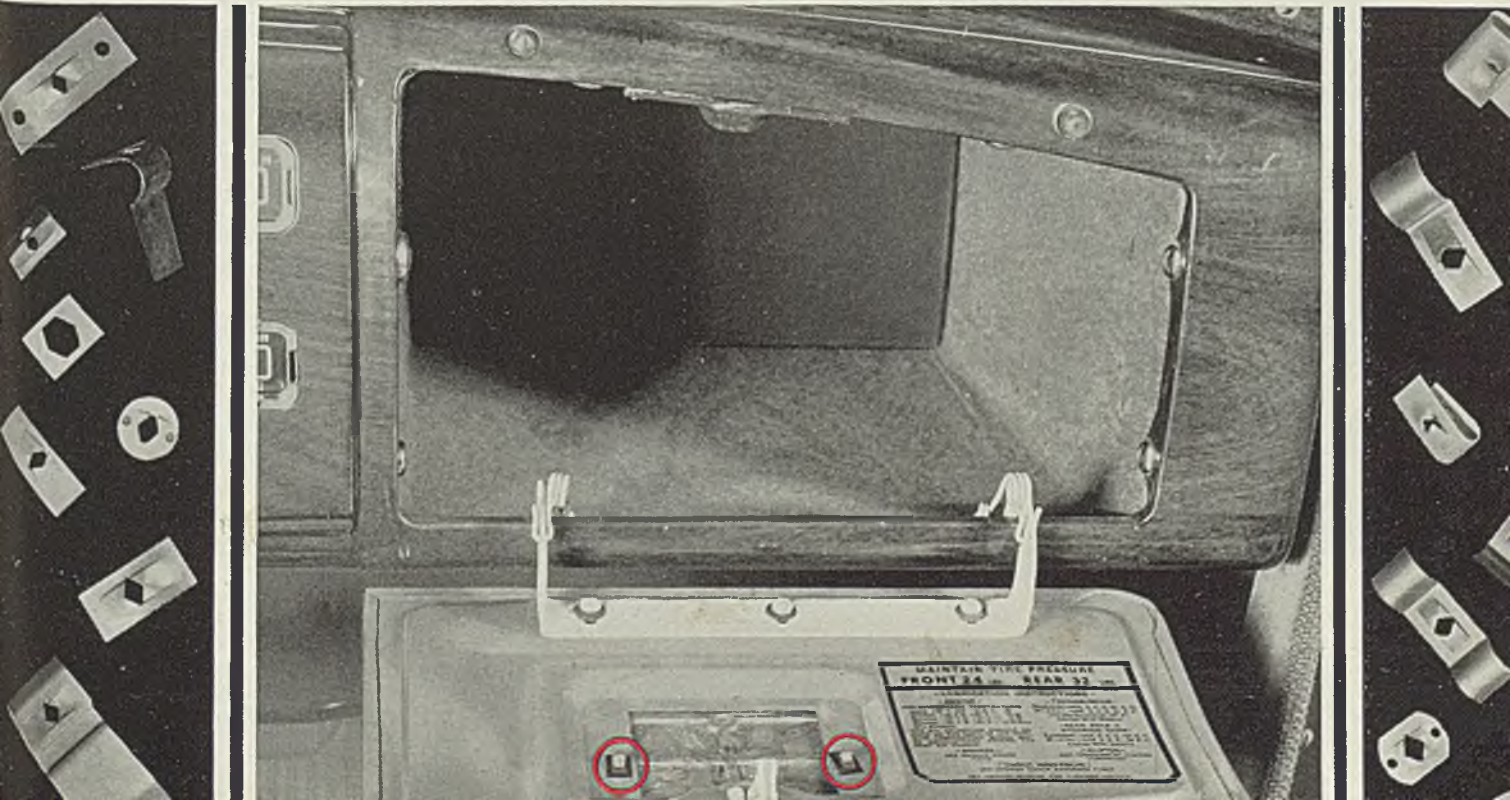
NUTS alone, threaded inserts and secondary operations are eliminated. (position of nuts indicated by six red ● d

SPEED NUTS provide dash to assembly problems of all modern industry. From toys to the modern highway vehicle, they provide low production costs and simplify initial design. They remain tight against vibrations and are made to conform to requirements... May we mail a card of assorted samples showing the widespread flexibility of SPEED NUT design meeting any assembly requirements.



SPEED NUT DIVISION
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SPEED-NUT assembly indicated by circles (O) on open glove-box door.





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WINDOWS OF WASHINGTON

WASHINGTON
A COUPLE of weeks ago, when the steel industry raised wages and reduced working hours, certain government officials when asked for comment on the Walsh-Healey situation and steel purchasers, put their tongues in their cheeks and said nothing. They wanted to wait, they stated, until after the navy had received steel bids to see just how it all worked out.

The navy department opened bids last week for more than 25,000,000 pounds of various kinds of steel, divided into many classes and subclasses, and received bids from 12 steel companies. The companies all stated that they would comply with the Walsh-Healey act. Of course, they can well do that now that they have gone on the forty-hour week.

The schedules of the navy for the steel included various types for special purposes. A detailed analysis of the prices and quantities of the bids are not available yet but the department has expressed much pleasure at the result. Bids were received from the following companies: Carnegie-Illinois Steel Corp., Bethlehem Steel Co., Alan Wood Steel Co., Jones & Laughlin Steel Corp., Enterprise Galvanizing Co., Joseph P. Cattle Bros. Inc., Ross Galvanizing Works, Penn Galvanizing Co., Phoenix Iron Co., Lukens Steel Co., Central Iron & Steel Co., and Worth Steel Co.

Wants More Drastic Law

Little has been heard during the past couple of weeks in connection with the Walsh-Healey act. However, the situation created by this law has not been solved by the action of the steel industry in meeting the hour conditions of the act, either for the government or for industry generally.

The attitude of the department of labor is just what it has been all along, that the law is not as drastic as it should be. It is reported reliably that officials of that depart-

ment are still endeavoring to draft clarifying and broadening amendments to the act.

It is believed that the department will propose a clarifying amendment establishing specific wage standards, because of the present uncertainty as to the intent of congress in allowing some latitude for administrative determination of prevailing minimum wage rates. Other amendments being considered at the labor department are said to include a provision lowering from \$10,000 to \$5000 or less the minimum amount which would subject a government contract to the terms of the act and provisions eliminating the present exemption of goods already in stock and materials purchased from subcontractors.

However, due to the navy steel buying fiasco, it will be much more difficult for Miss Perkins to get a sympathetic hearing on Capitol hill than it has been. A good many members of congress felt that she dealt with this matter very crudely in the public interest.

AMENDMENTS TO SOCIAL SECURITY ALREADY SOUGHT

There is talk here that the social security board, which has been having no bed of roses, is about ready to recommend to President and Congress some corrective amendments. This has been under study by the board for some time. It is said that among other things the board will recommend that there be a postponement of the scheduled tax increase, larger old age benefit payments, and the advancement of the time of old age benefits to 1939, instead of 1942, as provided in the present law. It is possible also that some other recommendations along this line will be made shortly by the board.

Hearings were held last week before the house committee on rivers and harbors in connection with a number of stream pollution bills that were referred to the committee.

No steel companies presented

testimony, although it is known that a number of firms are much interested in this matter. There were hearings on this subject during the last session of congress but the bills did not get to first base. Such industries, as the paper, for instance, are interested in delaying drastic legislation and asking for a bill that will provide for a thorough investigation of the subject by some government body before any definite action is taken on the subject.

NAVY'S MACHINE TOOLS ARE OBSOLETE AND INEFFICIENT

Captain H. F. Kimmel of the navy told the house appropriations committee in an executive meeting a short time ago, and the committee has just made public the record, that "good commercial practice calls for a 10 per cent replacement of machine tools, which results in equipment having an average age of five years." He gave this testimony in connection with appropriations the navy is asking for replacement of machine tools.

"The average age of machine tools in the continental navy yards," he told the committee, "is 19 years."

Captain Kimmel stated that "appropriations and expenditures during the fiscal years 1930-1936 have been considerably less than that required to reduce the present average age of machine tools and equip the navy yards properly. In part this has been due to the necessity of purchasing 'new additions' and plant appliances to keep pace with the shipbuilding program. The original machine tool program presented in 1922 contemplated spending \$1,500,000 annually for 'replacements' which would eventually reduce the average age of machine tools from 19 years to 12½ years, a moderate standard of excellence."

He told the committee in this connection that the budget for 1938, that is for the fiscal year, is made up of \$1,000,000 for the replacement of machine tools, \$250,000 for new ad-

ditions of machine tools, and \$250,000 for plant appliances.

In connection with the testimony of Captain Kimmel, Representative Scrugham of the committee stated that: "I have been investigating some machine tool practices, and I have found that some of this navy equipment is practically obsolete. You have probably charged to the navy over a million dollars worth of machine tools that are practically worthless at the Charleston, W. Va., plant. I inspected that some time ago, and there are at least \$500,000 to \$1,000,000 worth of machine tools of which no use can be made. They are obsolete under present conditions."

McGRADY URGES LABOR AND INDUSTRY TO FORM POLICY

Assistant Secretary of Labor McGrady, talking here last week to the American industrial development council, called on leaders of industry and labor to get together with the government and formulate a national labor policy.

He declared that old methods of dealing with labor disputes are "antiquated and ineffective." He said that "nothing is more obvious than that in this modern age, with all of its modern industrial problems, we must create a national labor policy. To prevent workers from joining organizations of labor of their own choosing, unsatisfactory substitutes were offered in the form of company unions. Some industrialists, feeling that this would not fully meet the situation, spent vast sums of money, as the recent congressional hearings clearly show (he referred to the La-Follette committee), in building up industrial and plant spy systems, providing tear and nauseating gas, revolvers, machine guns, gas masks and bullet proof vests."

McGrady said that "these facts speak for themselves. This is not a civilized way of finding a solution for differences between men and management. These domineering methods have not stopped the organization of labor and neither have they prevented strikes and lockouts. They have proved their futility. Now that we have had the proof, the time is ripe for leaders of organized industry and of organized labor, with the assistance of the government, to get together and work out some fair, sane, sensible program, either by legislation or by industrial agreements.

"This country has no labor policy," continued McGrady, "and as matters now stand, the decisions of the United States Supreme Court make the formulation of an effective national policy almost impossible.

"Doesn't it seem tragic," he continued, "that a nation that boasts of having the world's smartest business men and the world's most pro-

ductive workers has been unwilling or unable to adopt policies to settle its labor differences in an intelligent and honorable manner without having to resort from time to time to industrial warfare with all the bitterness that follows and the tremendous financial loss to all concerned?"

LABOR BARGAINING MUST BE FREE OF COERCION

Secretary of Commerce Roper, speaking last week before a group of business men, told them that "broad-minded and progressive men and women in all lines of endeavor will accept the objectives of organized labor through the process of collective bargaining for fair wages, proper working hours and conditions. We are in a period in which these purposes will receive the sympathetic attention of leaders in all economic groups and the public generally. But the right to bargain for principles presupposes a basis free from intimidation or coercion from any source, employer or employe. Free bargaining can progress in no other way. It requires open mindedness, fair play and the free operation of all factors involved."

SUPREME COURT DECISION ON WAGNER ACT DELAYED

No decision was rendered by the Supreme Court last Monday in the Jones & Laughlin and other labor board cases. No opinion can come down now until March 29, as the court has adjourned until that date. It is expected that all of the labor board decisions will come down on the same day and that they will state conclusively just what the situation is regarding the constitutionality of the Wagner act as all questions are contained in the several cases now awaiting decision.

However, at the last decision day the court refused to review several other appeals from labor board decisions both by industrial firms and the union. The Hatfield Wire & Cable Co. of New Jersey, and the Bethlehem Shipbuilding Corp. Ltd., San Francisco, had asked for a review of lower court decisions, in addition to five other firms. All of their appeals were refused. Some observers have interpreted this to mean that the court will uphold the act but quite the reverse conclusion could as easily be drawn. The fact of the matter is, probably, that these other appeals will be taken care of in the cases already pending.

TO STOP LEAKS IN TIN PLATE SCRAP EXPORTS

The house committee on military affairs has favorably reported out the bill of Representative Faddis, Pennsylvania, to amend the act to provide for the protection of domestic sources of tin.

The original act was approved Feb. 15, 1936. The national munitions control board is in doubt, the committee report says, "if the provisions of the original act are sufficient to prevent the shipment of tin plate scrap from the United States to the Philippine Islands, the Canal Zone, the Virgin Islands, American Samoa, and other lesser possessions of the United States, or to control shipments of this commodity from those places to foreign countries."

It is pointed out in the report that "if this interpretation of the act is correct, it is obvious that the purposes of the act could be defeated and the administration thereof rendered totally ineffective by the shipment of tin plate scrap from the United States to the places named and the reshipment from there to foreign countries.

"Under this amendment, authority would be vested to control the shipment of tin plate scrap from all the territories and possessions of the United States and the shipment of tin plate scrap from the United States to the Philippine Islands.

"It is believed, therefore, that the proposed amendment, if adopted by the congress, would vest adequate authority to control all shipments of tin plate scrap originating in the United States or in any of its territories or possessions and to restrict or prohibit such shipments in the event that such action should be required in the interests of national defense. The various departments concerned in the administration of this act are favorable toward the enactment of this amendment."

HOURS AND WAGES STUDIED

It is reported that the Roper business advisory council is making some progress on the hour and wage report which it is making at the request of the President.

There is, however, a general feeling among members of the committee that some kind of suggestions for legislation will go to the capitol in the next three or four weeks and therefore it will not be possible for the council to have any definite views on the subject before the President much before that time.

Studies on this subject are being made by several observers, both inside and outside the government, at the request of the President.

One of the most interesting which has come to light recently is that of Donald Richberg, part of which he has already announced. However, those who have seen the Richberg report state first that no actual legislation has been drawn up and second some of the recommendations are believed to be absolutely unconstitutional. It is reported, however, that the President is laying much emphasis on the Richberg study.

Editorial

He Who Decries Courts Can't Ask Others To Respect Them

DANGER impends when a movement launched for the avowed purpose of advancing the cause of professional labor unionism gets out of hand and leads to a state of near-anarchy. That, in a few words, describes what has been happening in Detroit during the past two weeks.

Since March 8 certain plants of the Chrysler Corp. have been occupied by sit-down strikers. Not satisfied with adopting the familiar passive attitude of sit-downers, the unionists in the Chrysler plants have seized the plants and offices, barricaded the property, evicted employes who were guarding plant and equipment for their owners, halted the delivery of incoming United States mail, and in many other ways violated the law. All of this has been accomplished by unionists, many of whom are not Chrysler employes, organized along military lines, for the professed purpose of enforcing their demand for a closed shop.

Chrysler officials asserted their legal rights by asking for a court order to force the trespassers from the property. Circuit Judge Allan Campbell issued an injunction ordering the sit-downers to evacuate the plants by 9 a. m. Wednesday, March 17, and fixed a penalty of \$10,000,000 to be levied upon the "lands, goods and chattels" of the defendants for failure to comply.

Authorities Plead for Respect of Law; Strike Leader Resorts to Old Fallacy, "Two Wrongs Make a Right"

After this order was issued, Governor Murphy said, "There should be no wilful disobedience of court orders nor defiance of public authority."

Judge Campbell said, "The union men freely admit seizure of another's property by force and threats of violence. There can be no compromise between the rule of law and the rule of violent self-help."

Homer Martin, CIO lieutenant, said, "we did not put the men in the plants and we are not going to take them out." The decision, he implied, was up to the sit-downers themselves.

When the dead-line on Wednesday arrived, the strikers ignored the court order. Mr. Martin, who previously had denied responsibility, sent a telegram to Governor Murphy, charging that the Chrysler Corp. had "flouted the national labor relations act"—presumably inferring that if the corporation had broken the law, the unionists were justified in doing likewise.

At this writing, the outcome cannot be predicted. The normal procedure would be for Chrysler attorneys

to produce evidence to the court that its order had not been obeyed, after which the court could cite the sit-downers for contempt and call upon the sheriff to evict them. Judging from recent experience, every effort will be made to handle the delicate situation without violence.

A simple and logical method of handling it effectively would be for a high public official to ask the sit-downers to respect the law. Under ordinary circumstances, it would be the duty of the mayor of Detroit or the governor of Michigan to make this request. However, it is doubtful whether the strikers would pay any more attention to these public officials than to the court, whose order they have defied.

There remains a higher authority and one whose word should prevail even against the will of sit-downers intoxicated with their newly-discovered power. The man who has that authority is President Roosevelt.

President, After Discrediting Courts, Is in Poor Position To Ask Strikers To Heed Court Orders

But is the President in a position to ask the strikers to respect the law? Could he do so with propriety?

He who twice has said, "I do solemnly swear that I will faithfully execute the office of President of the United States, and will, to the best of my ability, preserve, protect and defend the Constitution of the United States," has done more than anyone else in prominent position in the country to destroy the prestige of the courts. He has set the example of discounting the authority of the judiciary, and of the highest court.

Therefore, one may ask whether the President, himself having flouted the Supreme Court by innuendo and ridicule, can with propriety ask a group of earnest but sorely misled strikers to pay heed to the order of a lesser court.

Another obvious solution would be a law forcing unions to incorporate and thus be made responsible for their acts. It is rumored that John Lewis agreed to this as a condition of his deal with U. S. Steel. A law of this kind would lessen the danger of sit-down strikes in the future, but it is doubtful whether such legislation could be put through in time to be effective in the present emergency.

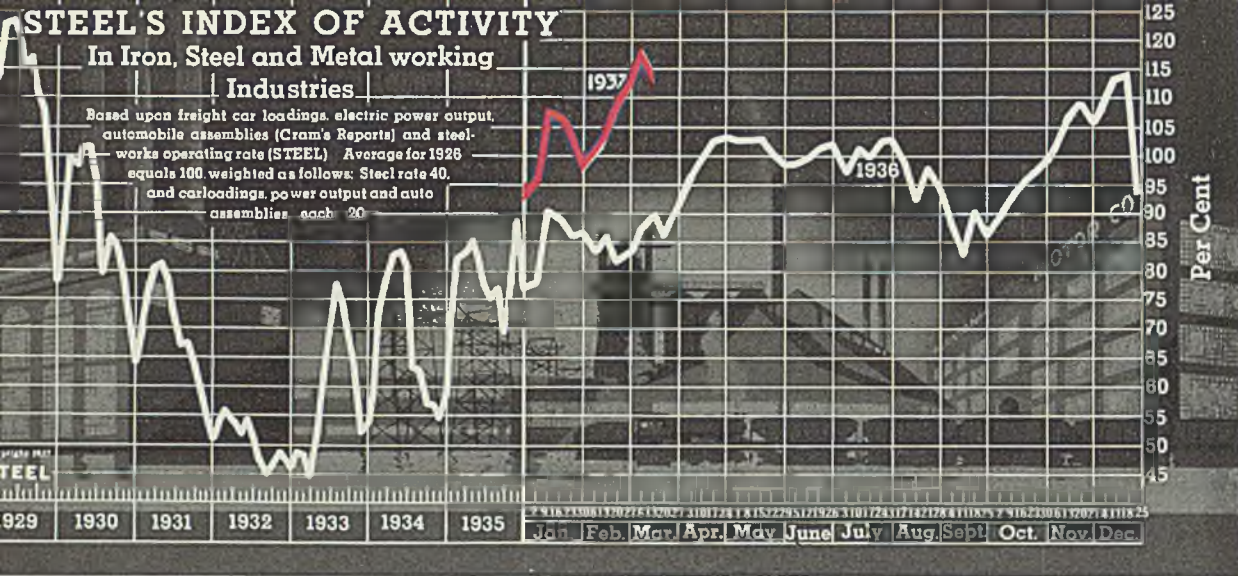
The real danger in the Chrysler crisis is not in the immediate field of labor relations. It is in the prevalence of lawlessness and in the breakdown of respect for law. If the Detroit situation spreads or continues to develop in the direction of anarchy, the next step will be a public reaction in which the seeds of fascism would find rich nourishment.

Americans have scoffed at dictator-ridden countries. We will do well to watch our step at home.

STEEL'S INDEX OF ACTIVITY

In Iron, Steel and Metal working Industries

Based upon freight car loadings, electric power output, automobile assemblies (Cram's Reports) and steel-works operating rate (STEEL) Average for 1926 equals 100, weighted as follows: Steel rate 40, and carloadings, power output and auto assemblies each 20



STEEL'S index of activity declined 5.4 points to 112.5 in the week ending March 13:

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
Jan. 30.....	99.6	86.6	81.8	66.9	49.9	56.2	72.9	97.4
Feb. 6.....	100.8	83.8	82.7	70.7	48.7	56.0	74.9	100.8
Feb. 13.....	101.9	82.8	82.4	72.4	48.3	55.5	75.4	100.9
Feb. 27.....	108.8	81.8	80.5	75.5	46.0	54.5	76.0	97.7
March 6.....	112.8	83.4	81.1	76.8	47.4	55.1	75.8	99.7
March 13.....	117.9†	87.7	82.0	78.6	43.4	54.1	79.2	98.3
March 20.....	112.5*	89.7	84.0	79.9	42.7	54.8	80.6	97.5

†Revised. *Preliminary.

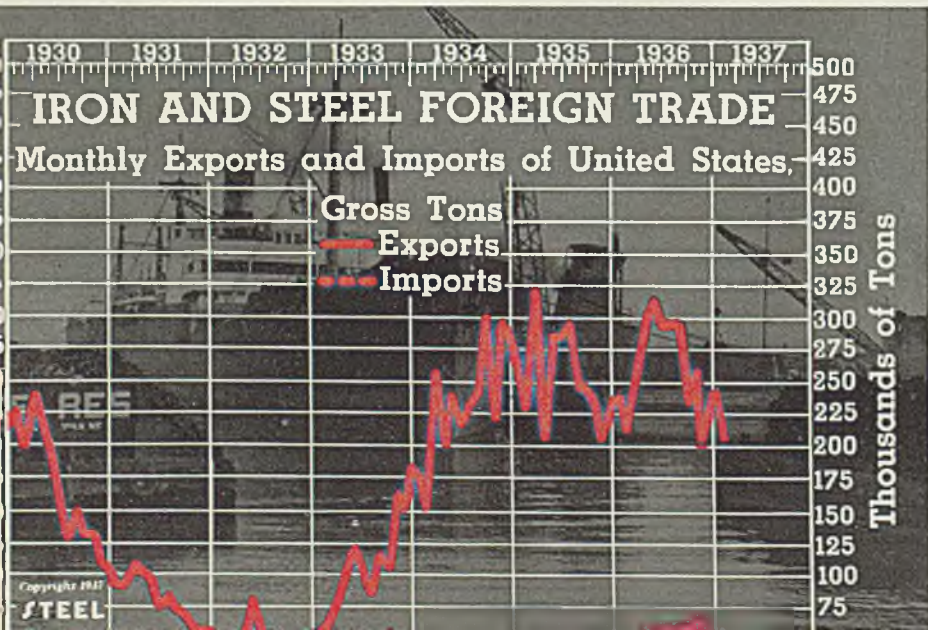
Labor Trouble in Motordom Lowers Activity Index

FOLLOWING a week of comparative freedom from production-curbing labor difficulties, a new wave of sit-down strikes washed over motordom, cutting the weekly output of automobiles from 126,975 in the week ending March 6 to 101,684 in the week ending March 13.

This recession was more than enough to offset a slight advance from 86 to 87 per cent of capacity in the rate of steelmaking and modest gains in freight car loadings and electric power output to effect a net reduction in STEEL'S index of activity in the iron, steel and metalworking industries from 117.9 to 112.5.

At the moment, the labor situation is such that industrial activity probably will continue to be curbed throughout the remainder of March. Much will depend upon whether or not the serious outbreak of the sit-down epidemic can be localized in the Detroit area. If it should spread, as did the bank closings which started in Michigan four years ago, the effect upon national activity might become serious.

One of the most significant statements issued from Washington in several years was the warning given by Chairman Eccles of the Federal Reserve board that the federal budget should be balanced promptly. His statement that "increased wages and shorter hours which restrict production are not at this time in the interest of the public or of the workers themselves" is timely recognition of the inflationary implications of the recent wage-hour actions. In other words, the day when pump-priming was needed has passed.

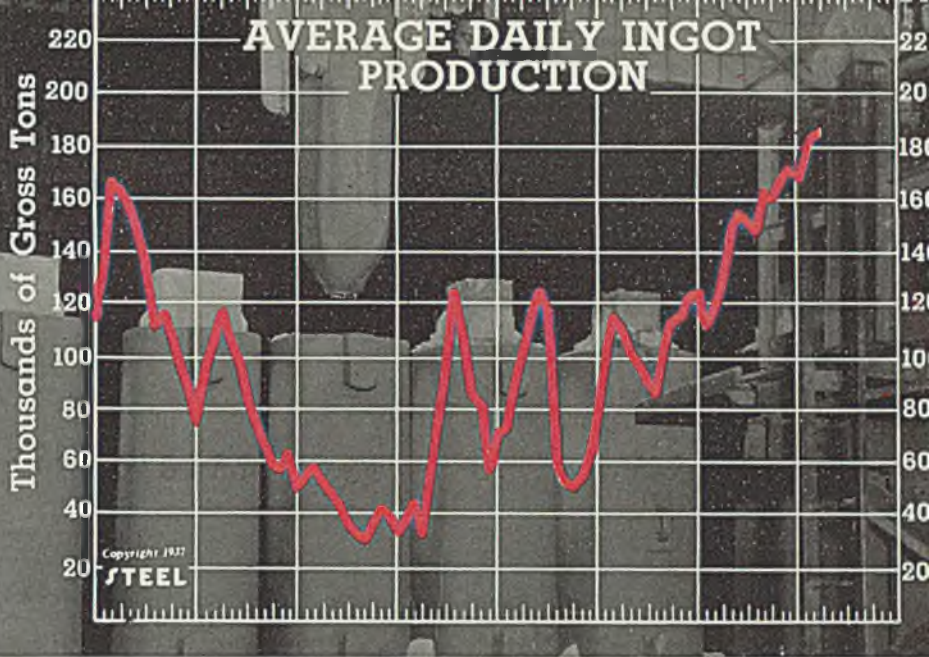


	1937		1936	
	Imports	Exports	Imports	Exports
Jan.....	43,063	201,511	50,489	241,564
Feb.....			43,358	213,802
March.....			56,720	264,337
April.....			49,621	301,987
May.....			59,391	314,950
June.....			59,910	294,951
July.....			47,940	296,738
Aug.....			60,697	295,341
Sept.....			59,993	235,571
Oct.....			64,509	261,882
Nov.....			61,970	203,297
Dec.....			52,584	244,156

BUSINESS'S TREND

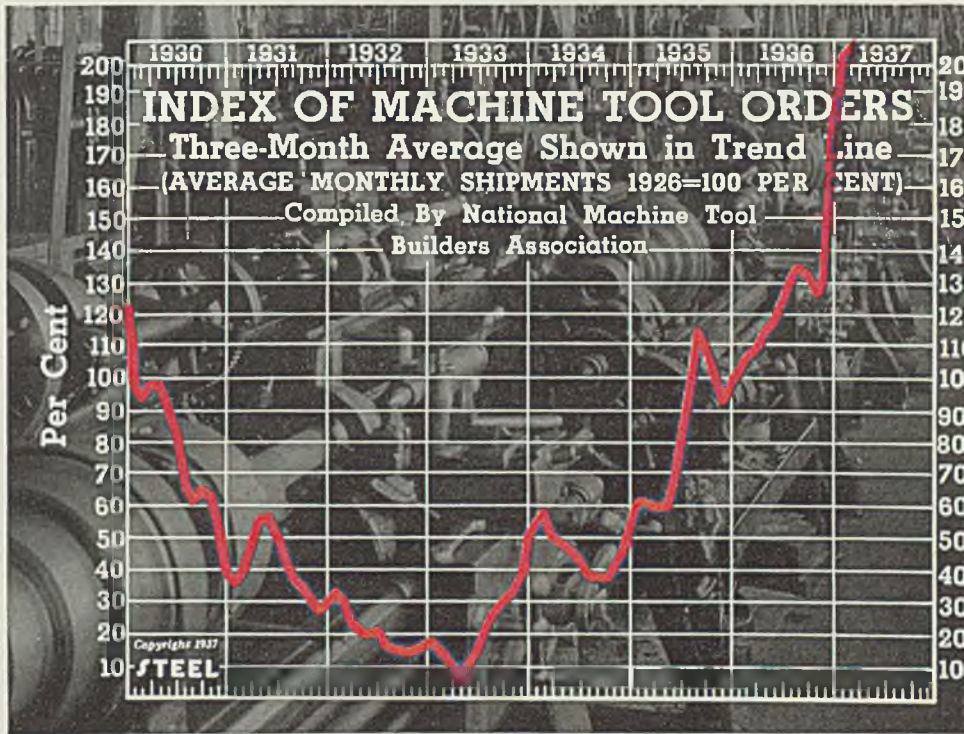
February Daily Ingot Output Shows Moderate Gain

	Gross Tons		
	1937	1936	1935
Jan.	182,181	112,813	106,302
Feb.	184,361	118,577	115,595
March		128,576	110,204
April		151,625	101,562
May		155,625	97,543
June		153,263	90,347
July		150,874	87,224
Aug.		161,351	107,997
Sept.		160,043	113,000
Oct.		168,333	116,398
Nov.		173,496	121,170
Dec.		170,448	122,936



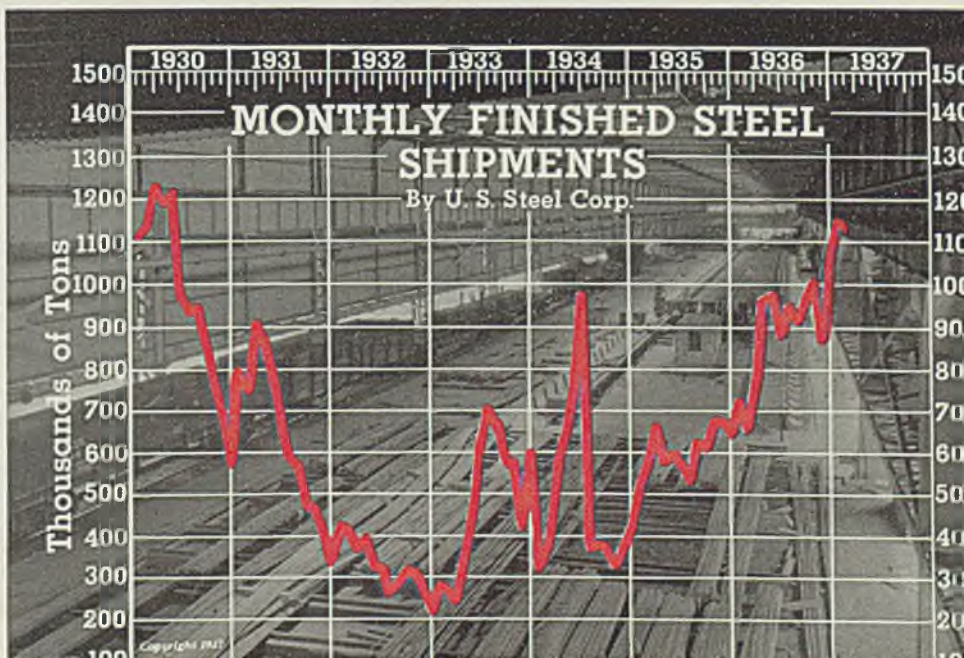
Index of Machine Tool Orders Continue Upward Trend

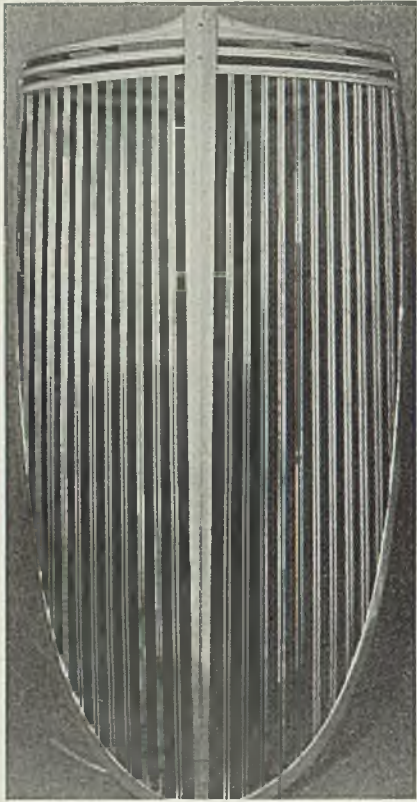
	Three-Month Average			
	1937	1936	1935	1934
Jan.	201.7	102.6	61.3	56.5
Feb.	207.7	107.1	61.5	58.2
March		109.4	60.3	50.9
April		114.4	60.3	48.5
May		116.6	67.1	46.8
June		124.5	76.7	42.6
July		132.6	94.7	38.6
Aug.		135.5	112.2	37.1
Sept.		132.0	108.5	37.4
Oct.		127.5	102.9	40.5
Nov.		134.0	93.8	44.2
Dec.		180.4	89.9	54.1



Finished Steel Shipments Decline in February

	Gross Tons		
	1937	1936	1935
Jan.	1,149,918	721,414	534,055
Feb.	1,133,724	676,315	583,137
March		783,552	668,056
April		979,907	591,728
May		984,097	598,915
June		886,065	578,108
July		950,851	547,794
Aug.		923,703	624,497
Sept.		961,803	614,933
Oct.		1,007,417	686,741
Nov.		882,643	681,820
Dec.		1,067,365	661,365





Smart appearing 1937 Nash grill, a fine example of advanced die casting practice

Significant Improvements

Promise Use of More Die

Cast Grills on 1938 Cars

BY W. J. DURING,
Chief Engineer, Precision Cast-
ings Co., Syracuse, N. Y.

+

HASTY conclusions, drawn without due regard to significant facts, are likely to be in error. This statement applies to current studies of grills for 1938 and other future cars, especially because conditions have changed radically and much has been learned since experience with 1936 models passed into history. In any event, nothing can be lost and much may be gained by a statement of the case for the die cast grill by one who had much to do with its initial development and has continued to follow and participate in later developments.

Appearance Aids Sales

It is generally admitted that fine appearance can be and has been attained with the die cast grill. Such appearance is of great importance from a sales angle. Many capable judges contend it is difficult, or perhaps commercially impossible, to secure equally fine appearance unless the grill is largely or wholly die cast. Those who take issue with this conclusion usually admit that the alternative involves a much higher tooling cost, though this may be offset, where quantities are large, by a lower unit cost.

Considered as a whole, production facilities for 1936 model grills left considerable to be desired. Few die casting machines large enough for the purpose were available and some of them were not too well suited for

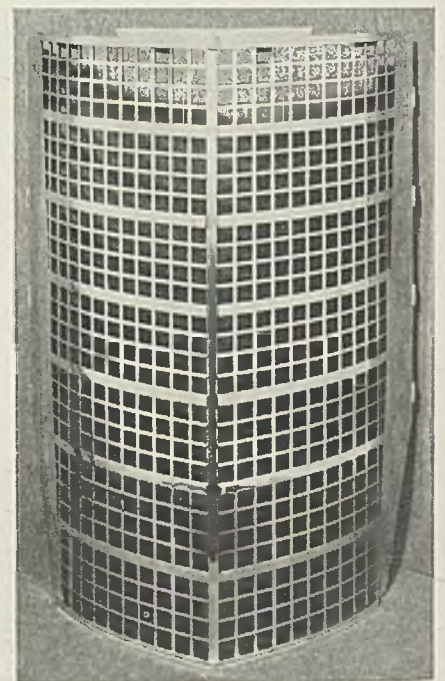
the work required. Machines of much improved design are now available and capable of producing a much improved product. Polishing and plating facilities have been improved. Thus, production delays which occurred in 1936 can be avoided.

It also has proved feasible, and in some cases advantageous, to employ a grill assembled from two or more die cast elements, producible in somewhat smaller die casting machines. One-piece die cast grills still are proving popular and are regarded by dealers handling the cars on which they are used as an important sales asset, because of their sturdiness, relative stiffness and general freedom from rattles or "tinny" characteristics.

Several factors are mitigating if not eliminating the criticism of the die cast grill on the score of high replacement cost in the event of breakage through collision. The 4 to 1 mark-up applied in some cases, and considered by some as excessive for a unit of this character, is being reduced to 2½ or 3 to 1 in some cases, making the consumer price considerably lower. Grills made in two or more die cast parts often require only partial replacement. In some cases, also, greater care in design minimizes labor cost in replacement.

In respect to weight reduction, some progress has been made and

more can be brought about by careful effort. At least one current design is fully 20 per cent heavier than it need be had the producer been given time to try lighter sections instead of being forced to play safe with thicker sections because the time allowed for building and



Front view of 1937 Olds eight grill, die cast from zinc alloy

trying out the die before production was so short. Present high pressure die casting machines permit of moderately thin sections and lighter weight, but time to achieve optimum results in this respect must be allowed. In general, the smaller the die casting, the lighter its section may be made. This may react in favor of a grill assembled from two or more die castings, but each case must be studied separately and assembly as well as handling, polishing and plating costs have to be considered.

Weight Is Optional

If the grill is to be made a structural element, designed to support attached portions rather than be supported by them, it is likely to be heavier than if the reverse is true. There may be good reasons for either type of construction, but when the grill is a supporting structure it deserves credit in weight accounting for the other parts it may displace.

On the score of strength, it may be worth keeping in mind that a V-shaped or arched horizontal section, properly supported, may be less easily injured by a frontal blow, as from a car backing into it, than one made from slender verticals with light horizontal supporting ribs. Some of the current V-shaped or arched grills, including those of honeycomb design, are remarkably strong, though some of them are quite heavy and involve production difficulties. Nevertheless, they are highly satisfac-

tory. In general the design adopted usually is predicated on appearance primarily rather than on structural factors, but the latter are deserving of proper study. Fortunately, the zinc alloys used are unusually high in impact strength, that is, quite tough for cast metals. With grills placed so far forward as they are in most recent designs, the hazards of injury to them are not decreased, but there are some indications of greater care by users. It is not unlikely that grill damage might be further reduced in some instances by improved design and by better placing of steel bumpers, perhaps of greater width.

It is not contended that die cast grills are the least costly of any form except perhaps for low production cars where the lower cost of casting dies as compared to stamping dies may be a controlling factor. It is contended that such cost differences as exist are more than offset by the selling advantages of the die cast grill. In addition, it is quite certain that die cast grills of fine appearance and lower in cost than any yet produced can be had if full advantage is taken of light weight in designs made possible by the latest production facilities.

For better appreciation of the latter, the production of Olds eight and Nash grills in the Eastern plant of the Precision Castings Co. may be considered, as this production is representative of latest practice. Casting is done in a relatively new machine

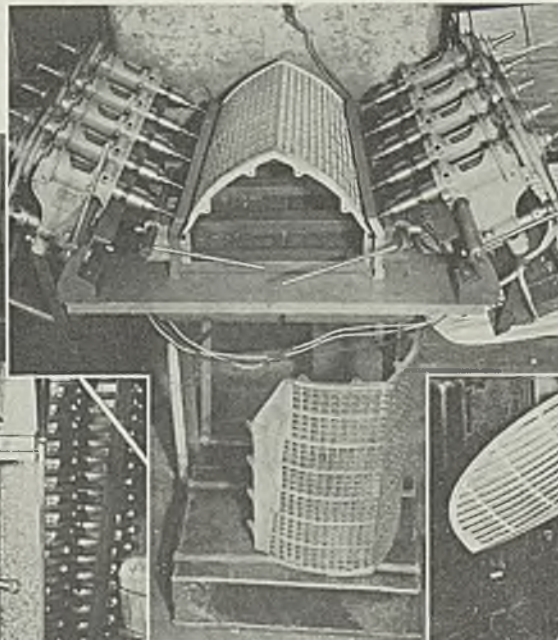
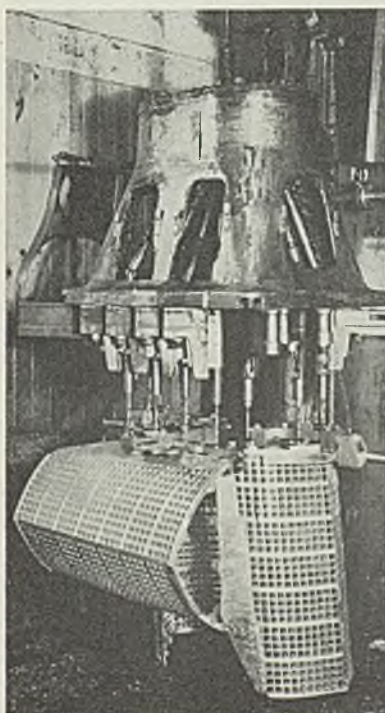
noteworthy primarily because of the high final casting pressure, 3800 pounds per square inch, and the enormous total locking pressure on the dies, 2400 tons; also because it is compact and of good design in other respects. This locking pressure is applied at four widely separated points by a heavy toggle mechanism operated by a hydraulic plunger under a 1200-pound per square inch line pressure. The combined stress of locking and of metal pressure is taken by four alloy steel bars of 5 inch diameter and spaced on 41 x 38-inch centers. The machine thus readily accommodates a die for a large grill.

Castings Free from Flash

Metal is fed into the die by a compound ram, a plunger within a plunger, which gives a rapid flow of metal at moderate pressure and finally subjects the molten metal to a pressure of 3800 pounds per square inch, which makes for sound castings of good surface finish. Not only this pressure but the heavy locking pressure is of great importance, since without the latter the dies would open and give a heavy flash tending to make cleaning difficult. This is a fault experienced with less sturdy machines and one tending to increase cost and to slow production. The machine produces castings almost free of flash except where required clearance is given to expell air and to fill overflow wells needed to yield perfect castings.

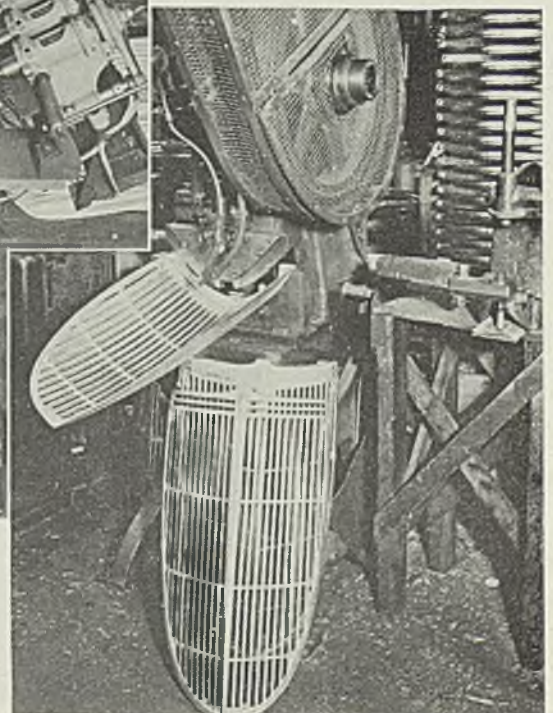
In this machine a side gate is used

Holes in Olds grill are drilled simultaneously at three stations around bed of multiple spindle drill shown below



Above is special machine with five drill heads at each side for making 10 attachment holes simultaneously in Olds eight grills

An important cleaning operation on Nash grills is shown below; the flash is sheared from the four horizontal slots at top



at the die parting, but with a side plate lapping the die joint and so arranged that the pressure of the gooseneck has no tendency to open the dies. Metal is fed from a gas fired pot at the side of the machine and this is fed in turn from an auxiliary pot filled with molten zinc alloy carried to it in a ladle from melting furnaces arranged to supply this and other machines. The ladle is handled on an overhead trolley. In the die for the Nash grill, the cavity is horizontal and is fed from the end, which becomes the top of the grill. This arrangement facilitates flow through the horizontal passages forming the vertical bars of the finished grill. In the Olds grill the cavity is vertical and the metal feed is at the side and through sections forming the horizontal bars of the honeycomb section. Both dies are water cooled and the casting rate ranges from 50 to 60 shots an hour.

Castings are taken from the machine by an operator who passes them to a helper who lays the castings on a wooden form and strikes off the gates with a hammer. Gates are so provided with a thin section as to break off in a line adjacent to

the edge of the casting. He then stands the casting in a vertical position on the floor to cool. Another operator removes the rough flash from the other end of the casting and hangs the latter on an overhead conveyor which carries it slowly outside the building where it cools. Subsequently, when cool, it enters the cleaning department.

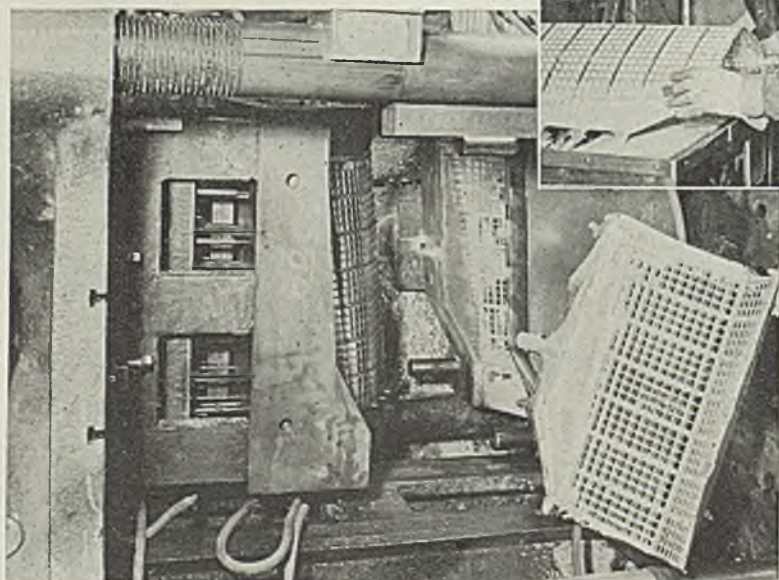
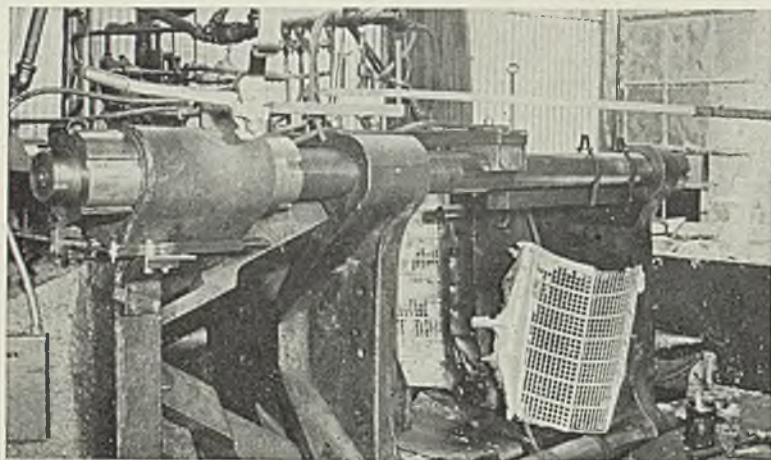
Drilling Process Outlined

In the cleaning department, the first operation on the Nash grill is to drill the hole on the top flange where the radiator ornament later is attached. Flash metal then is sheared from the four horizontal openings at the top of the shield shaped grill, this flash purposely being made heavy to facilitate metal feed to the vertical bars below. The shearing die is shaped to the grill contour and is used in a punch press. Eleven holes next are drilled at as many points in the top face of the grill in a Natco multiple-spindle drill, after which four additional holes are drilled and five are tapped on a 3-spindle Allen press. It then is necessary only to file burs and rough flash at edges and at a few points between the bars of the grill

and to inspect the latter before packing it for shipment to the plater.

Cleaning of the Olds grill which, with its honeycomb design, involves more than 600 holes needing edge filing, requires much hand work but it is done with remarkable rapidity, using simple wooden holding fixtures. Twenty-five men turn out 350 to 400 grills in eight hours, including the drilling of 32 holes, the spot facing of some bosses and the tapping of four holes. Half of the holes are drilled at three stations around a Natco multiple-spindle drill with the casting being handled successively by three men. Quick-acting clamp fixtures are used to give accurate hole location. Eight holes are drilled and spot faced on the back of the center bar, using a single spindle drill, and four top holes are tapped on the top face. The final drilling is of eight holes in a special machine with eight drill heads on a common fixture designed especially for this operation. The casting then is ready for inspection and packing.

With this efficient layout, a single large die casting machine of the type described and shown in an accom-



At top left is shown Precision's latest machine for die casting grills at pressure of 3800 pounds per square inch; dies are locked under total pressure of 2400 tons by hydraulically actuated toggle mechanism. At bottom is a close up view of dies in which Olds eight grills are cast. At top right castings, while still hot, are placed over wood form and rough flash broken from them; they are stood on end to cool and then are hung on a chain conveyor and transferred to cleaning department

panying illustration turns out 400 to 500 grills in a 8-hour shift and a good cleaning crew prepares these for shipment in about the same time. Two shifts a day often are operated and sometimes a third shift is required.

It is seen from the foregoing that the matter of efficient grill production has been studied and a highly satisfactory solution found. Facilities for polishing and plating on a correspondingly efficient basis also have been worked out, though not in the plant here described; hence it may be said that the production problems for grills have been pretty well licked. As corresponding or similar strides have been made in

other die casting plants, and as it would not be difficult to expand existing facilities should the business offered warrant, it appears that the die casters have done their part toward continuing as well as expanding the die cast grill business. It remains for the automotive industry to decide whether the facilities available shall be used to capacity or be expanded.

Experienced die casters are willing to do their utmost in preparing for production but it is certain that they can do a much better job if permitted to work well in advance of production requirements rather than rush through dies for which orders are placed at the eleventh hour.

use in production or service in the field. This adjustment is located conveniently on one of the door pillars.

While this description applies to cars with doors closing on the center pillar, the device can be applied to any system of door mounting. It may be applied also to coupe models, locking both doors and rear deck.

Further information on the device, known as the Lok-All-Handle, may be obtained from Walter F. Wright, General Spring Bumper Corp., Detroit.

Four-Door Locking Device for Autos Uses Toggle Mechanisms in Center Posts

AUTOMOBILE builders are studying the possibilities of a four-door locking device to be manufactured by Houdaille-Hershey Corp. at its Oak Products plant in Chicago. Referred to briefly in STEEL for Jan. 11, the system can be applied to new or old cars and comprises steel stampings, screw machine parts and steel cable. Brief description is as follows:

Turning of the door locking key in the cylinder and then the movement of the right front outside handle upward throws out a pin in the right front door lock and at the same time moves the retractor bar in the lock out of engagement with the latch bolt. This pin moves against a tablet in the center door pillar. Back of that tablet is a toggle or cam (see accompanying illustration) which is moved downward or in a pulling direction. At one end of that cam in the door pillar is attached a cable mounted in a tube and extending across the roof of the car. This cable is attached to a set of toggles or cams in the center door pillar on the opposite side of the car. The pulling motion on the cable forces these cams against two similar sleeves on the left side of the car which in turn force pins in each lock, thus moving the retractor bar in each lock away from the door latch and locking the doors on the left side of the car.

Simultaneously with the movement of the pin in the master lock, a sleeve is pushed backward in the right post assembly, that sleeve forces a tablet against the pin in the right rear door causing the same locking movement in the lock as on the left side of the car. This completes the locking action and permits all outside handles to be "free."

Total movement of parts in the device is only $\frac{5}{8}$ -inch.

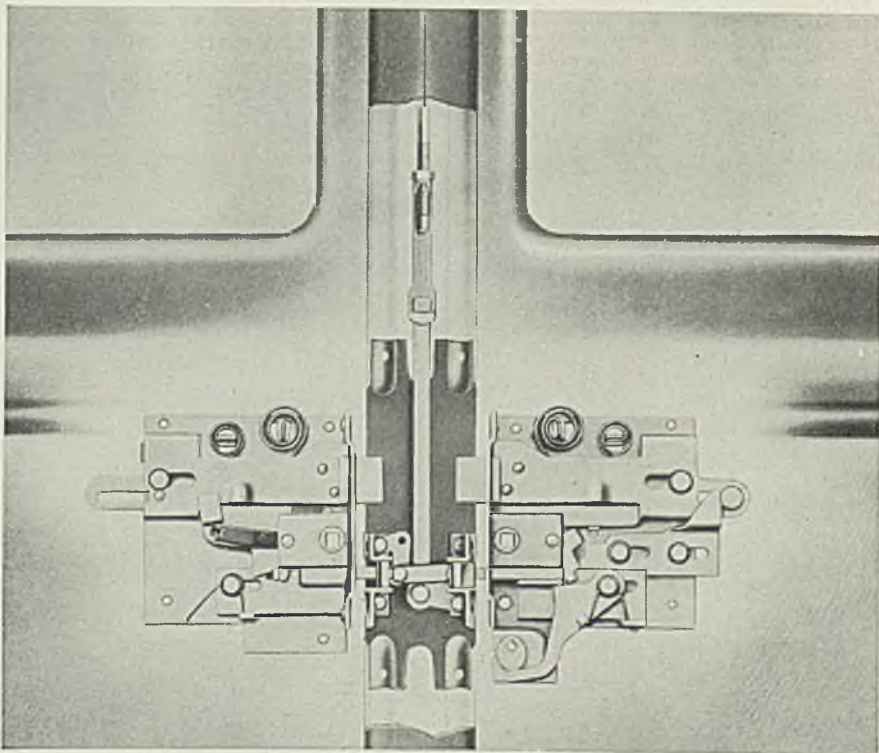
The doors are all unlocked by turning the key in the master door. Locking all doors from a single control point from the inside of the car is completed by the upward movement of the inside right front door handle. The action is the same as when locked from outside the car. Provision has been made for adequate adjustment on the cable for

How To Avoid Overpaying In Payroll Taxes

107 *Practical Methods of Minimizing Payroll Taxes*, by A. H. Berger; cloth, 159 pages, $5\frac{1}{2}$ x $8\frac{1}{4}$ inches; published by Tax Consultants of America Inc., New York; supplied by STEEL, Cleveland, for \$3, plus 15 cents for postage.

This volume, by an expert tax consultant, gives no suggestion of tax evasion but points out details to be observed to avoid overpayment of taxes and thus save legitimately the expense involved in the new tax on payrolls. To pay more than is required is an unnecessary burden on industry.

The author states that, as in the early days of the income tax, most concerns will pay more payroll taxes than are actually necessary under the law, due to misunderstanding of the law's requirements.



Phantom view showing toggle in pillar which actuates pins controlling both door locks. Cable extends up through pillar and across roof of car to a similar toggle controlling two doors on opposite side

Automatically Controlled Heating Furnace Increases Metallic Yield by 1 Per Cent

BY MARTIN J. CONWAY*

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CONTROL of furnace atmosphere and pressure in batch type heating furnaces is becoming an increasingly important problem both to fuel engineers and metallurgists. Much has been accomplished in subsequent heat treatment after rolling, as evidenced by the mass of literature dealing with this operation. But practically nothing has been done until recently properly to treat the steel in ingot and slab form previous to rolling, with the possible exception of maintaining a reasonably type furnace. Otherwise, the slogan has been: "Get them hot and get them out."

Continual demand for better plates at lower prices has put a greater burden on management. With raw material prices and metal-

*Mr. Conway, fuel engineer, Lukens Steel Co., Coatesville, Pa., presented this article in the form of a paper before a recent meeting of the Association of Iron and Steel Engineers, Philadelphia section.

lic yield in ingot form fairly well standardized, there are only three points remaining where cost improvement can be made; tons per hour, fuel per ton and rolling mill yield. Tons per hour largely is a question of furnace and mill facilities and correct sizes for economical rolling. The remaining two items are more flexible and responsive to research.

After 10 years of more or less continuous study with both recuperative and regenerative batch type heating furnaces, working under various systems of partial control, we decided that we were ready to recommend the installation of a recuperative side door heating furnace fully controlled. The heating furnaces in our 84-inch mill are the conventional regenerative type, having hearth length of 28 feet, width of 9 feet and overall outside brickwork dimensions of 39 feet 3 inches x 11 feet 3 inches. As the heating

facilities in this mill were inadequate, we decided to add a new furnace of the recuperative type on approximately the same floor space occupied by the existing furnaces.

The new furnace has 1 hearth length of 34 feet, width of 9 feet and overall outside brickwork dimensions of 36 feet 3 inches x 11 feet 3 inches. While the outside furnace length is 3 feet shorter than the existing type furnace, we have been able to add 6 feet to the length of of the hearth or an increase of 24 per cent in the effective heating space. The reason for this is easily accounted for when a comparison is made between the old and the new furnace ends as shown in Fig. 4.

The furnace was constructed by the Surface Combustion Corp., Toledo, O., and equipped with control furnished by Brown Instrument Co., Philadelphia. It was placed in operation Jan. 6, this year. The purpose of this paper is to describe briefly its design, method of control and the results thus far obtained as compared with the conventional regenerative type furnaces operating in the same mill. The furnace is installed entirely above ground and is essentially a tight structure, thoroughly insulated, having its recuperators behind the furnace and above ground. While taking up less space than the older reversing furnaces, every part of the furnace is easily accessible and readily checked.

The Control System

The furnace is under complete automatic control, illustrated in Fig. 5. The control system may be considered under three separate headings although each of these is dependent upon the others for its proper performance. Furnace pressure is maintained by an indicating Air-line controller. Pressure is measured at a point between the center doors and about one foot above the hearth through a 2 inch pipe led un-

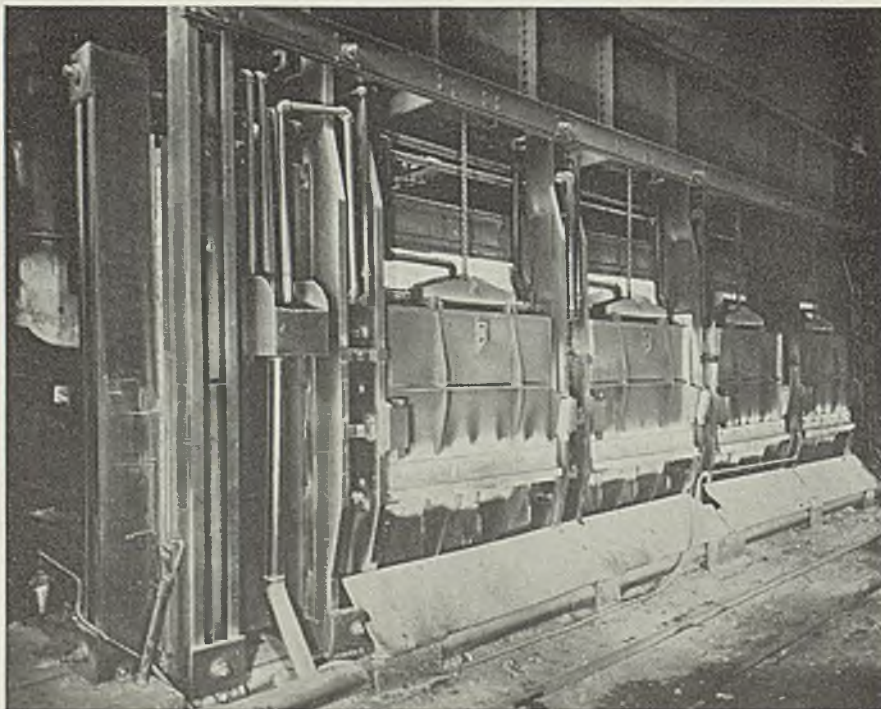


Fig. 1—Front view of new, recuperative, side door, ingot heating furnace

der the furnace to the control board and the instrument. To compensate for changes in temperature along the piping, a second pipe is laid parallel to the first but is open ended at the furnace. These pipes operate two bells in the instrument, the latter being equipped with a pointer and calibrated scale with a range of minus 0.1 inch to plus 0.1 inch H₂O. A change of 1/100 inch in pressure produces a pointer deflection of ½ inch. The instrument controls a piston pilot which in turn controls a pneumatic piston operating the stack damper on the top of the stack. In order to maintain equal closeness of control, regardless of the furnace load, the stack damper must be moved in much smaller increments when it is near the closed position and in larger steps at the other extreme of its travel. A cam in the piston pilot produces just such a condition and pressure is controlled within 0.003-inch at all loads.

Temperature in the furnace is measured by means of four thermocouples spaced along the back wall and connected in parallel to a potentiometer pyrometer controller, employing the Air-o-line system. The four thermocouples serve to provide a reliable guide for the control of the furnace. A single couple would be affected mostly by the steel in its immediate vicinity and other parts of the furnace might well be overheated or underheated. But with this arrangement all parts of the furnace are influencing the action of the temperature controller. The pyrometer controls a diaphragm mo-

tor connected to a rotary plug valve in the oil line to all the burners, as shown in Fig. 2. As the oil flow changes the air flow simultaneously is adjusted by means of a semi-metered combustion control system, employing the oil flow meter on the furnace. This meter is equipped with a pneumatic system which produces a definite and linear change in controlled air pressure with uniform changes in oil flow. This pressure then is transmitted to a piston pilot similar to that used for the stack damper control. The piston, in turn, operates a circular bottom slide damper in the preheated air duct thus producing an opening of a given area in the air duct for each condition of oil flow.

Valve Motion Is Modified

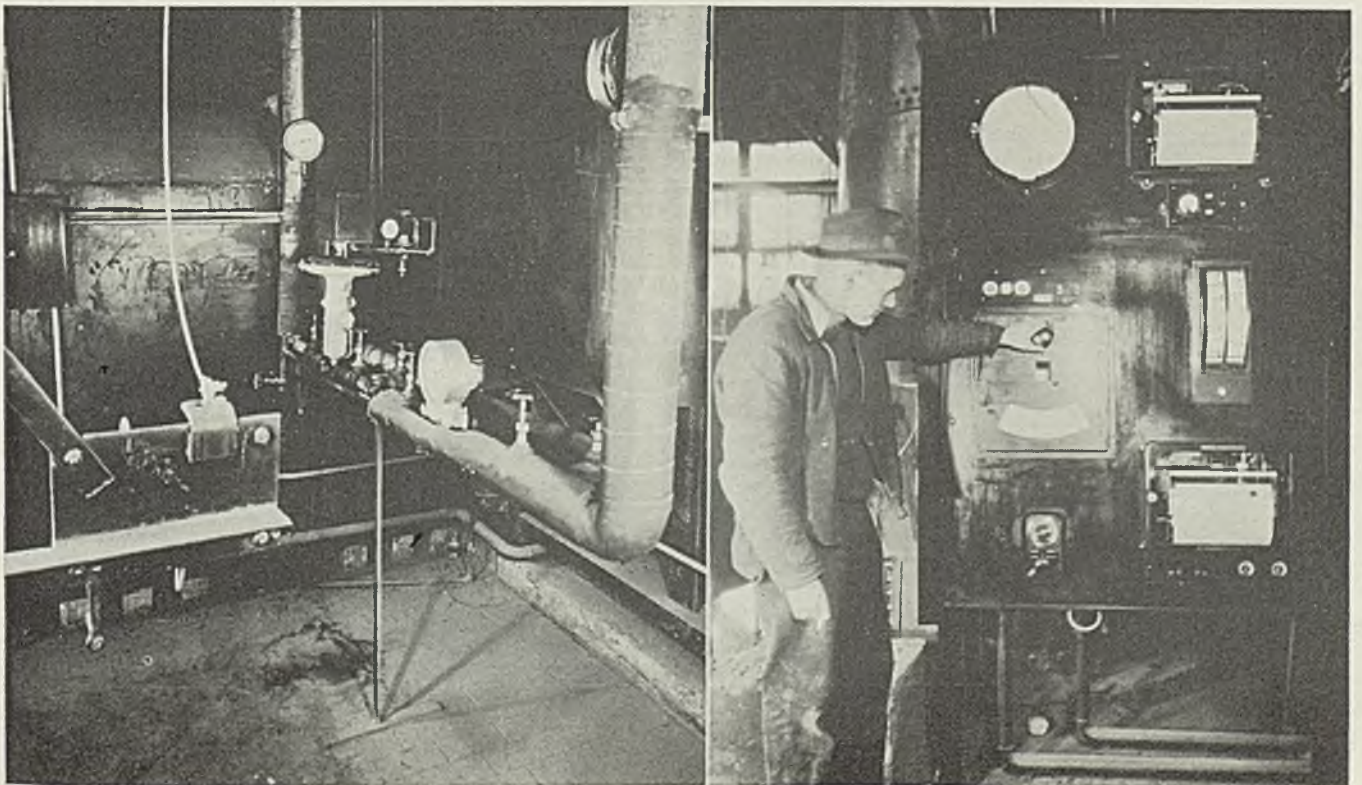
Flow of air through an opening varies directly with the area of the opening and with the square root of the pressure drop. A damper such as this does not produce uniform changes in area with equal steps of the damper, and, since the hot air fan is driven by a constant speed motor, the pressure ahead of the damper increases as the damper area is reduced. The valve motion must be modified for these two variables; that is, for non-uniform damper area characteristics and

variable pressure drops, in order to maintain the relation of oil flow to air flow in accordance with predetermined rules. This is readily accomplished by the use of a suitable cam for the piston pilot which produces non-uniform piston motion for uniform changes in the pressure from the oil flow meter. Changes in ratio are secured by means of a dial within the oil flow meter. This can be locked to avoid tampering by some disinterested party. The control instruments, shown in Fig. 3, are mounted on a panel board conveniently located at the back of the furnace.

In tackling a problem of furnace control such as this, many things must be taken into consideration. These factors conveniently may be divided into three groups: Conditions within the furnace, conditions outside the furnace and the selection of the control equipment. Under the heading of conditions within the furnace comes the means of temperature measurement. How should the temperature in a furnace such as this be measured? Obviously, as the heating of the material within the furnace is to be controlled by an instrument, we must transmit to that instrument reliable information upon which the control can act. In such a furnace, also, the temperature distribution is likely to be uneven, especially as the furnace is approaching peak material temperature ready for soaking.

Consideration must be given to the method of pressure measurement and to the selection of the point of measurement. It obviously

Fig. 2 (left)—Flow of air and oil to burners is regulated by a diaphragm valve, motor operated, which is controlled by the furnace pyrometer. Fig. 3 (right)—This panel board is the control for maintaining the correct rate of air flow to oil flow and for compensating for non-uniform damper area characteristics and variable pressure drops



will make a great deal of difference whether the pressure is measured at the hearth, at the roof or at the stack. Consideration must be given to the method of atmosphere measurement. Should a complete continuous analysis be taken of the furnace atmosphere or should infrequent orsat analyses be taken? The burner arrangement needs study. For necessary control or fuel it is not necessary simply to install a control valve somewhere in the fuel line and hope that the single valve control will accomplish the results desired. Most burners are controlled by individual valves directly at the burner; however, they are not designed primarily with the idea of maintaining a common supply to all units.

Passing now to the conditions outside the furnace, we must con-

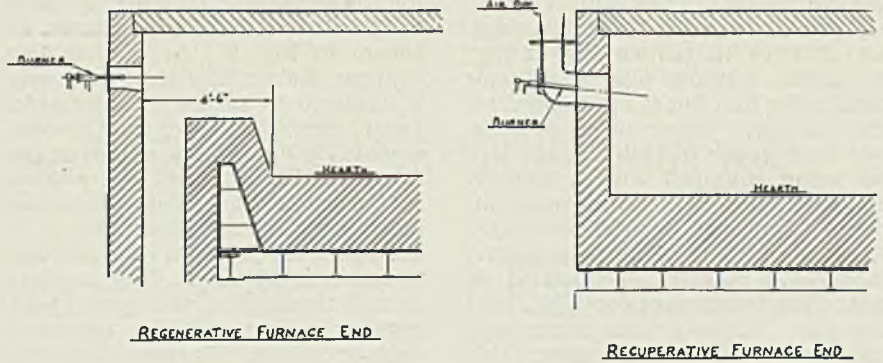


Fig. 4—Comparison between the regenerative and recuperative furnace ends reveals why the recuperative design permits hearths of greater length

the furnace should be provided with complete automatic control including furnace pressure control, temperature control and atmosphere

In addition, we have been able substantially to reduce metallic furnace losses due to scale, which is almost entirely a function of furnace control. Scaling of metals is the result of oxidation of some metallic element or elements in a metal alloy by a gas on gases present in the furnace atmosphere.

Findings on Atmospheres

It has been stated that air, water vapor and CO₂ when present in the furnace atmosphere are active oxidizing agents in the order mentioned. This being the case, it can be assumed that absence of free oxygen and a high carbon dioxide content in the furnace gases is most to be desired. In actual practice we found that it was neither economical or desirable to maintain a "neutral" or "reducing" atmosphere in the furnace as measured by analyses of flue gas leaving the furnace. I am using these terms as a combustion engineer uses them. With bunker C oil as the fuel, the most economical CO₂ content seems to be from 11 to 13 per cent; this provides the best fuel rate per furnace hour with no noticeable increase in scale thickness.

While it is desirable to limit scale thickness, it is not necessary to eliminate it entirely, but rather to
(Please turn to Page 66)

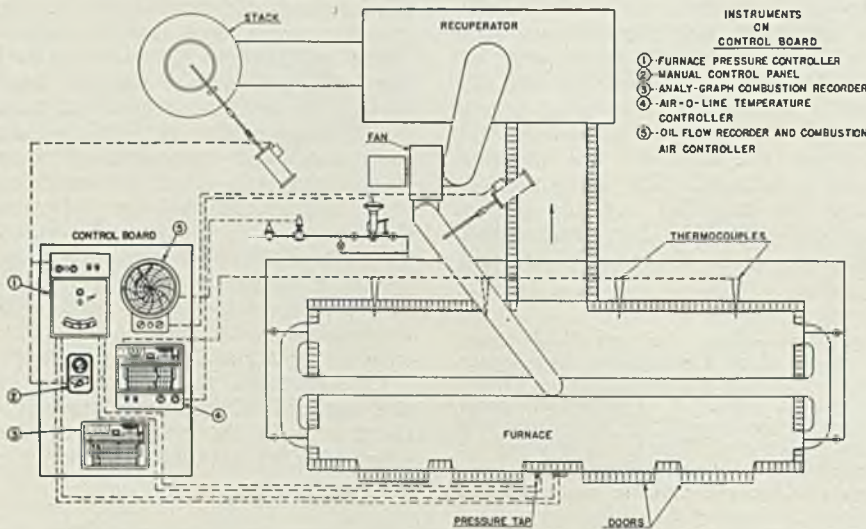


Fig. 5—The new furnace is featured by complete automatic control of furnace pressure, temperature and atmosphere, all keyed into one control board

sider: The temperature of the preheated air and its effect upon the control; temperature and nature of the oil, such as viscosity, fire and flash; Pressure of the steam and oil and the variations therein; fan characteristics of the preheated air; stack characteristics; physical location of fans and dampers.

Selecting Equipment

Selection of the equipment is a matter to which considerable thought must be given. One must consider:—Reliability, simplicity, accuracy, flexibility, maintenance required and cost. We place cost as the last item in this list because defects of the equipment in the other factors named materially may reduce the return on the investment. It is better to have a complete job without being wasteful than to attempt to be economical and have incomplete control.

In the consideration of these factors we reached the conclusion that

control. Pneumatic controls are used throughout in spite of the general dislike for this type of material which has existed in the steel industry for many years. We passed this decision largely upon the simplicity, flexibility and ease of maintenance of the equipment available. Instrument companies have progressed a long way from the early days when most of us had our first experience with air control. Accuracy of equipment of this type now can be depended on. The reliability is, we believe, superior and the maintenance required is comparatively small.

While the operation of the furnace is new to the mill heaters, we have been able to reduce our oil consumption consistently until we are now 8 gallons per ton of mill product below the conventional regenerative furnaces in this mill and we expect to do still better. This performance we attribute equally to recuperators and control.

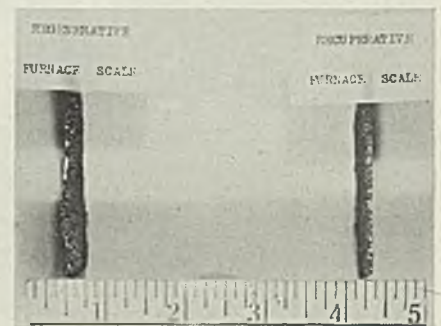


Fig. 6—Scale loss in the controlled recuperative furnace is at least 25 per cent less than in the regenerative furnaces, resulting in an increase of about 1 per cent in metallic yield from ingots heated in the recuperative furnace

Important Advantages Derived From Improved Soaking Pits

THE subject of soaking pits recently has become of vital interest to the steel industry. This is due not only to existing shortage of soaking pit capacity which in many instances is holding down the output of finished rolled steel, but to a change in attitude with respect to soaking pit requirements. Steel mills today are demanding heating of a higher quality, with close control of temperature and of the surface condition of ingots. The trend calls for the same sort of ingot heating that is common practice in refined heat treatment operations. It is generally recognized today that many defects in the finished product blamed on the open hearth are actually attributed to the soaking pit.

Improve Pit Design

To meet these demands, some important improvements recently have been incorporated in the design and construction of one-way fired soaking pits. One is a new type of self-sealing cover and the others provide automatic control of combustion and of temperature. In combination they permit a definite control of the furnace atmosphere, with resulting control of scale formation and the surface condition of the ingot. They offer to the heater a means of automatic assurance that he is delivering consistently ingots of the right temperature and surface condition. They give him a much more reliable guide than was possible when he depended largely upon his eye and judgment as to whether the steel was heated to

BY A. L. HOLLINGER,
Surface Combustion Corp.,
Toledo, O.

the most suitable temperature.

The new temperature control is the outgrowth of experiments conducted over several years and just recently has been adopted as standard with these pits. The control is pyrometric, with pyrometers placed in accordance with the requirements in each individual installation. Apparatus used is of standard type such as developed and manufactured by leading instrument companies, so that its selection is optional. The effect is that ingot after ingot may be taken from a hole at the same temperature, and there is no variation for different holes.

Combustion Control Is Standard

The combustion control permits the heater to adjust and maintain his air-to-fuel ratio. Here again the apparatus is of standard type, as developed by a number of leading instrument manufacturers and adapted to soaking pit use. The control is very effective and maintains desired conditions in the pit at all rates of firing and without being dependent in any way on the skill or judgment of the operator. In some cases a constantly reducing atmosphere is desired. In others an oxidizing atmosphere is wanted, so as to develop heavy scale in order to remove surface defects. Any de-

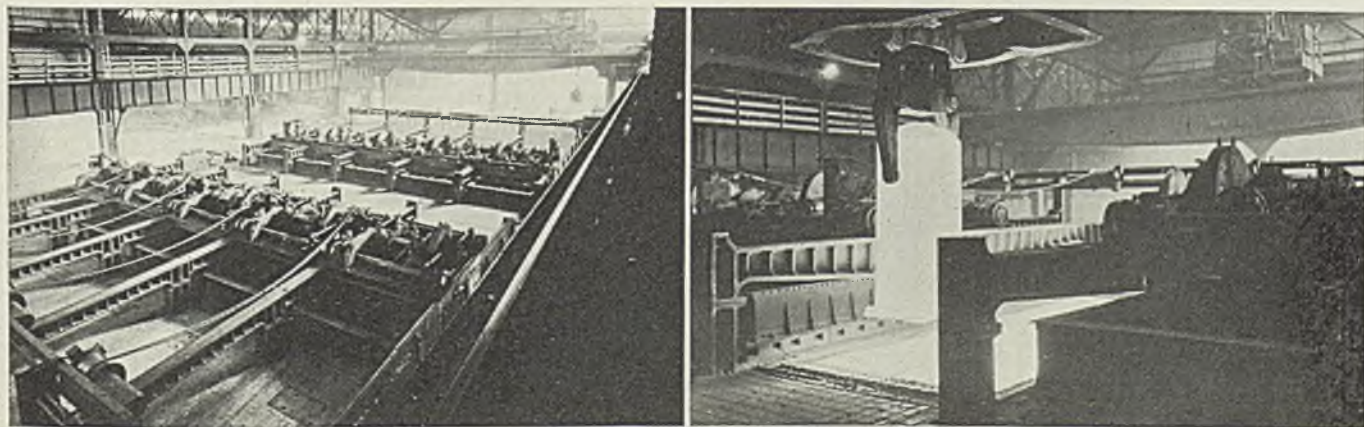
sired atmospheric condition may be established and maintained automatically. The combustion control has the added advantage of maintaining high fuel economy by reducing to minimum any excess of fuel or air in the products of combustion. Should the temperature control or automatic combustion control become inoperative for any reason, operation is still possible from hand controls.

Sand Seals Are Used

Another significant development is that all recent one-way fired pits are equipped with covers having sand seals and so arranged that the cover rises before it moves horizontally, thus permitting a tight seal around the cover edge. Normally two motors would be required to operate the cover, one for the vertical and the other for the horizontal movement. In the new covers both motions are accomplished by one motor. This is done through the use of a differential such as used in automobiles. The cover operating mechanism and motor are mounted on the cover, receiving power through cables and reels. The sand seal, by preventing infiltration of air, is a vital factor in controlling the atmospheric condition in the pit.

One-way fired soaking pits can be used with equal facility on any kind of gas or on oil. In connection with recently placed new orders for 26 holes of one-way fired pits, it is of interest to note that some of them are for use on straight blast furnace gas, some on mixed gas, some on producer gas, some on coke oven gas and some on oil. These pits, therefore, possess extreme flexibility with respect to fuel and may be adapted to local conditions in any mill.

They offer maximum capacity per square foot of floor space and it frequently is possible with this type of pit to get a 100 per cent greater



At left is shown top view of a recent installation of two 5-hole batteries of 1-way fired soaking pits equipped with a new type of self sealing cover and provided with automatic combustion and temperature control. At right is shown a pit with cover drawn back and ingot being removed; the sand seal which is the basis of the seal sealing cover is shown in this view

output from the same floor space. This is a big advantage where space is at a premium and where additional floor space for soaking pits could be obtained only by making major and costly changes in plant layout. The one-way fired pit offers a simple and sturdy type of construction. Burners and outlet flues are located in one end wall. All other walls and the hearth are of solid masonry backed by heavy steel binding. For this type of construction maintenance is at minimum. There are no intricate or light sections of brickwork in the pit. Ingots may be dropped or may fall over in the pit without causing serious damage. When repairs finally do become necessary they may be anticipated and a convenient time chosen for the work, thus avoiding emergency shutdowns.

Recuperators Provided

All one-way fired soaking pits are provided with recuperators so that the air for combustion is preheated to 800 to 1500 degrees Fahr., depending on the type fuel used. In these pits the combustion chamber is over the ingots, thus preventing burned spots due to impingement of flames against the ingots. Distribution of gases is such that the ingots are entirely uniform throughout. In these pits the ingots are stood on end and may be charged by any soaking pit crane. In this type of pit minimum openings are required in charging or drawing ingots. A 4-hole pit, for instance, has four covers and only one of these covers need be opened to charge or draw an ingot. As a result heat is conserved and there is a minimum disturbance in the character of the furnace atmosphere.

The design of these pits is such as to lend itself well to the battery type of construction. This method of construction results generally in greater heating capacity per unit of plant area and involves lower cost and other advantages such as decreased crane travel. It also offers flexibility in connection with subsequent expansion. For instance, a 4-hole installation which we recently

installed now is being doubled in size and will have eight holes. Another feature of importance in connection with the one-way fired pits is that they lend themselves extremely well to the application of ample insulation. The use of insulation combined with a reduction of outside wall space through the battery type of construction, therefore, reduces radiation heat losses to minimum.

The automatic features on the improved one-way fired soaking pits unerringly reveal the sources of difficulties with the steel. By identifying these difficulties it becomes easy to eliminate them and provide the remedy without delay. In conclusion, fuel economy with this type of pit may vary with conditions, but it varies principally with supervision, and it is surprising to note the great reductions in fuel consumption and the increases in tonnage of heated steel which are obtained when the full possibilities of this equipment are utilized.

Metals Handbook Presents Considerable New Material

A. S. M. Metals Handbook, 1936 Edition; cloth, 1540 pages, 6 x 9 inches; published by American Society for Metals, Cleveland; supplied by STEEL, Cleveland, for \$10; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This, the fifth edition of the well-known handbook dealing with metallurgical practices pertaining to the manufacture, treatment and use of metals, is thoroughly revised and enlarged to bring it up to date and is the first edition to appear in conventional page size. Work of revision and compilation was performed by authors and subcommittees supervised by a handbook committee of the American Society for Metals. Over 2000 individuals and more than 40 subcommittees participated in the preparation of special reports and articles.

The text matter contains 1392

pages and 335 articles and two main sections, a ferrous section of 898 pages and 180 articles and a non-ferrous section of 494 pages and 155 articles. Each section is arranged in the following divisions: General data, constitution of matter, structure, properties, testing, melting, casting, mechanical working, heat treatment, machining, grinding, welding, soldering, cleaning, equipment, and applications.

A committee of the Institute of Metals division of the American Institute of Mining and Metallurgical Engineers prepared the material in the non ferrous section through a co-operative arrangement. Through the efforts of this group, a considerable amount of new information on the properties, technology and applications of nonferrous metals and their alloys has been made available.

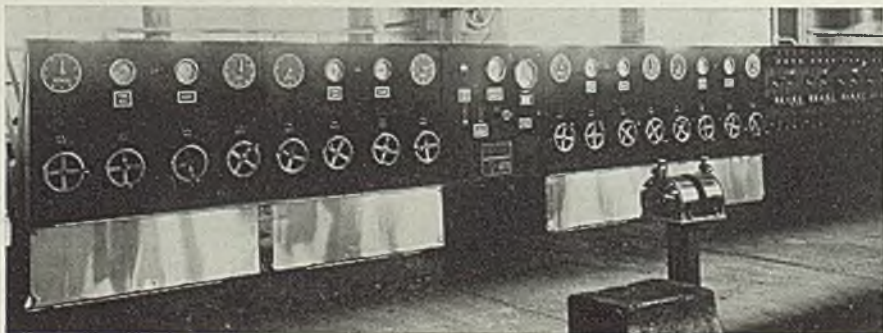
Of the 335 articles in the book, 97 are new for this edition. References to the technical literature have been listed generously throughout, a total of more than 2500 such references being given. A complete cross index facilitates use of the book.

Welding Electrodes Coated In Conditioned Air

An air conditioning unit recently has been installed in the plant of George A. Maurath Inc., Cleveland, it having been found that the quality of flux on electrodes for welding stainless steel is improved and the rate of production increased when the plant atmosphere is maintained at the proper temperature and the right amount of humidity. After the electrodes have been covered with the chemical flux they are carried by automatic conveyors through an 80-foot baking oven. The unit installed was furnished by York Ice Machinery Co., York, Pa., and includes an air conditioner, ammonia compressor and suitable temperature and humidity controls.

Improves Rolling Grilles

Cornell Iron Works Inc., 36-20 Thirteenth street, Long Island City, N. Y., manufacturer of rolling grilles, has developed a new monogram design whereby initials, street numbers, trademarks and the like may be placed on such rolling grilles. They coil and uncoil with the grille. These grilles coil overhead around a horizontal pipe shaft containing the counterbalancing springs and are retained at the sides in channel shaped rails. They are designed to prevent trespass or burglary and are made of galvanized steel, aluminum, bronze or stainless steel.



Automatic combustion and temperature regulation as well as operation of improved 1-way fired soaking pits are governed from this compact control panel

A.S.M.E. Arranges Program of Detroit Semiannual Meeting

A WIDE variety of subjects of interest to metalworking industries has been scheduled for the semiannual meeting of the American Society of Mechanical Engineers to be held at the Statler Hotel, Detroit, May 17-21. Particular emphasis, naturally, will be placed upon the automotive industry.

Although the formal program will not start until Tuesday, May 18, the A. S. M. E. council will convene on May 17 and a business session of the society will be held in the evening. A number of inspection tours have been arranged for that day.

Six general sessions will be held mornings and evenings of Tuesday, Wednesday and Thursday. Among the topics for these sessions are automotive design and production, improved methods of fabrication, light-weight high-speed trains, decentralization in industry, and steel and its application. Apprenticeship, machine shop practice, properties of steel when subjected to high-velocity loading, lubrication, welding, economic characteristics of typical business enterprises, and railroads, are among subjects to be discussed at technical sessions on afternoons of the same days, these sessions being sponsored by the society's technical divisions.

Dow To Be Honored

A dinner will be served on Thursday evening at which time J. H. Herron, consulting engineer, Cleveland, and president of the society, will confer honorary membership upon Alex Dow, president, Detroit Edison Co., and a past president of the society.

The tentative program for the meeting is as follows:

Tuesday, May 18

MORNING

"Scope and Purpose of the Planned Program" and "Historical Sketch Contrasting the Practice of Automotive Design and Production with Methods in Older Engineering Fields," by C. F. Hirshfield, chief of research, Detroit Edison Co., Detroit.

"Modern Locomotive Axle Testing Equipment," by T. V. Buckwalter and O. J. Horger, vice president and research engineer, respectively, Timken Roller Bearing Co., Canton, O.

AFTERNOON

Apprenticeship

"A Year of the New Apprenticeship in the Detroit Industries," by C. W. Culver, general manager, Employers' Association of Detroit, Detroit.

"Organization and Growth of the Future Craftsmen of America," by J. Lee Bar-

rett, secretary, Detroit Committee for Future Craftsmen of America, Detroit.

Machine Shop Practice

"Contribution of Broaching to the Automotive Industry," by Sol Einstein, vice president and chief engineer, Cincinnati Milling Machine Co., Cincinnati.

"Industrial Bearing Design as Influenced by Automotive Practice," by A. B. Willis, chief engineer, Federal Mogul Corp., Detroit.

EVENING

"Recent Developments in Basic Processes of Fabrication, Namely, Casting, Forging, Welding, Machining, Pressing, and Rolling, with Social Implications," by W. S. Knudsen, executive vice president, General Motors Corp., Detroit.

"Contribution of Machine Tool Builders to Mass Production in the Automotive Industry," by F. W. Cedarleaf, manager of machinery division, Ex-Cell-O Aircraft & Tool Co., Detroit.

Wednesday, May 19

MORNING

"Aspects of Automotive Engineering Which Have Been Applicable to Railroad," by Edward G. Budd, president, Edward G. Budd Mfg. Co., Philadelphia.

"Economies of Power for Light-Weight Trains," by Dr. Rupen Eksergian, Edward G. Budd Mfg. Co., Philadelphia.

AFTERNOON

Welding Session

"Welded Fabrication of Large Frames," by Everett Chapman, president, Lukenweld Inc., Coatesville, Pa.

"Hydromatic Welding of Frames," by C.

L. Eksergian, chief engineer, Budd Wheel Co., Detroit.

Relations with Colleges

"The Automobile Industry and Young Engineers," by C. J. Freund, dean, college of engineering, University of Detroit, Detroit.

Lubrication

"Apparatus and Test Results on Dry Friction—Various Materials and Comparisons with Other Data," by W. E. Campbell, member technical staff, Bell Telephone Laboratories Inc., New York.

"Description of Machine and Tests for Measuring Minimum Film Thickness with Various Bearing Metals," by G. B. Kaveltz, professor of mechanical engineering, Columbia university, New York.

Materials Handling

Descriptive lectures and tours to Plymouth assembly line and Chevrolet gear and axle plant.

EVENING

"Decentralization of Industry," by W. J. Cameron, Ford Motor Co., Dearborn, Mich.

Thursday, May 20

MORNING

"Modern Methods of Production and Quality Control of Sheets for Automobile Fabrication," by T. F. Olt, supervising metal engineer, American Rolling Mill Co., Middletown, O.

"Proper Grain Structure Required for Deep Draw and Other Problems Involved in Application of Wide Sheet."

AFTERNOON

Iron and Steel

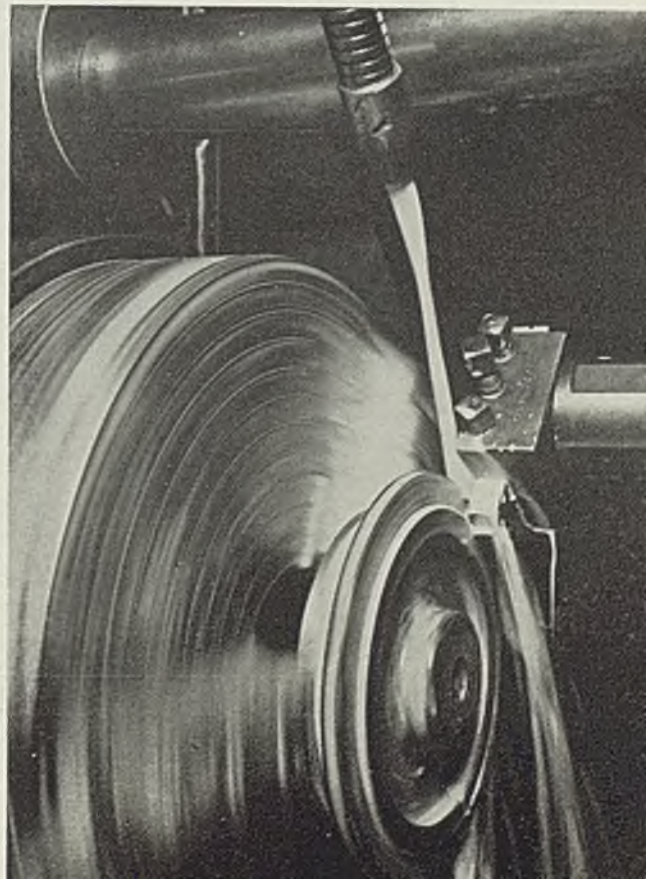
"Properties of Steel when Subjected to High-Velocity Loading," by Col. G. F. Jenks, ordnance department, United States army, commanding officer, Watertown arsenal, Watertown, Mass.

Economics

"Economic Characteristics of Typical Business Enterprises," by Walter Rautenstrauch, professor of industrial en-

Digging In

AN impression of speed and power is gained from this camera study of a Haynes Stellite J-metal tool biting into a low-alloy high-tensile steel gear blank. Diameter of the blank is $7\frac{1}{2}$ inches; brinell hardness 240. Surface speed is 106 feet per minute; feed 0.010-inch per revolution; depth of cut $\frac{3}{4}$ -inch



gineering, Columbia university, New York.

Cutting Metals Research

"A Study of the Lip Clearance on Twist Drills," by Charles J. Starr, associate professor of mechanical engineering, University of Illinois, Urbana, Ill.
"Grinding of Cemented Carbide Milling Cutters," by Hans Ernst, research engineer, and M. Kronenberg, Cincinnati Milling Machine Co., Cincinnati.
Report of various activities of cutting

metals committee, by Coleman Sellers 3rd, William Sellers & Co. Inc., Philadelphia.

Friday, May 21

MORNING

Railroad

"Notes on High-Speed Diesel Engine Maintenance Related to Railway Service," by I. I. Sylvester, special engineer, Canadian National Railways, Montreal.

New Sectional Framework for Building Construction Is of Welded Steel Rods

MILD steel rounds are the frame members in a new type of building construction recently evolved by A. M. McLellan, construction engineer, Los Angeles, in conjunction with State Steel Products Inc., 2500 East Twenty-third street, that city. For this new system are claimed lower construction cost and a design which makes possible the use of less steel tonnage. The new method has been incorporated in the new St. Augustin's Catholic church now nearing completion

BY J. EDW. TUFFT

at Culver City, just outside of Los Angeles. It has ground dimensions of 68 x 132 feet, is 50 feet high to the roof peak and adjoining it on one side is a 50-foot tower; for the frame structure less than 70 tons of steel was used. The system is about to be applied in the construc-

tion of a large airplane hangar whose entire floor space will be unobstructed by columns. Other buildings to be constructed after this system include 50 houses in residential court projects. It is said to be under consideration in connection with construction of a group of exposition buildings at Flushing, N. Y.

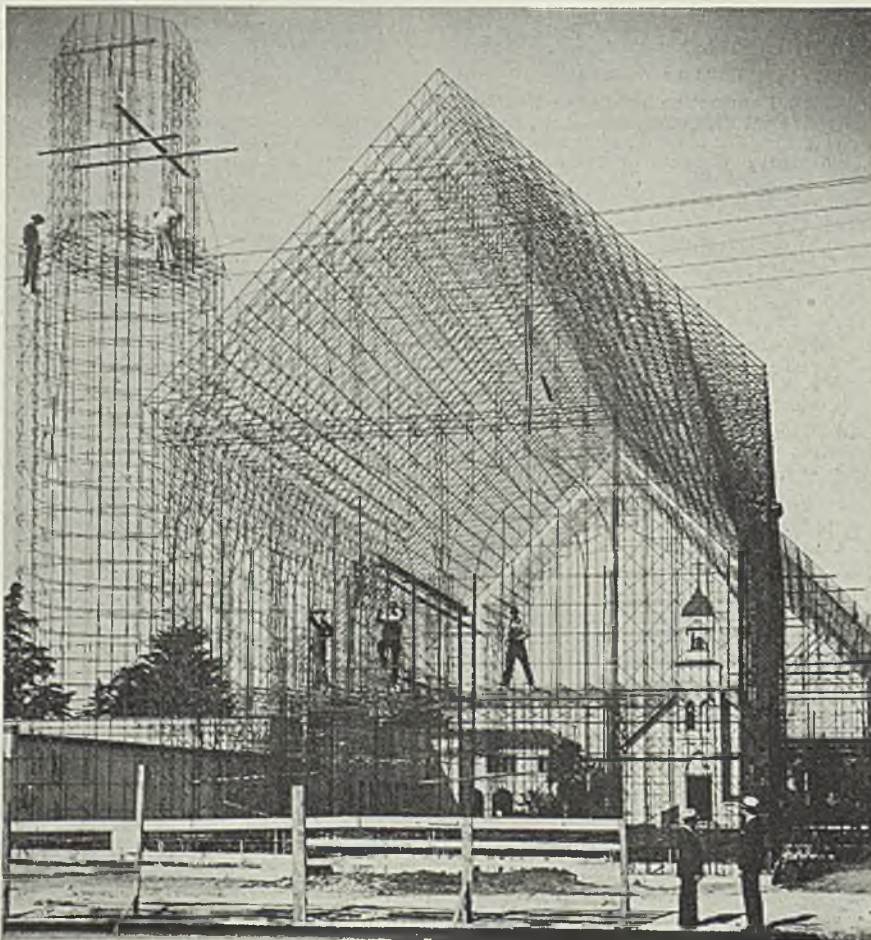
The accompanying drawing illustrates the system as applied in the construction of the church. Vertical members are $\frac{3}{4}$ -inch, lateral $\frac{1}{2}$ -inch and diagonal or brace members $\frac{1}{4}$ -inch steel rods. These members are cut and assembled by the electric arc welding method in the shop into sections usually 8 feet wide for convenient handling. Height depends on the building requirements. In the church framework the distance between the outer and inner wall laterals was 21 inches and that between parallel laterals in each wall 16 inches. Verticals were 2 feet apart. This arrangement produced a unit cube 21 x 16 x 24 inches. Braces binding the outer and inner walls together were arranged as shown in the drawing, being tied around the verticals and welded.

Mr. McLellan describes the steel frame as a series of small trusses within a larger truss in which each member is in both tension and compression, resulting in a perfectly compensating structure. With a sufficient large crane, he says, such a structure could be picked up like a birdcage without suffering any damage. The design is said to be resistant to lateral stresses such as caused by earthquakes. Tests have shown that 30 per cent of the steel in these frames can be ruptured, as in an air raid, without causing collapse.

Inner Frame Is Oval

No columns or buttresses are necessary in this design and none were used in the construction of the new church. In forming the inner, dome-shaped ceiling the same type of steel framing was used but fashioned in the form of an arch. In theory and practice, says Mr. McLellan, the eccentric loading does not produce an outward thrust in the church frame; the downward force at the peak against the inner oval frame causes an upward thrust farther down on the incline of the roof, with all weight being brought into simple moment on the supporting walls and evenly distributed on the foundation.

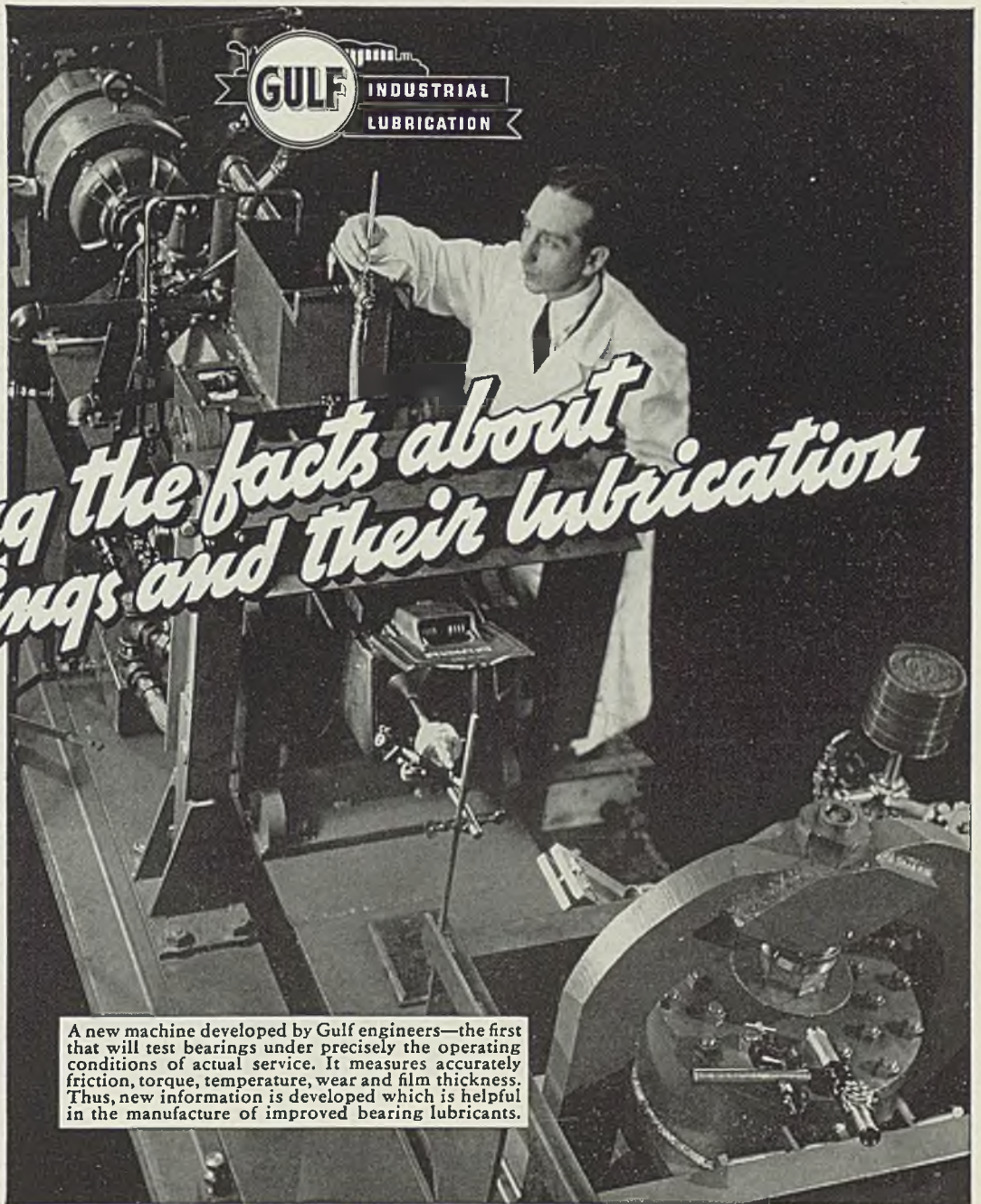
The steel sections are dipped in a protective coating material but this is only a precaution in view of the fact that temperature of the space between the enveloping walls ranges above the dew point, thus preventing condensation of moisture and resulting corrosion. The vertical rods are bent to a right angle at the base and embedded 16 inches deep in a con-



Less than 70 tons of welded steel rods, $\frac{3}{4}$, $\frac{1}{2}$ and $\frac{1}{4}$ -inch in diameter, were required for the frame of this 68 x 132-foot church and adjacent tower



Proving the facts about bearings and their lubrication



A new machine developed by Gulf engineers—the first that will test bearings under precisely the operating conditions of actual service. It measures accurately friction, torque, temperature, wear and film thickness. Thus, new information is developed which is helpful in the manufacture of improved bearing lubricants.

GULF ENGINEERS Seek . . . and **FIND** . . . the Answers *to many questions regarding bearing lubrication*

WHAT is the practical relation of viscosity to shaft speed, bearing load and various bearing metals?

WHY are some bearings *easy* to lubricate while others of similar construction and in similar service are *difficult* to lubricate?

HOW can present lubricants be improved to anticipate future progress in bearing design and application?

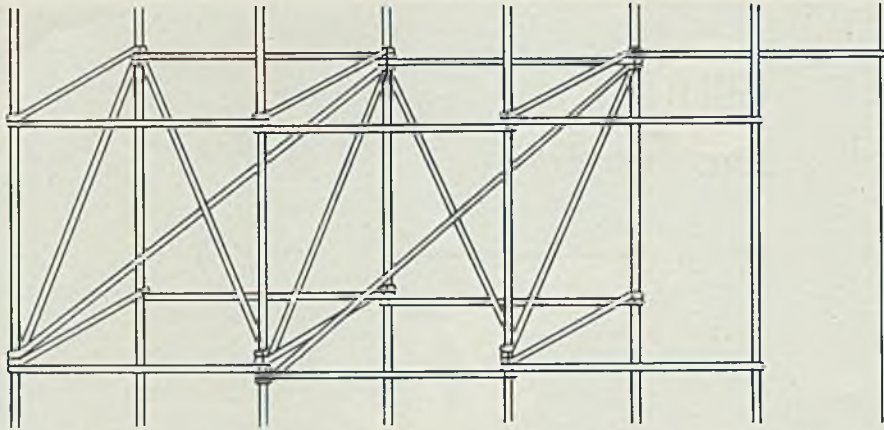
These and many other problems regarding bearing performance are being studied every day by

Gulf scientists in the most modern petroleum research laboratory in the world.

These laboratory findings—supplemented by 37 years of practical experience—are being converted into operating benefits for industry. The result—to users of Gulf quality lubricants—is lower costs for maintenance and lubrication.

GULF OIL CORPORATION
GULF REFINING COMPANY

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.



This sketch illustrates the design of frame sections as shop welded in widths of 8 feet for convenient handling

crete foundation. The outer walls are formed by applying cement mortar with a gun on paper backed metal lath attached to the frame members by steel wire. Steel mesh is used to reinforce the layer of mortar. The interior of the church was finished by applying a 1-inch coat of plaster on metal lath wired to the frame. The floor is of concrete slabs which rest on steel joists.

Alloy Steels Help In Redesign

SEVERAL important design changes recently have been effected by Page Engineering Co., Chicago, in its walking dragline machines and related equipment. When working, the machine rests on a circular base of larger diameter, enabling it to operate on ground softer than with predecessor machines of the same weight. The walking mechanism is of a positive crank action type that lifts and drags the machine automatically three steps per minute for an approximate step of 6 feet. The machines now are manufactured as standard in two sizes. One is a 3-yard unit with 80-foot boom and has operating weight of 165,000 pounds. The other is rated as a 4 to 5-yard machine, with 90 to 100-foot boom and with operating weight of 250,000 pounds. Use of alloy steels has played a great part in the development of these machines. Booms are of alloy steel, with welded construction.

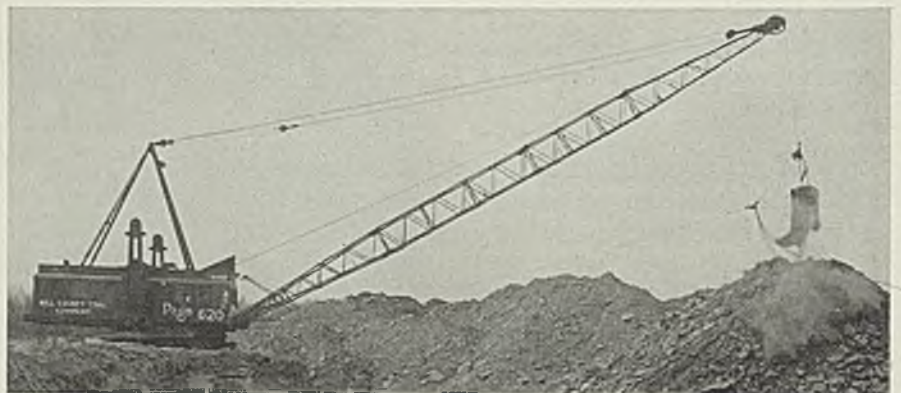
Diesels Redesigned

The company also has redesigned the diesel engines which power these machines. Previously it furnished horizontal diesels. It now is making 3-cylinder diesels in two sizes. One has bore and stroke of 11 x 15 inches while the smaller unit has bore and stroke of 9½

x 12½ inches. The large engine weighs approximately 18,000 pounds, has a cast steel engine bed, while other parts are of special alloy steels; as an alternate, the bed may be of all welded alloy steel. This engine turns over 400 revolutions per minute and develops 60 horsepower per cylinder. The smaller engine has an alloy steel, welded engine bed, with alloy steel parts, and turns over 500 revolutions per minute, developing 50 horsepower per cylinder. Either of these two engines also can be used as a basis for a 5-cylinder unit in their respective sizes, the only changes being a longer crankshaft and lengthening of the engine bed. All parts are standard for both the 3 and 5-cylinder engines.

Buckets Are Welded

Design of the company's line of automatic dragline buckets also has been improved. They now are being built of alloy steel body plate, using riveted welded construction, and with a 1-piece solid plate steel arch. They are being made in three weight groups. As previously, the buckets are so balanced that they automatically land in the pit with all the weight on the teeth, thus permitting quicker digging and increased yardage.



Redesign of this Page walking dragline, together with its diesel power unit and the automatic buckets used with it, were made possible by alloy steels

Stainless Steel Is Used In Handling Corrosives

Stainless steel is being used for the blade of a new kind of shovel manufactured by the Ames-Baldwin-Wyoming Co. Parkersburg, W. Va. The shovels are designed for use wherever chemicals or chemically treated products are handled. They also are recommended in the handling of coal and coke that has been sprayed with calcium chloride to keep dust at a minimum.

Armco 18-8 hot rolled strip pickled stainless steel, manufactured by the American Rolling Mill Co., Middletown, O., is being used. Three types of shovels, all with No. 2-B finish stainless, are offered by the company. They include hollow back round and square point stainless shovels.

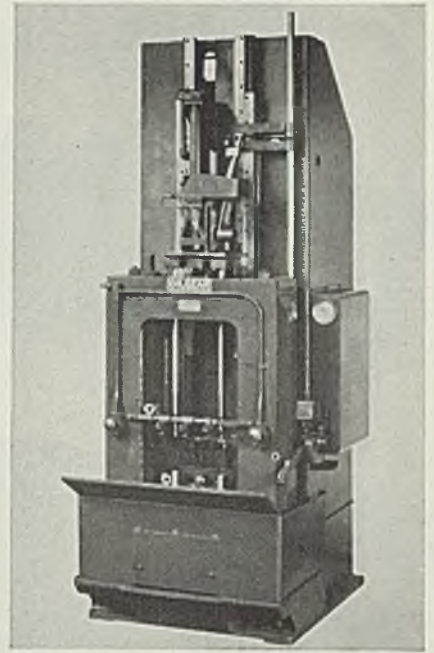
Cites British Progress in Hydroelectric Engineering

Recent developments in hydroelectric engineering with special reference to British practice were cited by P. W. Seewer, consulting engineer and chief designer, hydroelectric department, English Electric Co., Ltd., in a paper presented before the Institute of Mechanical Engineers of Great Britain. According to Mr. Seewer, in order to secure a share of the world output of hydroelectric machinery it has been necessary for British engineers to create new features of design affording real advantages.

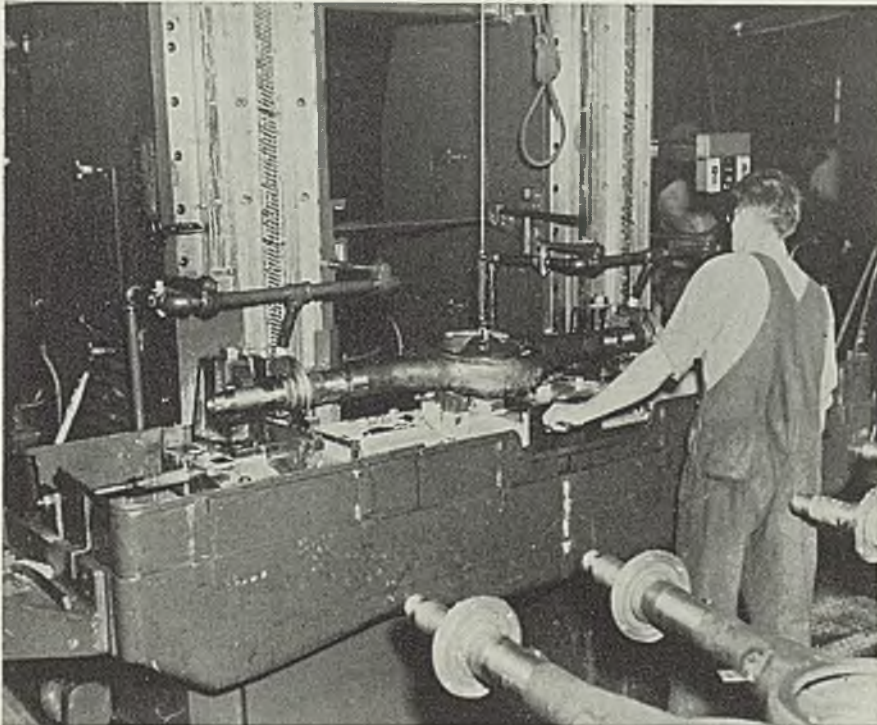
Illumination Is Increased

Efficiency of steel plant illumination has been greatly increased by the development of a high intensity mercury vapor lamp. The lumen output of the new lamp exceeds that of the incandescent lamp. It makes a suitable unit for inspection benches.

New Broaches Simplify and Speed Up Metalworking Operations

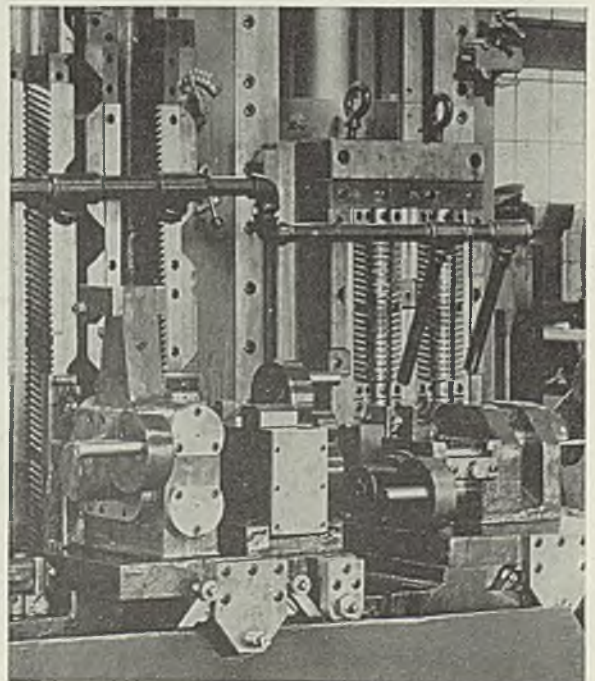


THREE SPLINES 120 degrees apart are broached in bicycle coaster brake hub shells at the rate of 540 pieces per hour on the above Oilgear cyclicomatic broaching machine. Each cycle produces three finished shells or a total of nine splines, each of which is 0.285-inch wide by 2 inches long. Tools are 40½ inches long, supported by detent holders on the tool handling crosshead. Broaches move down, are held in position by keys in lower sockets and the carriage moves the part up over the tools, following which the parts are ejected automatically. The entire cycle is controlled by two pushbuttons. Lubricant continually floods the upper surface of the work



BOTH ENDS OF A FINISHED REAR AXLE HOUSING assembly are broached in one set-up on the above unit at Chevrolet Gear & Axle plant in Detroit. Operation requires removal of about ½-inch depth of metal from one side of both rear axle flanges to produce a flat ⅜-inch wide and 4 inches long for mounting brake backing plates. Wide spread between the two flanges prevented using a single ram machine, so two standard Colonial single-ram columns were mounted in a single wide base. Both rams have a 60-inch stroke with 10-ton capacity, and are hydraulically interlocked for simultaneous action. Fixtures on the unit has a setting to give four production runs for every sharpening of the broaches, the latter being wider than required for a normal cut. Production averages from 80 to 90 axles per hour and at the present time 20,000 ends have been broached without the first sharpening of broaches

CONNECTING ROD BIG ENDS are finished completely with the exception of drilling and tapping on this Colonial dual ram broaching machine (right) in the plant of a leading truck builder. Rod and cap are forged separately, they are mounted in fixture shown at extreme left where thrust faces on rod and cap are broached. In the adjoining fixture locating flats and backs of bolt bosses are finished to size. The righthand ram broaches the joint faces and inside diameters. The two rams have an opposed travel and are interlocked hydraulically so that in one complete cycle six complete operations are performed, at the rate of 100 rods and caps per hour. Machine has 25-ton capacity, 48-inch stroke and variable-speed control



DON'T

FORCE SIT-DOWNS



Men sit down when machines stop. And machines stop when "starved" for work. What you get for your payroll depends on how you feed your machines. Industrial trucks powered by steel-alkaline batteries keep machines "well fed" with work. Safely — without fumes or noise — they scurry to and fro... form a flexible link between plant operations... keep production flowing.

But there's a vast difference in industrial batteries. Only the Edison is built of steel, uses an alkaline electrolyte—a preservative of steel. Because its active materials are enclosed in steel pockets and tubes, it lives two to five times longer, and never fails suddenly. This extreme ruggedness is priceless in mines, on railroads, in industrial plants, aboard boats... wherever power dares not fail.

EDISON BATTERY

STORAGE

DIVISION OF THOMAS A. EDISON, INC.
WEST ORANGE, N. J.

MATERIALS HANDLING



Special Equipment Features Materials Handling in Machine Tool Plant

PRODUCTION of turret lathes and hand screw machines, in common with other types of machine tools, entails a multiplicity of materials handling operations varying with the size and arrangement of plant, and with those factors involved in volume of output and in other conditions peculiar to the individual manufacturer's line. Given an opportunity to construct an entirely new plant, say a single-story structure with a direct railroad connection on two sides, this very important problem of handling could be given its due share of consideration in original layout plans, and close to the ideal in straight-line handling and production might be achieved. On the other hand, where a manufacturer has been in one lo-

cation for many years and has expanded operations by additions to existing buildings and equipment, the materials handling problem becomes more and more involved as distances between departments increase.

Plants Connected by Tunnel

This latter situation represents in a way the problem which has faced the Warner & Swasey Co., Cleveland. Having occupied the same location for many years, the company today has a plant which includes approximately 275,000 square feet of floor space. The main building is a multi-story unit, containing, in addition to general offices, materials and parts storage and manufacturing, assembly and shipping depart-

ments, while across the street is located additional production space, housed in a separate building. Because a busy city thoroughfare passes between the two buildings, interplant transportation requires "below the surface" connection via a tunnel.

To complicate the problem arising from these natural difficulties in distribution of materials, parts and subassemblies, the railroad upon which the company depends for carrier service carried out a plan of grade crossing improvement a couple of years ago and raised its tracks in the rear of the main building, so that it became necessary to move the shipping department from the first floor of the plant to the second to meet the new level of the switch tracks.

Faced by these difficulties, Warner & Swasey worked out an interesting and unusually efficient solution of its materials handling problems. The solution is by no means perfect—executives and department heads recognize that there is a cer-

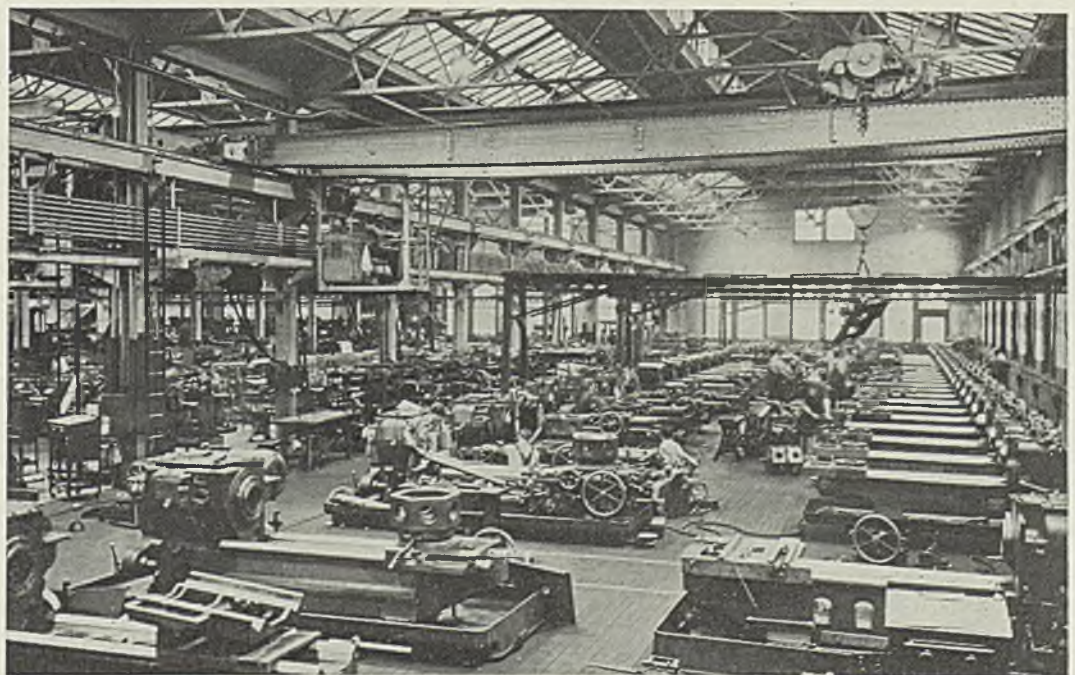


FIG. 1 — Assembling turret lathes in the Warner & Swasey plant. The 10-ton traveling crane and two single-leg semigantry cranes provide adequate facilities for handling parts, subassemblies and finished lathes

MATERIALS HANDLING



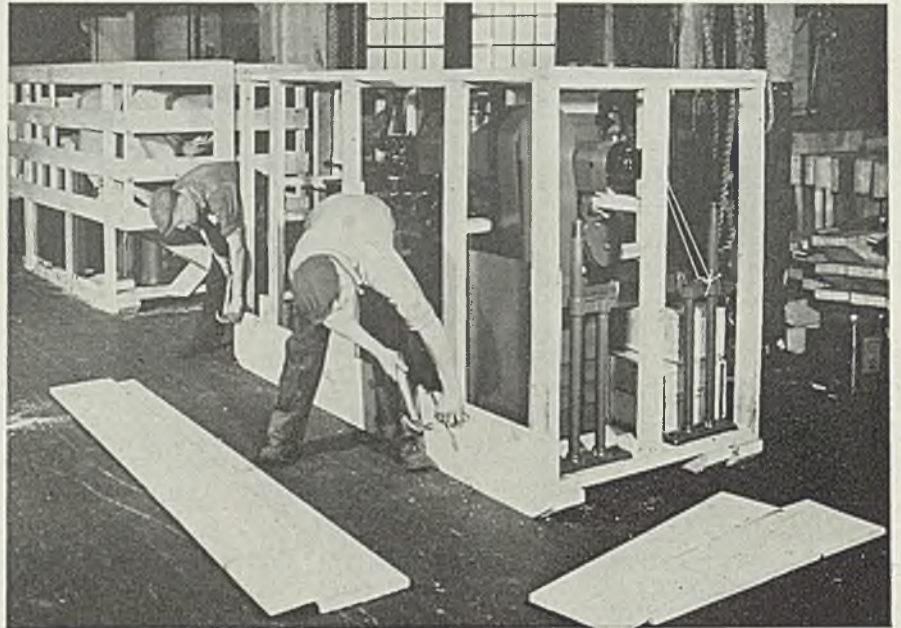
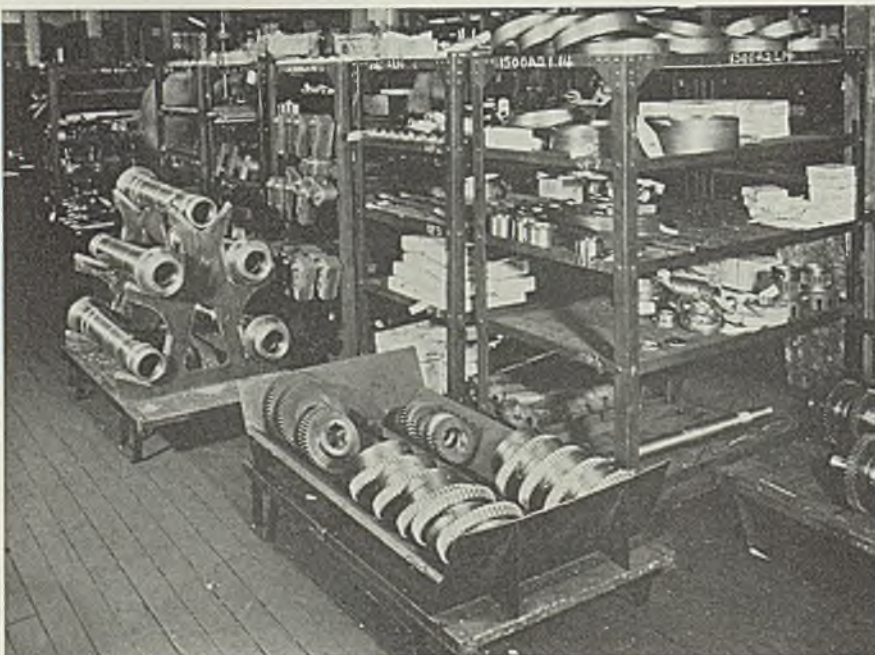
from the platform a sufficient distance so that steel and other heavy materials could be picked up easily and deposited on skids. Several weeks ago, an additional 3-ton electric hoist was installed so that two waiting trucks can be unloaded simultaneously, eliminating lost time and reducing platform and receiving room congestion, formerly prevalent. Both the company manage-

tain amount of back-tracking, that perhaps here and there a more ideal arrangement of certain departments might make easier handling possible and that some other improvements can be made now and then to provide added economies. On the whole, however, the plan embraces many interesting innovations in handling equipment application, and, in general, results indicate that the approach to the problem's solution was through sound principles of fitting the equipment to the job to be done, keeping parts and other materials "off the floor" wherever practical and giving to employees mechanical aids wherever tasks involve heavy lifting.

Handling Facilities Inadequate

Like that of most manufacturers of machine tools, the Warner & Swasey plant today is a beehive of activity, a striking example of the pick-up in the heavy industries. Recently, this increased production, with a corresponding increase in re-

FIG. 2—Special skid platforms with shelf bodies are used for transporting parts from the stockroom to the assembly floor. Handling spindles and gears with equipment of this type prevents damage. Parts awaiting reequitition are stored on steel racks



ceipts of materials, brought about a situation in the receiving department which required installation of additional handling equipment to effect a solution.

The receiving platform, at which commercial vehicles make deliveries, already was equipped with a 3-ton electric hoist, operating on a mono-rail extending out at right angles

FIG. 3—The shipping department is located on the second floor which is at the same level as the railroad siding. The crated machine at the left is for domestic shipment and the one on the right is being boxed for foreign shipment

ment and receiving department employees are agreed there is real economy to be gained in purchasing additional handling equipment when such results as these can be achieved.

After the hoists have deposited their loads on skids, the skids are picked up by either hand lift-trucks or electric industrial trucks, depending upon the class of materials and the destination either to some manufacturing or assembly department or to storage.

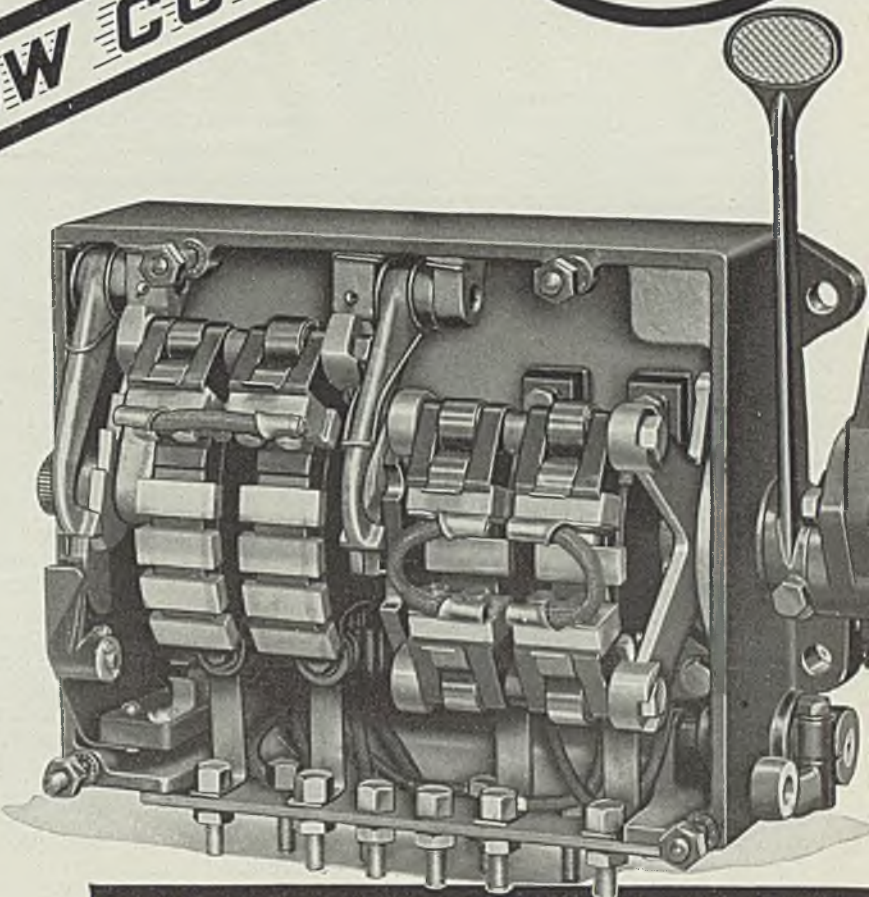
Keep Stores in Basement

The parts storage department is located in the basement of the main building, so that there is a certain amount of back-tracking involved when the distribution of the parts is made later to departments on upper floors of the main building. Even here, however, some advantage is gained because tunnel access to the building across the street is on the storage floor, and as interplant transportation is largely by electric trucks and special skids,

(Please turn to Page 71)

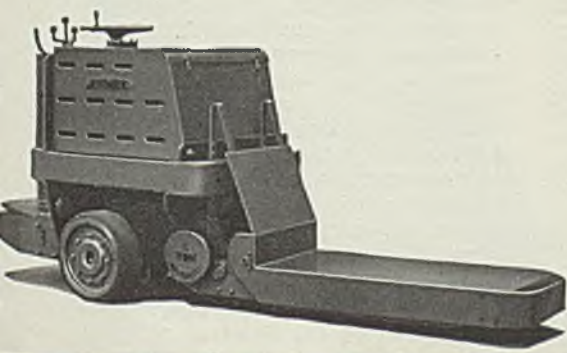
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5. Heavy Durable Jumpers on Brush Connectors
6. Foolproof Reversing Speed Safety Control
7. Serrated Shafts and Arms for Tight Gripping Connections
8. All Hand — All Foot Control Combination of Both as Desired
9. Contactor Switch Control — Brush Return to Neutral with No Voltage Load
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ELECTRIC AND GAS-ELECTRIC
MATERIAL HANDLING EQUIPMENT



WELDING, ETC.

BY ROBERT E. KINKEAD

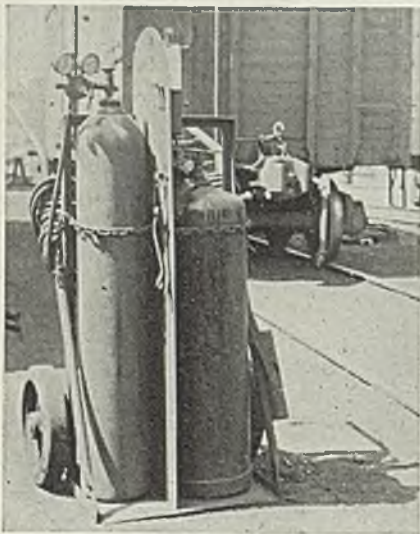
Doer Joins Thinkers

CASE SCHOOL OF APPLIED SCIENCE announces acceptance of an appointment to its board of trustees by Tom Girdler, Chairman of the Board, Republic Steel Corp., Cleveland. Case is to be congratulated for having in Dr. Wickenden a man who can interest men of Mr. Girdler's rank in the work of this fine educational institution.

The possibilities are great where industrial leaders can be induced to use their tempered intelligence in the conduct of professional schools for engineers and scientists. Presumably the faculty of the professional school is able to teach logic, the operation of natural laws, and a certain minimum number of essential facts. This comprises possibly 10 per cent of the knowledge a man like Tom Girdler needs to be able to use to conduct the business of his company successfully.

The professional technical schools have never solved the problem suc-

For Safe Handling of Gas



In this oxygen and acetylene truck, developed at a railroad repair shop, a light baffle plate separates the two cylinders. This construction greatly reduces the hazards in handling these gases. Recently an acetylene cylinder caught fire around the valve and but for the separating baffle the oxygen cylinder would have been overheated and damaged if not exploded

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.

cessfully of how to direct either students or graduates in the matter of how to get the remaining 90 per cent of the knowledge necessary to do a job as well as Mr. Girdler does his. For that reason the association is promising.

The most indecent slander ever uttered against the teaching profession was by Bernard Shaw, who said: "Those who can, do; those who can't, teach." Most of those who do, are able to because someone in or out of academic halls taught them how. Mr. Girdler, successful as he is, would be the first to admit that there have been great minds with whom he has worked who have taught him much that has been needed in his career. Case school evidently wants the advice and council of men who have what it takes in order that its graduates may do well in their professional careers.

Visibility Unlimited

IN 1936 manufacturers sold in the neighborhood of 8000 arc welding motor generators and 110,000,000 pounds of steel welding rod. It would require somewhat more than 24,000 men working one 8-hour shift per day for a year to use that amount of welding rod. Allowing 30 pounds of weld metal per ton of welded steel construction the welding rod consumption for 1936 indicates that about 3,600,000 tons of steel was welded.

With a total production of finished steel of 32,000,000 tons, it appears arc welding was used on a little more than 10 per cent of the finished steel produced. If spot, flash, and gas welding are included, owing to their large use in the automotive industry, probably 35 per cent of all finished steel tonnage was welded.

Height of the probable ceiling of the welding industry is speculation,

pure and simple. No one knows what it might be. If 75 per cent of all the finished steel were welded in some way before being put into use, it still would be impossible to estimate the peak of use of welding. The difficulty lies in the fact finished steel is being substituted for other materials at a rate which has heretofore been increasing by unpredictable increments. Thus, steel for machinery doubled in consumption rate from 1926 to 1936. But rolled steel for homes increased at some percentage of astronomical proportions for the reason there were no steel homes in 1926. There were no steel bathtubs, no welded steel diesel engines, no steel aircraft wings in 1926.

Ceiling of the welding industry will be determined by the ability of men to conceive, then to produce, things people want at a price they can afford to pay.

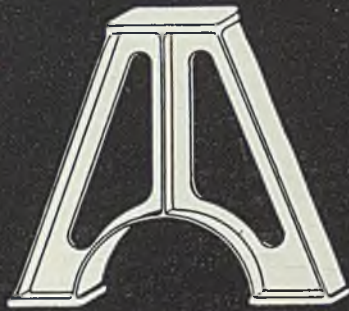
Composite Metals

A YOUNGSTOWN, O., foundry recently has obtained excellent results casting bronze around steel in a sand mold. Many uses are found for such composite metals in the building of machinery. Casting stainless steel around ordinary steel with subsequent rolling down to a commercial and entirely successful stainless-clad material is an established process. Several other methods of obtaining corrosion-resisting surfaces on ordinary steel are on their way to commercial use with the ultimate object of making available at low cost the desirable qualities of precious metals by their application to the surfaces where required to a depth much greater than is economical in electroplating.

Composite metals, the idea around which is being built an important part of the future market for metals, has broader implications than that of applying a brilliant and corrosion-resisting surface to metal. Surface hardening by welding hard metals to the surface or by torch hardening represents one development in this direction. Welding together different metals to produce a composite assembly in which each part is of a composition best suited to service requirements is a more recent example of the possibilities of composite metals.

Nor has the idea stopped at the seemingly insurmountable problem of welding metals to other substances. General Electric recently announced the welding of glass to metal in incandescent lamp manufacture. The same idea had been carried out in glass lined tanks, but the lamp problem required that the composite stand wide ranges of temperature variation and a solution was found.

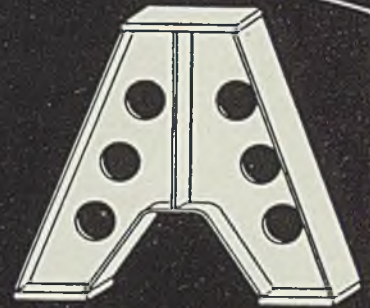
Sketchbook of Welded Parts



PEDESTAL—This casting, weighing 500 lbs., must be replaced with a part of same dimensions and weight, but of double the load capacity.



Component parts of rolled steel shapes used for the welded design.

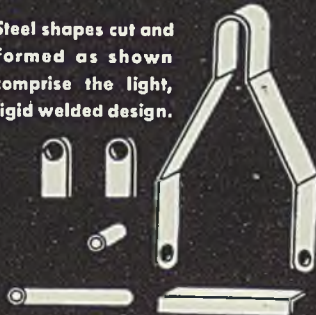


The welded structure. Same weight as the cast part. Has twice the load-carrying capacity and service life, yet costs 10% less.

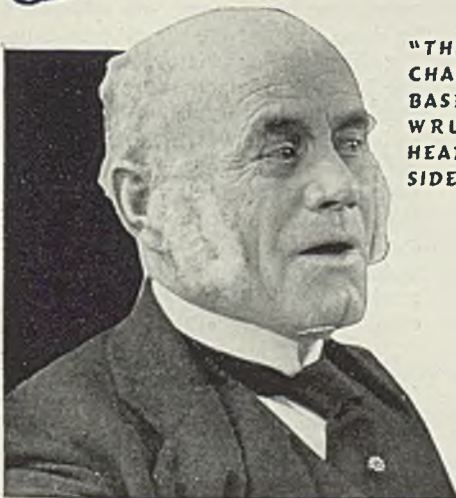
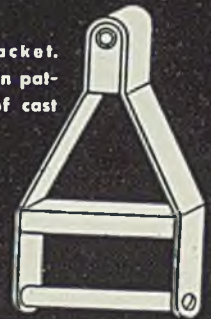
SPECIAL BRACKET—The cast design—a support providing two bearings at right angles to each other and some distance apart.



Steel shapes cut and formed as shown comprise the light, rigid welded design.



Welded bracket. Costs less than patterns alone of cast design.



"THANKS FOR THE TIP, LAD—BY CHANGING OVER OUR MACHINE BASE TO WELDED STEEL, WE'VE WRUNG POUNDS, HOURS AND HEADACHE PILLS OFF THE DEBIT SIDE OF THE LEDGER."

"HERE'S ANOTHER TIP, POP—DON'T STOP!—WELDED STEEL CAN DO WONDERS WITH THE FRAME OF YOUR MACHINE. TOO! ALSO THE HOUSING, THE BRACKETS AND SMALLER GADGETS. CHANGE THEM A PART AT A TIME. YOU'VE WRUNG OUT SOME RED INK, POP, BUT THAT'S JUST THE FIRST RUNG. YOU'VE GOT A WHOLE LADDER TO CLIMB—AND YOU'LL FIND EACH STEP THE HEIGHT OF EASE."



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POWER DRIVES



Electrical Factors Can Effect Saving In Changes or Additions to Plants

WHEN considering extensive changes in plant layout or additions the plant engineer may well think over some of the following electrical factors affecting planning and economical operation.

Wherever production requirements are subject to frequent change so that equipment must be shifted to fit into the new demands consider the use of box or trough ducts for distribution feeders. The original cost is little, if any, greater than for all conduit circuits. The saving in time and cost of making changes will soon make the installation a very profitable investment. Even though a layout may be considered as fixed, changes in requirements are almost inevitable over a period of years, thus necessitating new machines or shifts in arrangement. Therefore, some provision for economical changes will save expenses in the future.

Leave Room for Expansion

In laying out feeder lines leave a safe margin for future expansion and demands. With the rapid increase in size of motors on machine tools to provide greater power behind cutting tools a feeder ample today may be much too small for next year. Feeder lines are too expensive to warrant frequent changes.

When additions, extensions or changes which require a number of motors are planned the small plant should consider the voltage. Most plants, when small, use 110 or 220-volt current. New motors are added at the same voltage. Today many large plants wish that some years ago they had made additions at 440-volts and gradually turned over the older equipment to the higher rate.

To make the change today would

require a very high capital investment, in many cases scrapping the power generating units; to continue the lower voltage necessitates heavier wiring and greater expense when making shifts or changes. Combining the two voltages in one department is seldom feasible. However, any addition which requires extensive changes in incoming power, particularly if purchased or new generating units are installed, may well be made at the higher voltage.

For economical operation and distribution the purchase or generation of power at 2200 volts and its distribution and use at 440 volts on all but small motors is considered to be most practicable. Department transformers supply 110 volts for light and small power units.

Controlling Repair Costs

MAINTENANCE men can "run their heads off" doing a good job inspecting, servicing and repairing equipment but seldom can keep the costs within reason unless they have the co-operation of the foremen of the various departments using the equipment. Where repair costs for the month or year are lumped together in totals, the department foreman has little opportunity to analyze the work performed or to locate definite derelictions in his duties and responsibilities in the care of the equipment under his direction.

Under such conditions of lumped maintenance costs, the head of the maintenance department is the only one who can be "ridden" to reduce the expense. As he has no authority over the foremen his only recourse is to pick out specific items for complaint. Often this is considered as

"passing the buck" and causes friction.

Some plant managers have adopted the practice of submitting to each foreman an itemized list of all repair expenses incurred in his department during the month, together with the costs. If the costs or number of breakdowns are excessive then it is the foreman's place to explain.

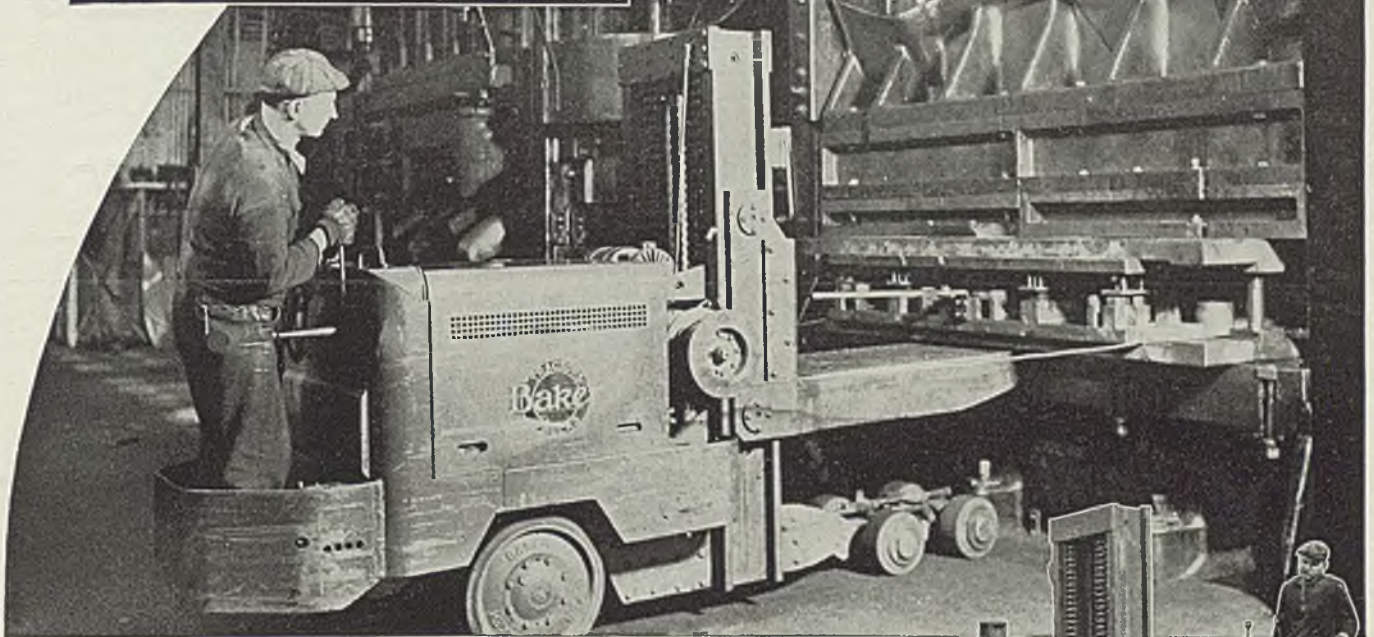
This practice does not relieve the maintenance department from all responsibility as the foremen will complain if a job must be done over repeatedly. To protect themselves against the accusation of slipshod work the maintenance men then must be sure in each case that the real cause of the trouble is located and corrected, as well as performing good, careful work.

Before purchasing power factor corrective equipment, see what can be done to improve conditions causing low power factor. Analyzing the loading of each motor and correcting the loss by adjusting motors to loads may decrease the amount of corrective equipment necessary to install. In one plant about one-third of the corrective capacity originally considered necessary was not needed after improvements were made.

A recently developed flexible coupling of the 3-jaw type uses a special insert holding balls between the hardened jaws to carry the load on point contacts and provide flexibility in operation. Hubs are not hardened which permits boring to fit shafts.

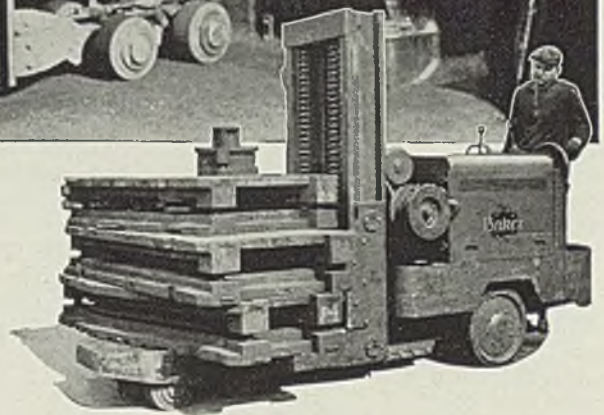
With the increasing tendency to generate power at higher voltages and step it down for light and small motors, another piece of equipment, the transformer, is added to inspect and maintain. When this burns out the entire section of the plant serviced is without current.

TAKE THE GRIEF OUT OF *Die-Handling*



● One of the toughest, most expensive and most dangerous manufacturing operations is made simple and fast by new methods developed and perfected by Baker users in cooperation with Baker engineers. As a result owners of Baker Hy-Lift and Fork Trucks are reporting almost unbelievable savings in the handling and setting of heavy dies.

Let a Baker engineer call with complete data and photographs covering the variety of efficient new methods developed for handling and setting dies of all sizes, up to 60 tons, to reduce idle press-time, prevent accidents, and speed up the movement of dies to and from storage. Write, wire or telephone the address below.



● *{Large illustration}*... Baker Hy-Lift Trucks, in capacities up to 30 tons, handle dies directly on the truck platform. Semi-trailers are used for larger dies.

● *{Smaller illustration}*... Rapid movement of dies to and from outdoor storage yards or indoor storage racks is assured when a Baker is on the job.

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way to handle
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SURFACE TREATMENT AND FINISHING OF METALS

Permanent Colors Produced Electrolytically On Metal Surfaces Without Aid of Pigments

A METHOD of coloring metals by an entirely new principal has recently been developed and patented. No pigments of any kind are used, the colors being produced by making the metal article the cathode in an electroplating bath which produces a thin film of metal showing interference colors. These interference colors appear in a succession according to the increasing thickness of the film in the order of the spectral colors, violet, blue, green, yellow, orange and red. After the red color has appeared and the film thickness increases, the colors are repeated until the film reaches such thickness as to show the characteristic color of the metal being plated. The desired color is obtained by arresting the process at the proper film thickness.

Process Has Two Modifications

The process has two modifications; the first, in which the plated metal is copper¹, produces the colors directly in the bath, the second, in which the plated metal is iron, cobalt or nickel², requires a subsequent baking operation to bring out the color. Similar results may also be obtained with molybdenum, chromium or manganese.

The process using copper, which is the simplest, will be described first. A typical copper bath for this process contains 20 ounces per gallon lactic acid, 14.5 ounces per gallon copper sulphate, and 16 ounces

per gallon sodium hydroxide. Articles to be colored are made the cathode in this bath at a current density of approximately 0.46-ampere per square foot. The potential at this current density is approximately 0.3-volt. The colors appear uniformly over the entire surface in the order named above. Color is a function of time and the process is arrested when the desired color is reached, preferably after the first cycle of colors has passed.

The film deposited is undoubtedly copper oxide and is not attacked by concentrated sodium hydroxide so-

lutions or the commonly used organic solvents. It is soluble, however, in ammonia, potassium cyanide, and mineral acids. The film will turn white in dilute hydrochloric acid and is darkened in concentrated nitric acid.

Colors are not affected by temperatures up to approximately 570 degrees Fahr. The quality of the color, but not the color itself, depends upon the smoothness and color of the base metal which can be any metal less active than aluminum. Bright, polished surfaces give rise to brilliant colors, and un-

New Design in Pressed Steel

***E** NDS and legs of this modern ironer, with integral drop leaves, are of one-piece pressed steel construction, welded to the table supporting the cabinet. Baked enamel finish is used throughout, except for the cabinet top, which is vitreous enamel. Designed by Clement Thelander, Chicago, for Barlow and Seelig, the ironer features smooth, clean lines, a special type of knee control in addition to the regular hand control, and thermostatic regulation of heat*



¹British patent 452,464, Aug. 24, 1936; Jesse E. Stareck, assignor to Kansas City Testing Laboratory, Kansas City, Mo.

²United States patent 2,059,053, Oct. 27, 1936; Jesse E. Stareck, assignor to Kansas City Testing Laboratory, Kansas City, Mo.

polished surfaces produce duller tones. Dull colors may be polished on cloth wheels. The deposits resist weathering and salt spray tests well.

This process may be used to produce thick films of copper oxide for use in electrolytic rectifiers, or thick films may be reduced to metallic copper, producing a deposit of unusually fine grain and beauty. The color of this deposit is a pigmentary one and depends upon the base metal. On iron the color is a rich brown; on buffed copper orange and red colors are formed; on bright electrolytic copper purple and blue-gray colors result; on brass the colors are rose and blood red.

When iron, nickel, cobalt or some other oxidizable metal is used the procedure is varied somewhat. The colors produced in the bath are of a subdued hue and not very stable in air. However, if the film is subjected to controlled oxidation the deposited metal is converted to the

oxide and brighter permanent colors of the same tint result.

The process using iron as the oxidizable metal is typical of this group. The baths used are alkaline in which iron is kept in solution by the use of an organic body. An organic acid, such as tartaric or citric acid, is satisfactory. Similar baths may be made by dissolving ferric chloride in an alkaline solution of a tartrate.

Heat Brings Out Color

Articles to be colored are cleaned and polished in accordance with usual plating practice and made the cathode in the bath. An iron anode is satisfactory but insoluble anodes may also be used. Iron is not attacked rapidly as an anode in a caustic soda solution and replenishment of the bath is by addition of ferric compounds.

In the bath, the successive colors appearing are dull but characteristic; there is enough change in the

appearance of the cathode article to guide and serve the workman. The bright colors are developed in the subsequent heating. The colors developed are characteristic and differ from those produced by the copper process. In the order of their occurrence they are yellow, orange, red, purple, blue, blue-green, silver, yellow, gold, peach, rose, violet, green and green-yellow. As film thickness increases, a new progression of colors may appear in the same order; the colors developing with integral multiples of the original thickness. Polychrome effects of two or more colors may be obtained by blocking out portions of the article being colored with paraffin or beeswax, at various stages of the process.

In a specific trial of the process, a white metal cigarette case was given a green color with a monogram in pink. The case was first cleaned in accordance with usual
(Please turn to Page 73)

Anodic Process Applies Uniform Rubber Coating to Intricate Metal Parts

USE of rubber to finish metal parts has been given added impetus by development of the anodic dipping process. Intricate metal articles may now be coated uniformly with an ease unknown to other methods. The coatings can be obtained in several degrees of hardness and may be specially formulated to resist specific corrosive conditions.

Multivane blower rotors and housings may be coated with rubber to resist the fumes of sulphuric and hydrofluoric acids and almost any other acid condition. The rotor, illustrated left, would be difficult to coat by any other process.

These coatings are also used for

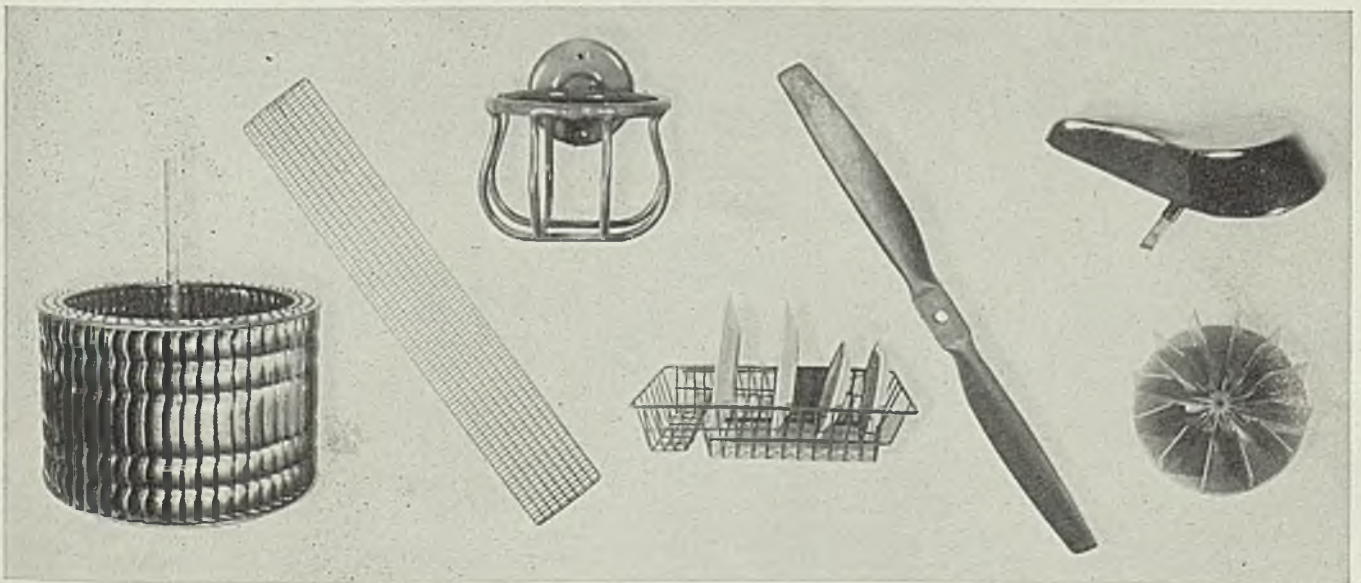
sound deadening and cushioning. Shown below are bathroom glass holder which has been rubber plated to eliminate breakage and noise; dish drainer, the coating of which not only reduces chipping of dishes and noise while in use, but protects the wire frame from rusting. These are finished in various colors and have a high gloss.

Coatings of this type on auto radio loud speaker housings enable the radio to produce clear, resonant tones and eliminate vibration at high pitches at full volume. Shown here also is a grid type automobile radio aerial coated with rubber for weather-proofing and elimination of

wheel static. Thickness of coating ranges from 1/32-inch up.

Metal parts to be rubber plated are first thoroughly cleaned in an acid solution. This is followed by several treatments known only to the manufacturer, after which the parts are submerged in an electrically charged tank of latex rubber. Thickness of coating is governed by the length of time the parts are submerged. After coating the parts are allowed to dry and then cured for about three days at a temperature of approximately 150 degrees Fahr. The cured rubber may then be coated with lacquer if the appearance factor is important.

Photo Courtesy Belke Mfg. Co., Chicago



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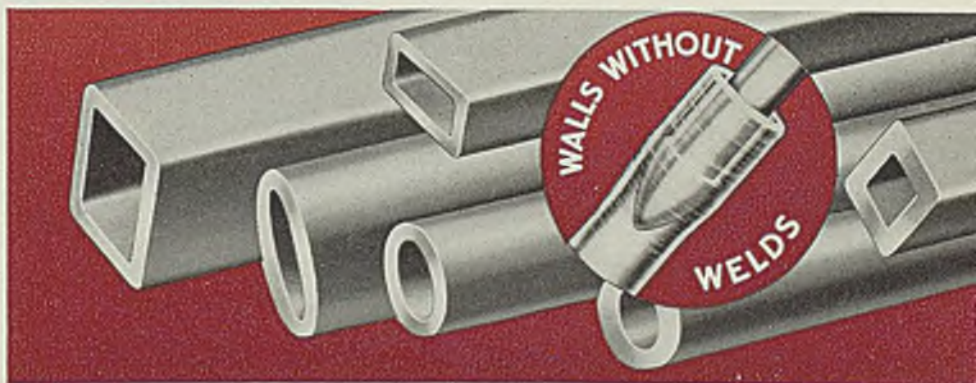
AS the bloomer girl of the early 90's pedaled swiftly by, dudes and rubbernecks along Main Street goggled in admiration. In those days SHELBY Seamless found its first application as simple bicycle tubing. That was about the only use for it. Since then, inventive genius and engineering resourcefulness have developed this tubing in ever more versatile form—have extended its use to thousands of mechanical applications undreamed of years ago.

Today in machinery and equipment of all kinds, and especially in automobile and aircraft construction, innumerable parts essential to efficiency are being made of SHELBY Seamless Steel Tubing. These parts are not only better but cost less to produce. They are strong. Without excess weight. Uniformly dependable in service. And because they can be turned out with a minimum of machine work, they assure the maximum economy of production.

In SHELBY Seamless, we place at your disposal mechanical steel tubing of almost any shape—round, square, oval, rectangular, streamlined—in practically any size and wall thickness, in grades and treatments of steel to meet the most exacting and specific requirements. This tubing is produced by the largest manufacturer of tubular products in the world, by men skilled in their craft determined that the name SHELBY shall be borne only by tubing as perfect as research and modern manu-

facturing facilities can create.

These are the reasons why SHELBY ranks first in the minds of mechanical men. If you make "parts" try it out in your shop. Find out how easily SHELBY fabricates—how it minimizes grinding and machine operations, cuts tool costs, reduces labor. Find out what you can do with tubing—our engineers will gladly show you how this versatile material can easily be applied to improve your product, speed up your production, reduce waste, increase sales.



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UNITED STATES STEEL



PROGRESS IN STEELMAKING

Roller Conveyors Facilitate Handling Hot Strip Steel at Pickling Station

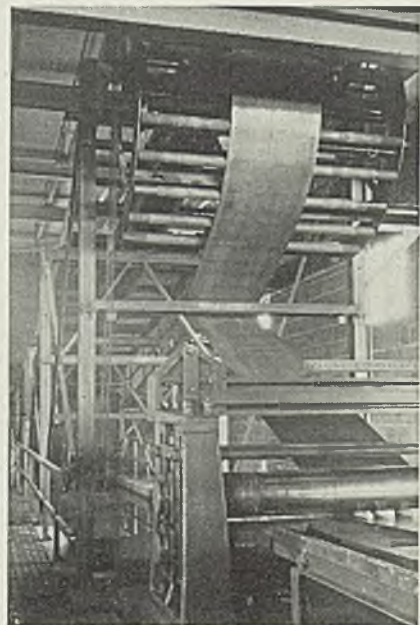
HANDLING strip steel at the various processing stations in the mill long had been a problem until roller conveying equipment was pressed into service. Today even the most intricate problems of handling the product have been simplified.

A view of the receiving end of a continuous pickler loop conveyor is presented at right. This unit is necessitated by the speed of the connecting machine operations. In other words, the switcher and decoiler operate at greater speed than the continuous pickler, and so the continuous sheet comes out faster than the pickler can handle it. This unit permits the excess amount of strip to form into a large loop. A con-

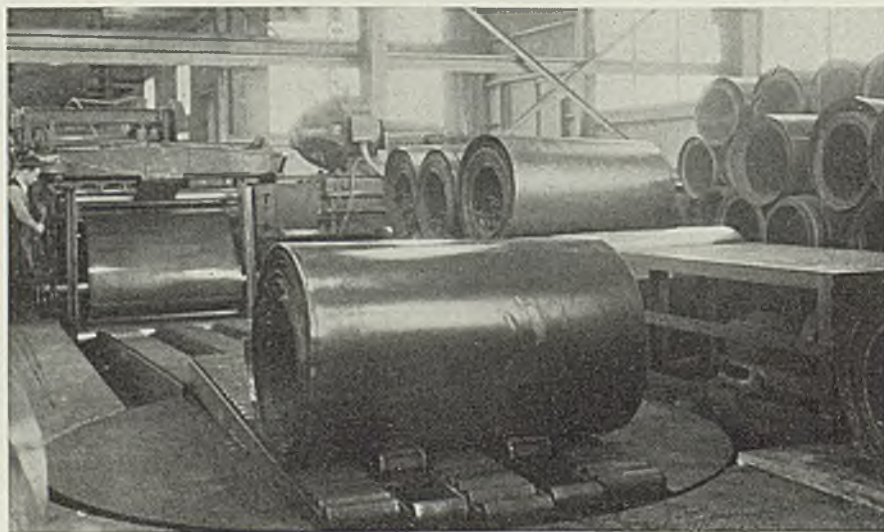
veyor leads into a pit. The sheet follows this pit conveyor to a point of contact with the rear wall and overlaps and runs back up the incline to the curved portion of the overhead system where it follows the contour of the overhead conveyor to the entrance point of the pickler. At the time this photograph was taken, all the slack had been taken out of this sheet.

Handling Small Coils

One of the special turntables in a large steel mill is shown below. The necessity for this unit may be better understood by explaining one of the operations that precedes its use. Small coils are transported from the hot mill to this storage



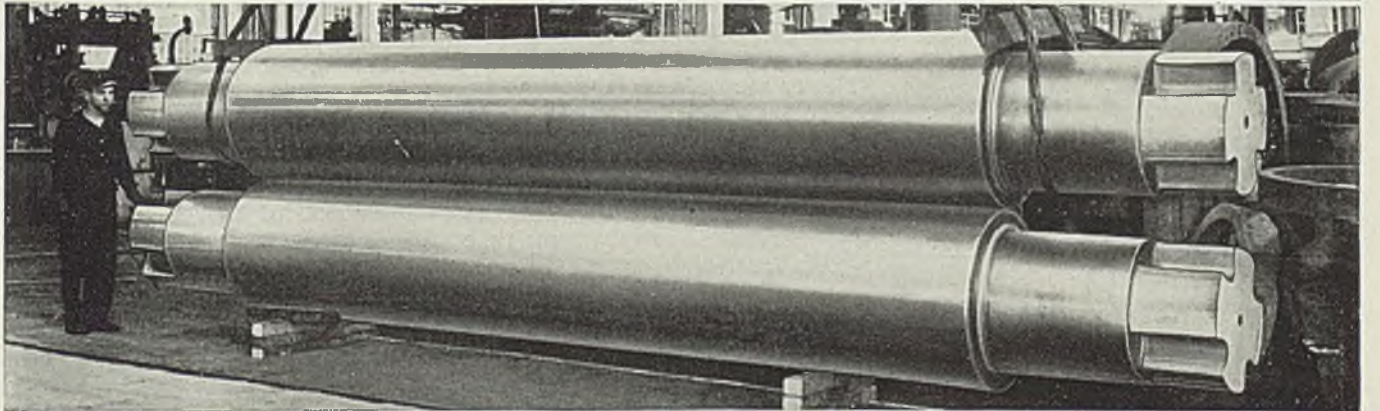
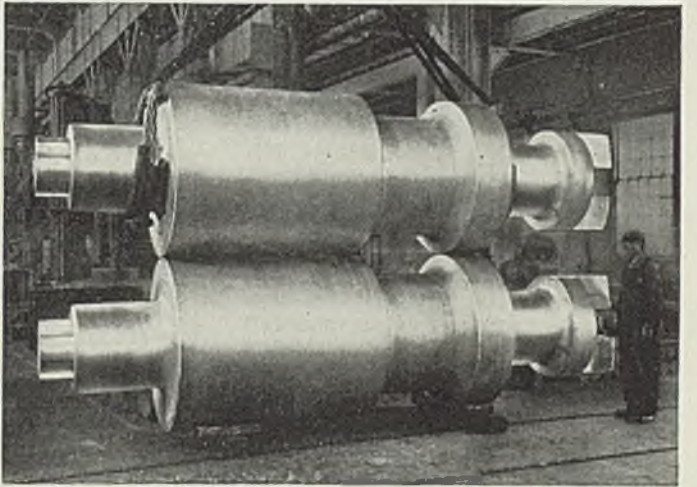
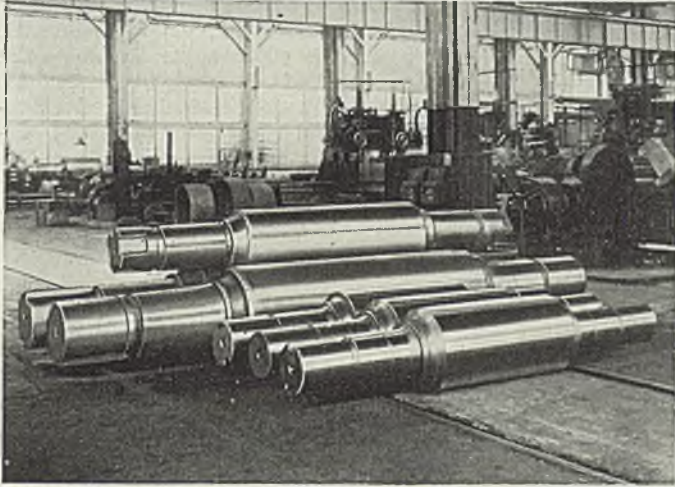
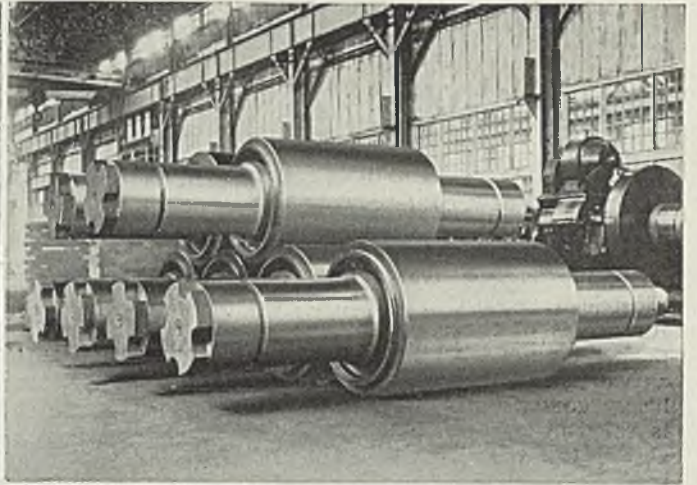
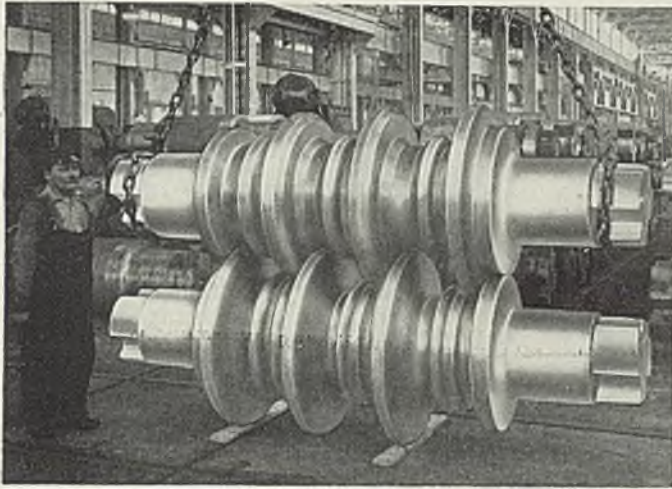
Loop conveyor which handles the slack in strip while in transit



Special turntables such as this are installed near the entrance of the pickling department serving a broad strip mill. Upon receiving a coil the turntable is reversed to its normal position and the brakes released. The coil then enters the receiving booth of the decoiling machine

building by means of tunnel conveyors. These coils then are boosted from the pit by an incline elevator and are discharged, rolling out on skids with the fishtail end turning in a counter clockwise manner. From this discharge pit, three coils are picked up at one time by an overhead crane equipped with magnet and are placed in storage.

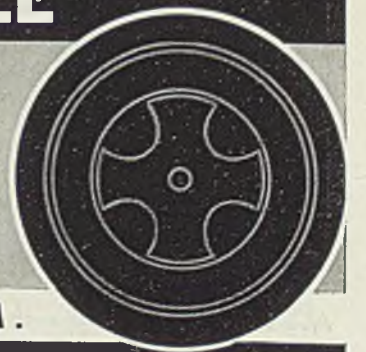
When required for production, the coils are lifted by crane and deposited on the turntable, which has been reversed from its normal position. After the coils have been deposited, the operator reverses the turntable to its normal position and relieves the brakes, permitting the coil to enter the receiving booth of the decoiler at the entrance to the continuous pickler unit. When discharged in this manner, the fishtail is in the right direction to be received by the decoiler. The conveyor shown were built by the Mathews Conveyor Co., Ellwood City, Pa.



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MESTA MACHINE COMPANY . . . PITTSBURGH, PA.

Bright Anneals Copper Wire

ACCOMPANYING illustration shows a new, continuous special atmosphere furnace now being used in a well known plant for bright annealing copper wire. Built by Electric Furnace Co., Salem, O., the furnace is of the straight through, pusher type and handles coiled wire as well as fine wire on spools and heavy gage wire on large reels. It is rated at 100 kilowatts and is designed to operate at temperatures ranging from 700 to 1000 degrees Fahr.

Material to be annealed is loaded on trays which, at predetermined intervals, are pushed automatically through the charging vestibule into and through the heating chamber, through a cooling chamber and out the other end through a discharge vestibule and onto an unloading platform from which the trays are unloaded and the empty trays returned to the charging end. The protective atmosphere used is produced in an Elfurno gas generator located along the right side end of the furnace.

This furnace has no water seals and employs no vapor of any kind. Thus the wire is dry at all times and no staining occurs and no drying is necessary. Wire is discharged uniformly annealed, absolutely bright and dry and ready for shipment without further processing or fabricating. Heating elements used in this equipment are heavy cast nickel chromium alloy grids and are located in the roof and bottom of the heating chamber; these elements are

divided into two separately and automatically controlled zones. Length of the furnace is approximately 85 feet. It has capacity for bright annealing about 36,000 pounds of copper wire per day. It can be built in larger or smaller sizes to fit individual requirements.

Model Studies Aid Designer

PROPER design of any machine or structure requires that we predict what forces will act upon the completed assembly and the conditions under which these forces will be active, said Fred L. Plummer, associate professor of structural engineering, Case School of Applied Science, Cleveland, before a recent meeting of the Cleveland section of the American Welding society. It then is necessary that we determine the stresses and distortion which will be created in the structure by the applied forces. Finally, we must select the material and determine the amount and shape of that material which will most efficiently provide a safe and useful service life for the projected machine or structure. Included in this final step is the selection and design or proper connections so that the parts of the structure may be assembled and act as a unit.

Newer methods of fabrication together with the increased use of high strength and light weight metals make essential more exact methods of analysis and design if our machines and structures are to be economical and at the same time

provide satisfactory service records.

The designer of machine tools, said Prof. Plummer, will find many types of model studies to be of great aid in executing his designs. Three dimensional models built of identical or similar materials may be loaded and tested just as the full scale structure might be tested. Models made of brittle material having a constant stress-strain relationship up to ultimate strength are useful in determining stresses on complicated sections. Rubber models may be used to demonstrate and study distortions. Several useful analogies have been developed which enable the engineer to solve stress distribution problems by observation of electrical, hydraulic or other phenomena. The photoelastic method is especially valuable to the designer of machines because it enables him to determine and therefore avoid the points of stress concentration which have so frequently resulted in fatigue failures of machines which involve reciprocating or rotating parts.

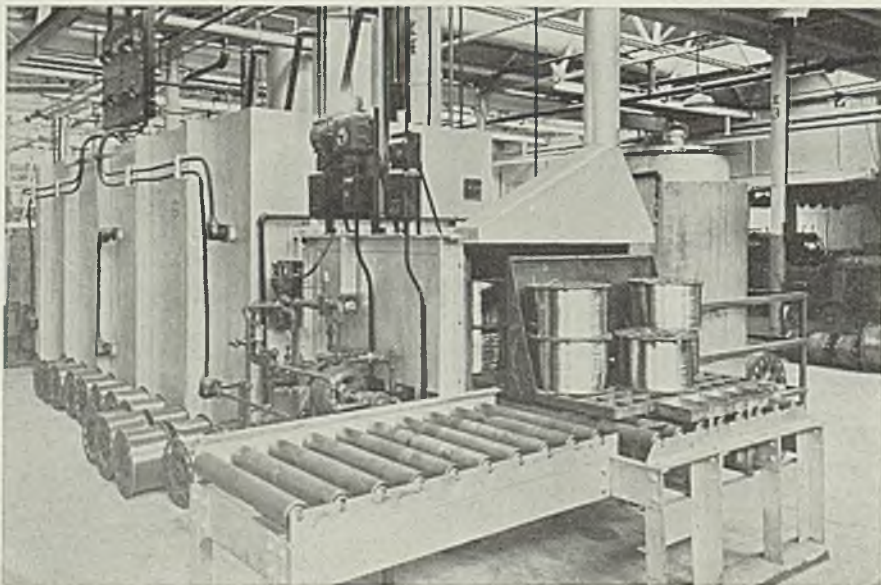
Handbook of Inorganic Chemistry Adds a Section

Gmelin's Handbook of Inorganic Chemistry (Gmelin's handbuch der Anorganischen Chemie), edited by the Deutschen Chemischen Gesellschaft; paper, 184 pages, 6 7/8 x 10 inches; published by Verlag Chemie, G.m.b.H., Berlin, Germany; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This volume is Section VIII of Part A of the well-known Gmelin's Handbook of Inorganic Chemistry. It is in German and deals with the mechanical and thermal properties, iron-carbon-hydrogen, iron-carbon-oxygen, iron-carbon-oxygen-hydrogen, iron-carbon-nitrogen, and numerous other iron systems.

Announces New Square Hanging Eaves Trough

Announcement has been made on a new type of square hanging eaves trough known as Kuehn's gutter, named after Louis Kuehn, president of Milcor Steel Co., Milwaukee, which is marketing the product. Installed on a building, it gives a box gutter effect because of its new shape. Although the sheet metal trough has an entirely different appearance, its application is the same as the ordinary half-round trough. The new design incorporates decorative flutings on side and bottom, which makes for a stronger, straighter, and more easily handled installation.



About 36,000 pounds of copper wire, in coils, on spools and large reels, are bright annealed daily in this new continuous, controlled atmosphere, electric furnace

A.S.T.M. Committees Formulate New Tests and Specifications To Supplement Standards

A NUMBER of new specifications and tests were approved by various committees of the American Society for Testing Materials when they met in Chicago, March 1-4, during the society's 1937 Committee Week. These specifications and tests will now be confirmed by letter ballot of the respective committees preparatory to their submission to the society at its fortieth annual meeting in New York, June 28-July 2.

About 150 meetings were held throughout the week and total attendance was in excess of 600. Groups participating in the program were main standing committees, sections and subcommittees, including a number dealing with ferrous and nonferrous metals, methods of testing and fuels.

In connection with the group committee meetings, the society conducted two symposiums, one of which dealt with corrosion testing procedure. This symposium, embracing six technical papers, was organized to serve as a preliminary step in a program to standardize corrosion tests. An extensive report of the symposium was presented in the March 8 issue of STEEL.

Following are brief summaries of the important work accomplished by various committees on ferrous and nonferrous metals:

Committee A-1 on Steel

Included in existing tentative specifications recommended for adoption as official standards are those covering: Forged or Rolled Steel Pipe Flanges for General Service (A 181), Seamless Cold-Drawn Heat-Exchanger and Condenser Tubes, and Still Tubes for Refinery Service (A 179) and (A 161) and Electric-Resistance-Welded Steel and Open-Hearth Iron Boiler Tubes (A 178). Other tentative specifications to be submitted to letter ballot of the committee for recommended adoption as standard cover Fabricated Steel Bar or Rod Mats and Welded Steel Wire Fabric for Concrete Reinforcement, A 184 and A 185.

Several new specifications in course of development during the past year were studied and are to be referred to committee letter ballot for recommendation as tentative new standards. Products covered by some of these new specifications include intermediate alloy seamless steel still tubes and intermediate alloy seamless heat-exchanger and condenser

tubes. These are proposed as companion specifications to existing A. S. T. M. items for similar carbon and alloy steel products. Committee on boiler steels reported progress on an active program which includes four new specifications covering carbon steel, low carbon nickel steel, molybdenum steel, and chromium-manganese alloy steel plates of flange quality for locomotive boiler shells and of flange and firebox qualities for stationary boilers and other pressure vessels.

An important new specification for iron and steel filler metal (arc welding electrodes and gas welding rods) was presented at the meeting and will be balloted upon by the committee for approval as a new standard. This was developed in joint co-operation with representatives of the American Welding Society.

Other Projects Being Studied

A number of important questions are being investigated by various divisions of Committee A-1. One of these involves inclusion of surface conditioning requirements in the Tentative Specifications for Structural Nickel Steel. Subcommittee II in charge of this work has in hand also recommendations for standard specifications for steel sheet piling. An interesting development in the work of the subcommittee on steel tubing and pipe is the proposal to eliminate use of Birmingham wire gage in tube specifications and substitution therefore of a system of designating wall thickness by decimals of an inch. A special subcommittee was appointed to develop recommendations at the June meeting concerning this matter and also the question of co-ordinating wall thickness tolerances in accordance with the change in method of designation. The committee has under preparation a new specification for alloy steel boiler and superheater tubes for high pressure and high-temperature steam service.

One of the actions taken, subsequently to be submitted to letter ballot, involved withdrawal of the List of Specifications for Steel Suitable for Fusion Welding (A 151-35) with recommendation that existing specifications covering materials offered for fusion welding be revised to incorporate specific requirements for welding or to include a statement that the material is suitable for welding.

The committee working on specifications for bolting, which last year developed the Tentative Specifications for Alloy-Steel Bolting Materials for High Pressure and Temperatures to 1100 degrees Fahr. (A 193-36 T), plans to study two new drafts of the standards which will contain in tabular form those alloys felt to be of most practical use. These drafts will be considered by the committee at a meeting in May.

Existing standard specifications A 158 covering seamless alloy-steel pipe for high-temperature service are to be re-

drafted as a new tentative specification and because of the wide range usage of the carbon-molybdenum alloy steel composition, especially by the power industry, in ranges of 900-1000 degrees Fahr., this grade will be removed from the specification and covered in a proposed new tentative standard. In the revised specifications A 158, three alloys are to be deleted because of lack of demand and five new alloys added.

Committee A-5 on Corrosion of Iron and Steel

This committee approved submission to the society of two proposed tentative specifications which will serve as general revisions of existing standard specifications for farm-field and railroad right-of-way fencing and for barbed wire. The new specification requirements differ from present standards primarily in inclusion of three weight-of-coating classes for both fencing and barbed wire.

Active work is under way on revision of existing specifications for strand, line wire and chain-link fencing, galvanized after weaving. New specification requirements for chain-link fencing, galvanized before weaving are being studied. During the past year, the committee developed test methods for determining uniformity of coating by the Preece test on zinc-coated wire. This test is referred to in the standard methods of determining weight and uniformity of coating on zinc-coated articles (A 90-33) and the committee agreed to retain this reference with a note to indicate that when wire is being tested, the method outlined in A 191 should be followed.

Inspection of the committee's country-wide outdoor exposure tests of bare and galvanized sheets and hardware and plated specimens is being continued. Installation of material in the latest tests on wire has been completed at the 11 test fields. Materials included in this work are plain unfabricated wire, barbed wire, wire strand, farm-fence and chain-link fencing.

Tests of physical and chemical properties of all materials exposed in the wire tests are now being carried out at national bureau of standards and the complete data resulting from this work will be published.

At the meeting of Subcommittee VII on Methods of Testing there was considerable discussion involving electroplated coatings. While at the last session of the committee consideration was given to publication for trial and comment of promising test methods, no action was taken. Various methods of thickness measurement including (a) metallographic, (b) stripping, (c) chord method, (d) dropping jet and spot tests, and (e) magnetic methods, was discussed. A new magnetic method devised for measuring thickness of nickel coatings on nonferrous base metals was demonstrated. Consideration was given to methods for measuring porosity of coat-



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ings, and accelerated tests such as salt spray and intermittent immersion.

An extensive exhibit depicting the scope of the outdoor testing activities of Committee A-5 and several other committees doing similar work in other materials fields will be held at the annual meeting of the society in New York, June 28-July 2.

Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys

Subcommittee on Classification of Data reported active consideration is being given to assembly of information for data sheets covering the iron-chromium, iron-chromium-nickel and related alloys. The tables of Data on Chemical Compositions, Physical and Mechanical Properties and Corrosion-Resistant Properties of Corrosion-Resistant and Heat-Resistant Alloys, prepared by Committee A-10 in 1930, have had a wide circulation but there has been an urgent demand that this information be brought up to date. It is planned that the new summary will be issued in standard letter-size sheets and will cover authoritative information for the various metals and alloys within the scope of the committee, including individual tables of information on each of the typical alloys and for the various forms in which the metals are fabricated.

Subcommittee on Methods of Corrosion Testing took action to appoint a committee to give consideration to preparation of details for recommended practices covering particular types of corrosion tests including the boiling liquid immersion test, the plain immersion test, the spray test and atmospheric exposure testing.

The committee is greatly interested in information and data concerning service behavior of stainless alloy steels, consequently consideration was given to arrangements for the inspection of typical installations of such stainless metals after exposure. A special committee is to be appointed to look into the possibilities of arranging for such inspections of existing installations on various structures throughout the country and to prepare a report of its findings. In a number of instances, the original chemical composition and physical properties of the metals to be examined may still be available.

The committee also considered need for a study of the relation between exposure behavior, that is, changes in appearance and in mechanical and metallurgical properties and original history and fabrication procedure of the alloys under its jurisdiction. It was decided that a small committee should be appointed to study possibilities of such a program.

Subcommittee on Specifications for Flat Products has completed preparation of certain minor revisions in existing Tentative Specifications for Corrosion-Resisting Chromium-Nickel Steels (Sheet, Strip and Plate) (A 167-35 T) which, after approval by committee letter ballot, will be presented to the society at the annual meeting.

Committee B-6 on Die-Cast Metals and Alloys

This committee decided to expand its present extensive corrosion test program to include indoor and outdoor exposure tests on three magnesium-base alloys. These were selected as representative of best American and European practice. It is planned to bring in samples of the alloys at the end of 5 and 10 years; the third period will depend on the status of the tests. Specimens representing these three alloys will be exposed at the six outdoor and four indoor locations used in present tests. Various producers of the alloys will furnish the test specimens and erection of test racks and inspection and testing of samples

will be carried out by other committee members.

In planning its 1937 report, the committee intends to include two interesting papers as appendices. One of them on brass die castings will discuss in detail developments to date in this field and will be prepared by J. C. Fox, chief chemist and metallurgist, Doehler Die Casting Co., Toledo, O.

The second paper, by G. L. Werley, New Jersey Zinc Co., Palmerton, Pa., on the effect of die design on properties of zinc-base test specimens, will deal with methods of channeling, runners, X-ray inspection and mechanical data.

Subcommittee on tin and lead-base die-casting alloys perfected plans to undertake extensive series of tests on five lead and tin-base die casting alloys representative of American practice. The comprehensive test program involves a series of tension, impact and hardness tests. The committee also will start long-time creep tests.

The committee plans to recommend a revision of the Specifications for Aluminum-Base Alloy Die Castings (B 85-33 T). This change will include insertion of Alloy No. XI and information data concerning its properties will be included in the table appended to the specifications. This alloy has a nominal composition of 2 per cent copper, 8 per cent silicon, 1.5 to 2.0 per cent iron, 0.05 maximum manganese, 0.05 maximum magnesium, with aluminum the remainder.

The committee reviewed work in progress on endurance and creep tests on both aluminum and zinc-base die castings. Progress was reported in the work under way on producing impact test specimens with notch cast in place.

Committee B-7 On Light Metals and Alloys, Cast and Wrought

Subcommittee on Aluminum and Aluminum Alloy Ingots completed extensive revisions of the Tentative Specifications for Aluminum-Base Sand-Casting Alloys in Ingot Form (B 58-33 T). The revised specifications are intended to replace the existing ones and, after approval by committee letter ballot, will be submitted to the society in June. Specifications are being prepared for aluminum ingots for permanent mold castings which will be in the nature of companion specifications to the Tentative Specifications for Aluminum-Base Alloy Permanent Mold Castings (B 108-36 T), completed last year and issued as an A.S.T.M. tentative standard.

This subgroup also is reviewing a tentative draft of specifications for aluminum-alloy ingots for die castings, the work being carried on in co-operation with Committee B-6 on Die-Cast Metals and Alloys. Consideration will be given to bringing requirements for ingots for die castings in line with revisions made in specifications for aluminum alloy ingots for sand castings.

Subcommittee on Testing Light Metals has completed a series of tests to obtain information on the modulus of rupture of aluminum alloys. Data obtained in these studies will be presented in the form of a technical paper to be appended to the 1937 annual report of Committee B-7 in June. The paper will contain data on some seven or eight of the aluminum alloy castings as covered in the A.S.T.M. Tentative Specifications for Aluminum-Base Alloy Sand Castings (B 26-36 T).

This subcommittee also reported consideration is being given to obtaining information respecting the relative hardness of various aluminum-base alloy castings as covered by the A.S.T.M. Specifications B 26, and also of the aluminum-base alloy permanent mold castings as covered in the Tentative Specifications B 108-36 T. This subcommittee is undertaking a survey of problems in connection with the production

of the sand-cast test bars for testing aluminum-base alloys in accordance with Specifications B 26.

Joint Committee on Effect of Temperature on Metals

Sponsored jointly by the American Society of Mechanical Engineers and A.S.T.M., this committee gave consideration to a reorganization of the committee's setup. A number of new members are to be added after approval by the sponsor bodies and will be assigned to service on the committee.

N. L. Mochel, Westinghouse Electric & Mfg. Co., Philadelphia, who served as secretary for a number of years, was elected as vice-chairman; J. W. Bolton, Lunkenheimer Co., Cincinnati, was chosen secretary. F. B. Foley, Midvale Co., Philadelphia, and E. L. Robinson, General Electric Co., Schenectady, N. Y., were elected to the executive committee. H. J. French, International Nickel Co., New York, is chairman.

As new projects are undertaken in the future, the executive committee or chairman will appoint a chairman of a special committee to handle the project, and upon completion of a project, the special committee is to be automatically discharged.

Technical projects were agreed upon as follows:

No. 10. "Testing of Tubular Members." C. E. MacQuigg, chairman. Work to be carried out at Massachusetts Institute of Technology.

No. 11. "Assembly and Interpretation of Available Creep Data." P. E. McKinney, chairman. Under way since last year at University of Michigan.

No. 12. "Continuation of a Long-Time Creep Test on K-20 Carbon Steel." Dr. H. W. Gillett, chairman. Work to be carried out at Battelle Memorial Institute.

No. 13. "Investigation of Properties of Metals at Low Temperatures." Dr. H. W. Russell, chairman. Conducting a questionnaire on this matter.

No. 14. "Study and Revision of Tentative Method of Test for Long-Time (Creep) High-Temperature Tension Tests of Metallic Materials (E 22-35 T)." Dr. C. L. Clark, chairman.

No. 15. "Torsion Creep Tests for Comparison with Tension Creep Tests." Dr. A. E. White, chairman. Work to be done at University of Michigan.

No. 16. "Relaxation Tests." E. L. Robinson, chairman.

No. 17. "Study of High Temperature Acceptance Test Methods." Dr. A. E. White, chairman.

No. 18. "Study of Effect of Manufacturing Variables in Steel Manufacture on the Creep Resistance." Dr. H. W. Gillett, chairman.

Research Committee on Fatigue of Metals

Informal discussion was held of outstanding unsolved research problems in connection with failure of metals when subjected to repeated loading. A number of problems were outlined as follows:

1. Strength developed in specimens when tested in different ways — direct repeated pull, repeated bending, repeated twisting, differences between results with solid and hollow specimens.

2. Effect of lubricant in changing the strength of parts subjected to repeated pressure over a small area, such as gear teeth, ball bearings, and car wheels.

3. Behavior of different metals when subjected to loads above the smallest value which will cause eventual failure — the length of "life" which can be expected for such loads, and the lowered resistance to subsequent repetition of lower loads.

4. Effect of cold working and heat

treatment on the crystalline structure of metals and the resultant effect on resistance to repeated stress and the damage done by occasional overstress.

5. Effect of speed of repetition of load on resistance to repeated stress.

Joint Committee on Exposure Tests of Plating on Nonferrous Metals

Data giving the results of exposure tests to date were discussed, and it was agreed that the present system of rating on a numerical scale furnished a good basis for comparison of the coatings.

Effects of cleaning and protecting the plated surfaces with grease or wax were illustrated by actual specimens from racks in New York. It was decided to expose new specimens of about 30 typical sets to which the cleaning and protective films would be applied at the start and at regular intervals thereafter.

It was also recommended that some new sets with different methods of preparation and thickness of coating be prepared and installed as soon as feasible. Pending results of these supplementary tests, no conclusions from the research will be published.

Use of color photography for recording exposure tests was demonstrated by C. E. Vincent-Daviss. Results were of interest and value, although no entirely satisfactory way has yet been found for photographing bright surfaces without getting the color of the sky or other reflected surfaces.

Following the general conference, the committee discussed details of supplementary tests to be initiated as soon as practicable.

Committee on Wrought Copper and Copper Alloys

This committee considered two proposed tentative specifications, one for rolled nonferrous bearing plates for bridge and other structural uses, and the other for seamless condenser tubes and ferrule stock. These specifications will be submitted to committee B-5 shortly for consideration for publication as tentative.

The first specifications cover rolled nonferrous plates used in bridges and other structures for fixed or expansion bearings where motion is slow and intermittent and pressure does not exceed 3000 pounds per square inch. Two types of composition are provided, one with a minimum tin of 3.8 per cent, maximum phosphorus 0.5 per cent and the sum of these elements, plus copper, minimum 99.5 per cent. The other type provides for a minimum copper content of 94.8 per cent, with silicon in the range 2.70 to 3.75 per cent. Certain other elements may be present within specified limits. These specifications represent extensive revision of the existing Tentative Specifications for Wrought Phosphor-Bronze Bearings and Expansion Plates for Bridges and Structures (B 100-35 T), and are intended to replace these specifications when issued.

The specifications for condenser tubes and ferrule stock cover seamless tubes and ferrule stock of various alloys for use in surface condensers, evaporators and heat exchangers. The chemical composition requirements provide for various types of alloys including Muntz metal, admiralty, red brass, aluminum brass and aluminum bronze, 70-30 and 80-20 copper nickel, copper, and arsenical copper. The tests require microscopical examination with a uniform grain size not in excess of 0.045-millimeter in average diameter. Other tests provided include expanding, strain and hydrostatic tests. Under the latter, each tube is to stand 1000 pounds per square inch without leakage. When approved as tentative, it is anticipated this new specification will be a consolidation and

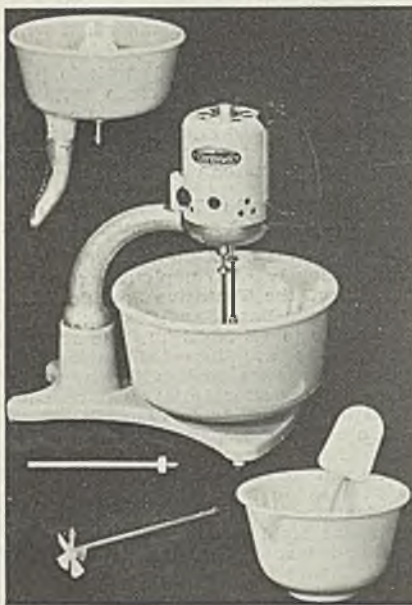
replace other existing standards covering specific materials.

Gaseous Fuels Meetings

National standards for testing gaseous fuels as they affect purchase and sale of such products to consumers are now being prepared under the supervision of committee D-3. Actual details connected with the preparation of such standards are being carried out by some seven subcommittees.

New Heatproof China Bowls Help Kitchen Mixer Maker

Breakage of glass bowls has caused more annoyance than any other factor in the manufacture of combination kitchen mixers and juice extractors, according to H. A. Dormeyer, president, A. F. Dormeyer Mfg. Co., Chicago. This trouble now has been cured to the extent of about 80 per cent by substituting china for the glass bowls



Steel sheets, gray iron castings, aluminum die castings, stainless steel are some of the materials used in parts of this kitchen mixer and juice extractor

formerly used. This substitution has been made possible as a result of extended experiments at a pottery at Golden, Colo., where china bowls of highly attractive appearance now are being made within the desired size tolerances. These china bowls have much greater impact resistance than glass bowls, a factor of great importance for the reason that three bowls go into each shipping carton along with a steel mixer assembly, making total weight of 20 pounds. In addition, breakage due to changes in temperature are eliminated because the china bowls are heat proof.

This development has served as a distinct spur to sales of mixers,

according to the company, which fabricated all parts of the mixers and motors complete, with the exception of the commutators which it buys outside. Steel sheets of required physical characteristics are bought in carloads for the forming of motor housings, bowl turntables and other parts. Bases are aluminum die castings or gray iron castings, depending on the price at which the mixer is to be sold. Beater rings and drink mixer are of stainless steel. The juice extractor has a porcelain reamer and an aluminum spout.

Furnace Improvements Aid Heat Treating Processes

(Concluded from Page 40)

govern its thickness and density so that a thin heavy scale which readily breaks away from the ingot is obtained instead of a thick porous scale which has a tendency to cling to the ingot or slab. Regarding this scale weight or, as it is termed, "furnace loss," repeated tests have shown it to be at least 25 per cent less by the controlled recuperative furnace or about 1 per cent increase in metallic yield from the ingots heated in this furnace.

During the week ending Jan. 30, the mill rolled 1532 tons which was heated in three furnaces, one being the recuperative furnace. We made a preliminary study of the defects by furnaces including both open hearth and mill defects, with the result that of the 5.67 per cent total defects, the recuperative furnace produced 16 per cent less defects than the regenerative furnaces.

We do not think that we have yet attained our goal but we have effected economies both in fuel and mill yield, we have given the steel better "treatment" during the heating process and at the same time made the heater's job a lot more pleasant.

Offers New Welding Rods

A new welding rod for quick starting with minimum power consumption has been placed on the market by Electric Arc Cutting & Welding Co., Newark, N. J. Known as the Compensating rod, it is evenly tapered throughout its length and is smaller at the starting end than the finishing end. It is claimed that the design prevents the stub end from becoming too hot to continue welding. It is claimed that the design also compensates for current resistance loss in that part of the rod waiting to be deposited. These rods, also recommended for corner and deep vee work, are offered bare, fluxed, dipped and extruded, in all sizes and kinds.

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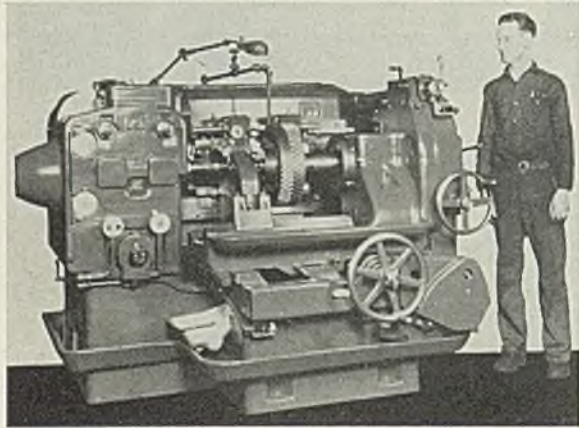


Gear Generating Machine—

Farrel-Birmingham Co., Ansonia, Conn., has recently introduced a new Farrel-Sykes 2-C gear generat-

cently placed on the market a special rivet designed for riveting from one side of the job by one operator. It is constructed of a hardened steel body with horizontal cut-

up with a wrench or nut runner. The steel compressing sleeve is drawn down over the shank and forms a steel rivet, sealing the head on the inside or blind side of the job, which leaves only a hex nut on the outside.



Farrel - Sykes 2-C gear generating machine designed for high speed production

ing machine. This machine is designed to meet demands for high-precision gearing, coupled with high-speed production. A single operator can attend from two to four machines. The automatic infeed mechanism is adjustable to take from one to seven cuts, and changes in the depth feed are made without special equipment. All operations are automatic except mounting the work and removing it. The machine is suitable for tool room or general production work, and it will cut every type of gear connecting parallel axes, machine cylindrical surfaces on shafts or pistons, cut parallel and tapered spline shafts, two members of a cluster gear or many gang-mounted gears simultaneously. Speed and feed controls are on the front, and the change-speed gear box is in one unit. All high-speed moving parts are forced lubricated, and slide-ways are covered to keep grit out of the sliding surfaces.

ting ribs, through which a special steel bolt passes. A steel compressing sleeve is placed on the taper of the body and held by the bolt head. The compressing nut locks the assembly together. The rivet is driven into the hole and the nut is drawn

Unit Heater—

L. J. Wing Mfg. Co., Seventh avenue and Fourteenth street, New York, has recently introduced a new unit heater combined with a revolving discharge unit. The revolving unit sweeps slowly around through 360 degrees, directing the air flow in every direction successively. Air velocity is sufficient to reach the walls and remote corners. According to claims, this method of distribution of air reaches around obstructions and provides a more uniform heating in the room or plant in which it is installed.

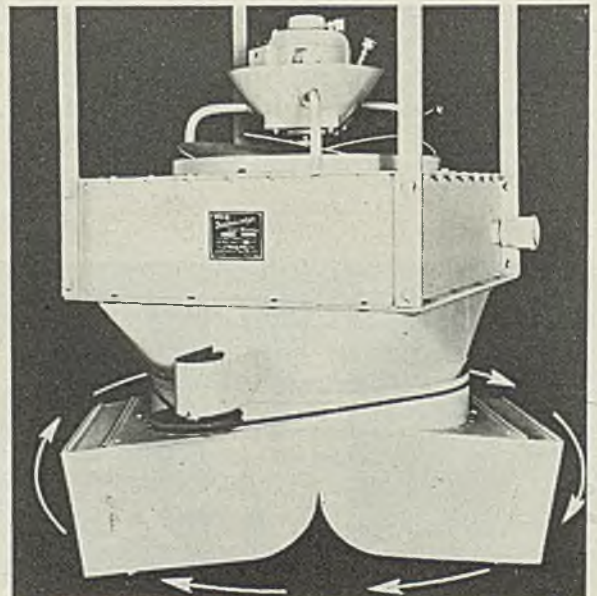
Composition Mallet—

Forsberg Mfg. Co., Bridgeport, Conn., has recently placed on the market a new line of mallets made of thorite. This material is resistant

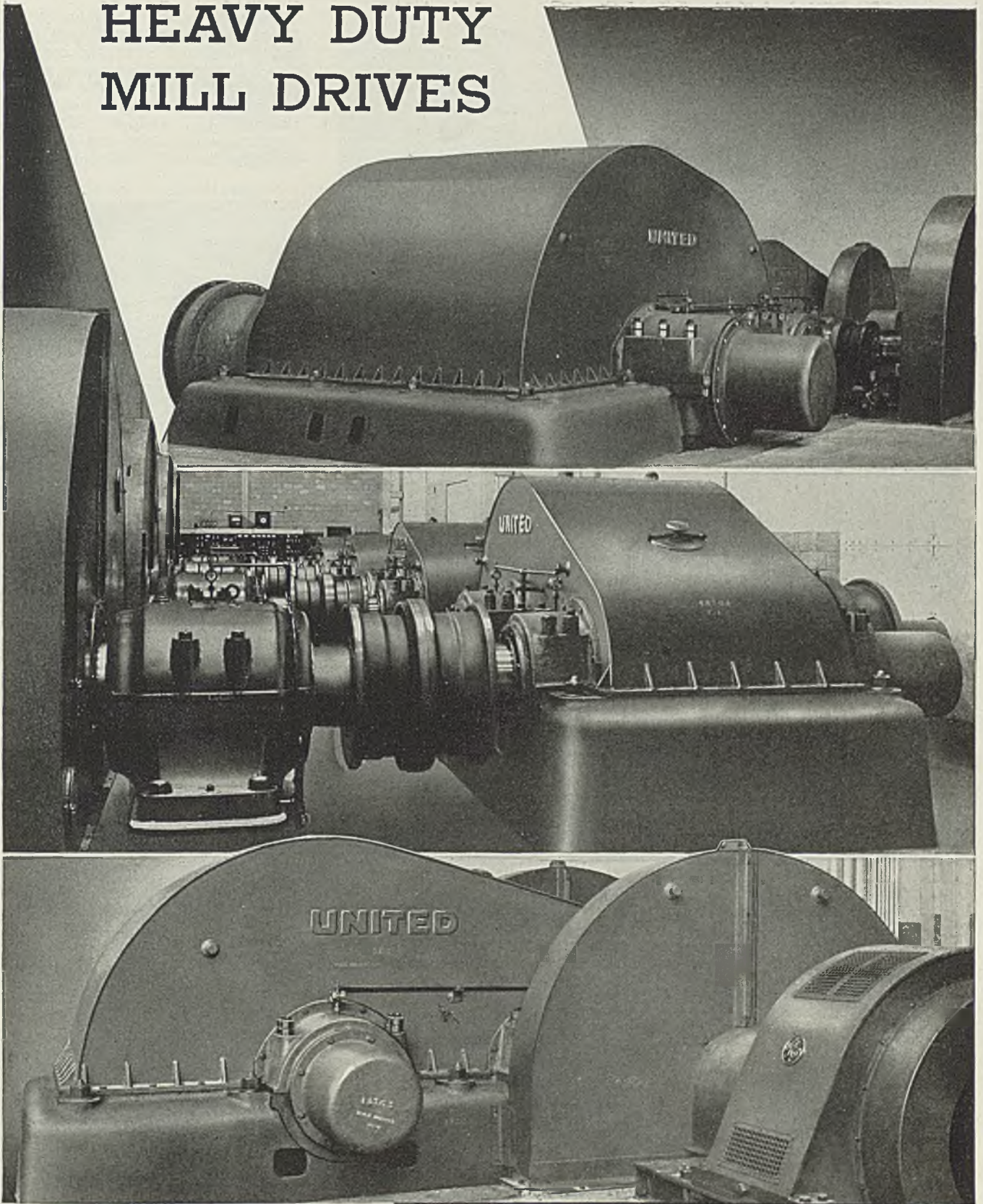
Front Drive Rivet—

Multi-Seal Mfg. Co., 123 North Jefferson street, Chicago, has re-

Wing unit heater equipped with a revolving discharge for uniform heat distribution



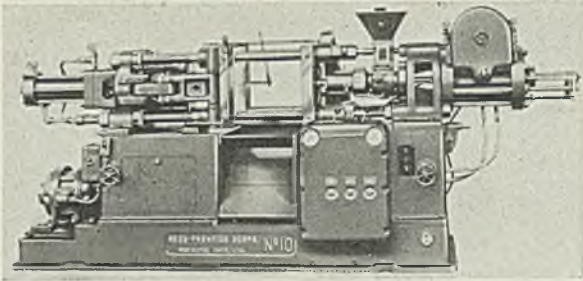
HEAVY DUTY MILL DRIVES



Drives such as these, quiet and efficient in operation, are made possible by "United's" modern gear cutting equipment and machine shop facilities.

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Reed-Prentice hydraulic plastic injection molding machine

to grease and oil, and the new mallets are intended to be used in place of rawhide, copper, lead, wood or similar mallets. The mallets are furnished in four sizes ranging from 12 to 32 ounces. Head size on all mallets is 2 x 3 3/8 inches, weight being varied by variation in concentration and not by loaded cores.

Molding Machine—

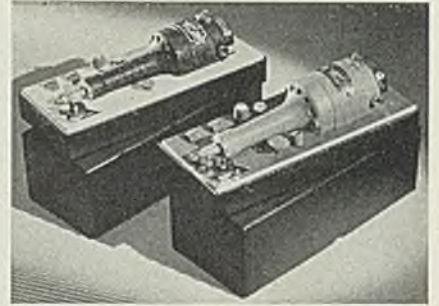
Reed-Prentice Corp., Worcester, Mass., has recently announced a new automatic hydraulic plastic injection molding machine. On the new model, the motor has been mounted outside the cabinet, eliminating the use of a fan cooled motor as in previous models. Three timing units control the automatic cycle, each being adjustable from 1 to 120 seconds.

The units control the time of pressure, period for solidification of material and the amount of time the molds are held open for ejection of the product, respectively. When the machine is manually operated, it is controlled by two levers, one for closing the mold and the other for operating the injection cylinder. Electric heating unit for the heating of the material is furnished together with a rheostat, and provision is made for thermometer or thermocouple control of the material. A safety device and an automatic knock-out for the product is also provided.

Hand Grinder—

Dumore Co., Racine, Wis., has a new hand grinder equipped with a

1/18 horsepower dynamically balanced Dumore motor, 1/8-inch collet chuck, a tested 3-bearing construction using selected precision grease-sealed ball bearings. The air used in the cooling of this tool passes through the snap-on filter cap which prevents dust and dirt from entering the tool. This tool together

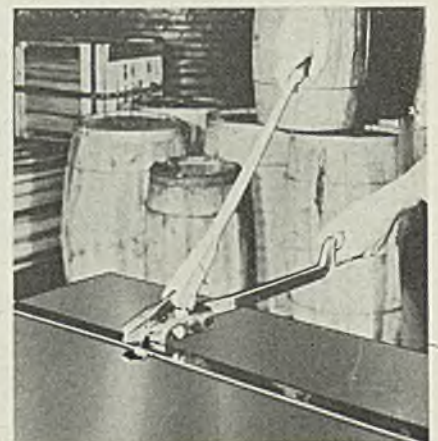


Dumore hand grinders are now being sold in these newly designed containers together with convenient ly mounted accessories

with the No. 8 grinder, previously announced, has been packaged in a new type box, illustrated herewith. Equipment included consists of mounted wheels, abrasive bands and arbor, wrenches, cord, plugs and toggle switch built into the case. Speed of the new unit is 20,000 revolutions per minute.

Shear—

Acme Steel Co., Chicago, has recently perfected a simply operated shear for cutting flat steel bands. This tool has been designed particularly for shippers and receivers who are required to unpack heavy shipments bound with steel strapping. The new shear cuts 3/4 and 1 1/4-inch bands easily and quickly. A single stroke of the upper handle makes a clean square cut and the sheared ends of the band remain flat, according to company claim.



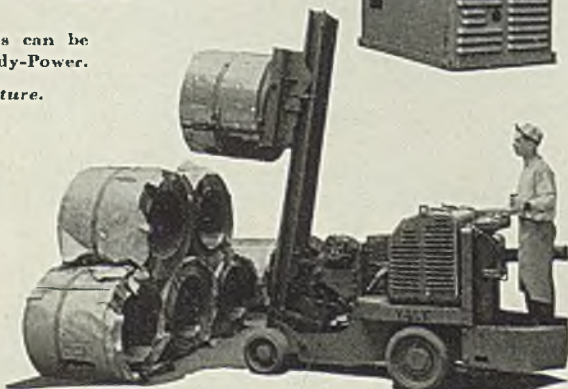
Simple in operation, this shear has been designed by the Acme Steel Co. for severing bands on packages

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THE READY-POWER COMPANY
2930 GRAND RIVER AVENUE DETROIT, MICHIGAN U.S.A.



Special Equipment Handles Materials in Tool Plant

(Continued from Page 50)

the basement storage serves adequately.

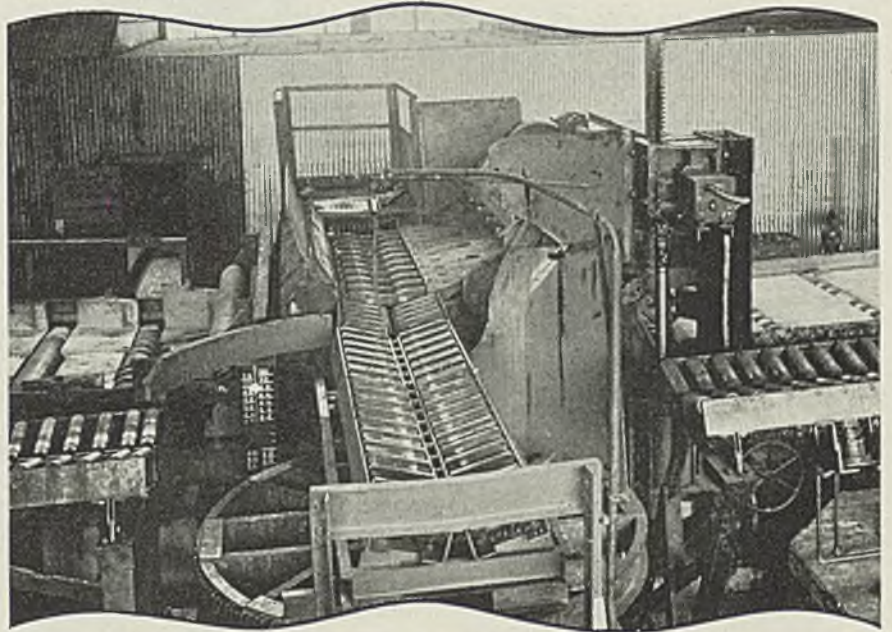
Several points are of interest in the storage department. First of all, steel storage racks are used throughout. Some of these racks are shown in Fig. 2. Every item has a place, and every item is in its place. At the head of each aisle between racks is a push button which lights a row of electric lights for the convenience of a stock chaser who might require additional illumination while filling an order for parts stored in that particular section. This is a small item, but it has proved an advantageous one.

To move parts out from storage on requisition, specially constructed skid platforms are used. Several varieties are employed, each having a special purpose. One of these is a skid with a 6-tier platform body; another is a skid box with a wooden body for transporting spindles; a third is a skid box adapted to the specific job of carrying gears. Skid platforms constructed to handle spindles and gears are shown in Fig. 2.

Parts Protected from Damage

Discussing advantages of designing special skid bodies for special handling work, an executive of the Warner & Swasey Co. said: "As an example, this special gear skid has solved a problem of long standing. We found that under the former method of transporting ordinary skid loads of gears, many of them would sustain nicks from striking against one another, and against other metals, while being distributed to the subassemblies. Sides of the skid boxes are slanted now in such manner and center-spaced by wooden sides that gears do not contact one another during transit. The spindle trucks are simply standard platforms with a special rack body cut from boiler plate, with the ends of the cross-pieces protected by copper pads. Our own organization designed them from experience with standard equipment used formerly."

Eight electric industrial trucks comprise the fleet of power units for interdepartmental transportation. In addition, a few hand-lift trucks are utilized for short distance travel and for lighter loads, and a crawler tractor, gas-powered, is used as a general utility machine for emergency work in moving com-



SECONDS, COUNT NOW IN PRODUCTION



THE speeding up of the production process in the Steel Industry has now reached the point where seconds count for as much as minutes used to. The Continuous Flow Principle of Handling Materials calls for conveyor systems capable of much higher speeds of travel and for automatic and semi-automatic switches, turntables, transfers, tilting and other mechanical handling operations.

Mathews conveyers and auxiliary equipment meet this need most effectively because Mathews engineers have had over 32 years of Continuous Flow experience in many industries, and because Mathews equipment embodies basic (and patented) improvements which anticipate the increasing speed and loads the Steel Industry demands.

The leaders in this industry, responsible for 85% of steel production in the United States and Canada, are applying the Continuous Flow Principle of Handling Materials.

MATHEWS CONVEYER COMPANY

142 TENTH STREET
ELLWOOD CITY, PENNA.

MATHEWS

CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

CONVEYERS

MATERIALS HANDLING



pleted machines around the plant. This crawler tractor has earned its cost in various activities, notably when a recent arrangement of certain department entailed moving of heavy machine tools and other equipment.

Special floor operated equipment is not alone of interest in this plant. Outstanding in heavy lifting equipment are several single-leg semi-gantry cranes, which are arranged in main crane bays to supplement large electric overhead traveling cranes. For instance, in one bay three of these are installed. Their advantage is in ability to operate without interference with the work of the main cranes; there is no waiting for the latter to complete a job, nor is there any hold-up of travel of the heavy crane when the single-leg units beneath are in use. The heavy cranes can pick up a complete machine and carry it down the length of the room without interruption. Fig. 1 is a view in the turret lathe assembly department. Shown are a 10-ton traveling crane and two one-man cranes beneath it.

No Heavy Manual Lifting

Throughout various departments is also a plentiful supply of tramrail equipped with chain or electric hoists. In the radial drill department, chain hoists only are used; likewise in the milling machine department. In each instance, the company finds it economical to utilize

an individual lifting device wherever the machine tool operator has any lifting to do. Generally speaking, a hoist is furnished for all heavy lifting jobs and for most light lifting as well. A tramrail is provided for each battery of planers in the planing department, with a 5-ton crane in each bay to do heavy-duty work.

In the heat-treating department, liberal use is made of air hoists of a reciprocating type, which lift and lower the loaded pots automatically. An air compressor for these units is located to one side of the room, out of way of aisles.

Provide Well for Maintenance

Electric truck maintenance is entirely under supervision of the plant electrical engineer, and a battery charging station capable of charging four batteries at one time serves to keep the eight electric trucks on the job. Seven spare batteries are kept in stock to prevent stoppage of service for battery renewal or re-

Will Handle Sheet Packs

THIS shipment of special lifting devices recently was dispatched from the plant of the manufacturer, Cullen-Friestedt Co., Chicago. Each of these devices is of 10-ton capacity and their destination a steel mill in the Middle West where they will be used in connection with overhead traveling cranes for handling packs of sheet steel

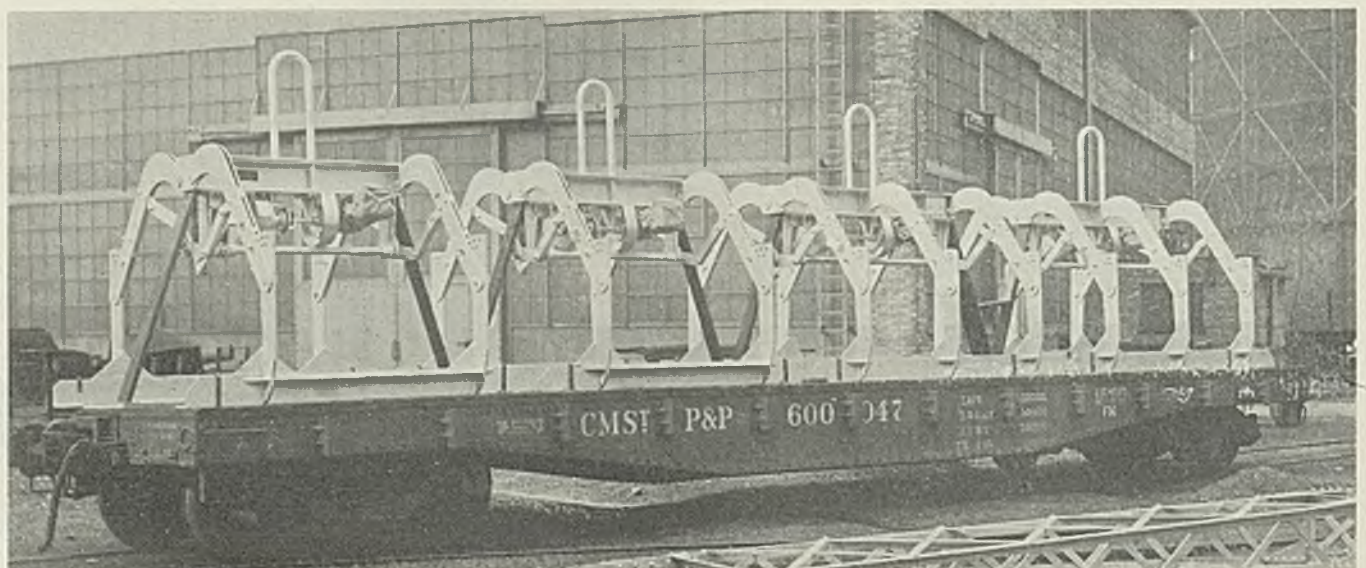
pairs. Repairs to skids and other floor operated equipment are made in a separate department.

As was mentioned previously, the shipping department is located on the second floor. For domestic shipments, completed machines are crated, with liberal allowance made for protection in transit. Foreign shipments, however, are packed carefully in wooden boxes, with waterproofed paper wrapping and interior packing for protection in water and land transportation. Foreign shipments are protected also by steel strapping. Fig. 3 shows a machine crated for domestic shipment and another machine being boxed by the two workmen for foreign shipment.

Trucks Run on Schedule

In conclusion, it is worthy of note that interdepartmental skid shipments are made according to carefully arranged trucking schedules, a large freight elevator being part of the interfloor transportation system. The single-leg cranes, as well as the aforementioned special skids, were worked out first by the company, and then built by materials handling equipment manufacturers. In the boiler room of the plant, also, great reliance is placed on mechanical handling equipment, hoists and monorail carrying the coal up above the bunkers and depositing it in a drag trough which feeds it into the bunkers; a steam jet system is used for handling ashes.

Throughout the plant is a general evidence that materials handling is recognized as a most important part of the production system, and that every effort has been made to co-ordinate the various types of handling equipment. In spite of the wide area over which departments are spread, results have proved that attention to both methods and equipment pays dividends in the modern industrial plant.



Permanent Colors Produced Electrolytically on Metal

(Concluded from Page 57)

plating practice to insure a surface free from grease, dirt and oxide. It was then made the cathode in a bath containing 19.2 ounces per gallon sodium tartrate, 22.4 ounces per gallon ferric chloride and 16 ounces per gallon sodium hydroxide. (These figures were obtained from the patent. An unstated amount of water was added to this solution before using). The current was allowed to flow until the entire surface assumed an appearance corresponding to the pink color to form the monogram later. The case was then removed and the monogram "stopped off" with wax. Flow of current was resumed until the remainder of the surface took on the appearance resulting later (after baking) in a green hue.

The first coating, prior to stopping-off, required 1 minute with a potential of 0.6 to 0.7-volt and a cathode current density of 9.29 to 11.2 amperes per square foot. The second operation, at the same voltage and current density, required 1.5 minutes. An iron anode was used.

The treated cigarette case was then removed from the bath, washed, dried and heated in a muffle with free access of air until the desired colors appeared. In this particular instance, after the baking was completed, the case was removed, cooled and spray coated with a transparent lacquer. In the baking operation temperatures as high as 1200 degrees Fahr. are sometimes used.

The baths described above are not the only ones which will produce these colors. Many alkaline baths containing copper will produce them. For instance, Fehling's solution or solutions containing sodium silicate and sodium hydroxide in addition to copper sulphate will produce interference colors. Other copper solutions, containing sugar and alkali or organic salts and alkali will also work.

As can be seen from the above specifications, the processes are simple and should be capable of economical and practical operation on a commercial scale. Research will undoubtedly open many variations of the processes which should find wide application in many fields of metal decoration.

Buff and Polishing Trade Practice Rules Approved

Trade practice rules for the buff and polishing wheel manufacturing industry have been approved by the federal trade commission under its

trade practice conference procedure.

Application for approval was made by the Buff and Polishing Wheel Manufacturers association Inc., said to represent 66 per cent of the firms in the industry. The association members represented 94 per cent of the industry's total volume of sales in 1935.

Discoloration and Corrosion In Canned Cream Is Studied

Bronzing, purpling and blackening of tin cans containing cream

are shown to be due to tin sulphides produced by the breakdown of proteins when the temperature or the duration of the sterilizing process is too great, according to the results of researches made by C. J. Jackson and C. R. Howatof the Hannah Dairy Research institute and T. P. Hoar of the International Tin Research and Development council. Findings of this research have recently been published at Technical Publication 49 Series A of the Tin Research council. According to the results, effect of steel on cream is adverse and pore-free coatings of tin are needed for cream cans if full protection is to be afforded.

WHAT could be more fitting than a mascot to dramatize the Permanent "Stick-to-it-iveness" (Adhesion) of Blue Knight Flexible Finishes! Steel tubes finished with them can be banged together hard . . . and the finish doesn't Chip, Flake or Peel!

The Blue Knight wants to symbolize the permanent *Flexibility* of Roxalin Finishes. Got any ideas for another mascot?

(See our Exhibit at the Metals & Plastics Bureau, 3rd Floor, International Building, Rockefeller Center, New York City.)



FLEXIBILITY AND ADHESION

Plus! **NO FATTY EDGES on This Texture Finish!**

RINCON - TROL, easily - applied, gives a beautiful, uniform (small crater) texture on great surfaces like air-conditioning units 3' 6" x 5' 6" x 3' 3" . . . or on the tiny areas offered by buttons. There are NO FATTY EDGES . . . the common abomination of most texture coatings. It hides defects in castings or other metal surfaces. This hand-

some fine-grained finish is highly resistant to perspiration.

Ask us to send you (without obligation) a panel or a die-casting finished in RINCON-TROL that demonstrates *easily* achieved, *beautiful* uniformity of texture and freedom from fatty edges. Please address your request to Roxalin Flexible Lacquer Co., Inc., Box 473, Elizabeth, N. J.

ROXALIN *Flexible* FINISHES

CELLULOSE & SYNTHETIC TYPES
ENGINEERED FOR SPECIFIC PERFORMANCE



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

Precision Bearings—Hyatt Bearings division, General Motors Corp., P. O. Box 476, Newark, N. J. Folder depicting the production of Hyatt bearings.

Gas Producer Regulator—Chowning Regulator Corp., Corning, N. Y. Bulletin No. 33, illustrating typical application of the Chowning regulator and controllers.

Porcelain Enamel Stock Signs—Horace R. Whittier Co., Pequabuck, Conn. Booklet listing some three thousand 2½ x 10-inch porcelain enamel stock signs.

Chimney Reconditioning—Weber Chimney Co., 1452 McCormick building, Chicago. Folder illustrating typical jobs on which successful reconditioning was accomplished.

Tractors—International Harvester Co., 606 South Michigan avenue, Chicago. Booklet No. A-75-AA, illustrating the precision methods in the manufacture of its TracTractors.

Nickel Alloy Steel—International Nickel Co. Inc., 67 Wall street, New York. Bulletin No. U-2, illustrating the application of nickel alloy steels in petroleum production equipment.

Diesel Power Units—Fairbanks, Morse & Co., 900 South Wabash avenue, Chicago. Bulletin No. 3600-A1, describing construction and applications of its model 36 diesel power units.

Compression Fittings—S. R. Dresser Mfg. Co., Bradford, Pa. Folder No. 361 R 10, illustrating the complete line of Dresser style 65 compression fittings, including table of sizes available.

Bearings—R. W. Rhoades Metaline Co. Inc., P. O. Box No. 1, Long Island City, N. Y. Folder describing oilless bronze bearings, including a list of some installations where the bearings are being used.

Springs—Barnes-Gibson-Raymond division of Associated Spring Corp., 6400 Millar avenue, Detroit. Catalog describing spring making. A practical handbook of modern spring engineering for users and designers of springs.

Luminous Tube Transformers—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Bulletin No. 72-240, describing transformers for indoor and outdoor installations; includes illustrations of various types and also construction.

Micromax Recorder—Leeds &

Northrup Co., 4934 Stenton avenue, Philadelphia. A die-cut booklet, N. D. (1), half the size of Micromax recorder; opening the leaves gives the effect of handling an actual model, showing all interior parts in actual relation.

Electrodes—Page Steel & Wire division, American Chain & Cable Co. Inc., Monessen, Pa. Booklet No. DH-984, covering Hi-tensile "F" electrodes; describing this shielded arc electrode in detail and the shielded arc method of welding, with illustrations showing procedure for various types of welds.

Rotating-Cam Switches—General Electric Co., Schenectady, N. Y. Bulletin No. 2230, describing a new line of rotating-cam switches, designed especially for built-in control applications and adaptable to a variety of electrical functions and machine requirements. Folder No. 2472, describing its automatic switch gear.

Fluid Meters—Bailey Meter Co., 1050 Ivanhoe road, Cleveland. Catalog No. 301, describing fluid meters for steam, liquids and gases and illustrating how indicating, recording and integrating features may be combined with a flow mechanism suitable for the measurement of steam, liquids or gases under high, low or medium pressures.

Announces Summer Course On Strength of Materials

Massachusetts Institute of Technology, Cambridge, Mass., offers a special summer school and conferences on "Strength of Materials" for four weeks beginning June 21. Four seminars will be held during the period to afford opportunity for the presentation of recent developments in allied fields of engineering mechanics and the course will be concluded with two all-day conferences on fatigue and creep.

The subject of creep will be presented by Dr. A. Nadai, consulting engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., with C. R. Soderberg of the same company delivering the last two lectures in which design and applications using plasticity theory will be discussed.

Lectures on fatigue will be given by Dr. H. J. Gough, superintendent,

engineering department, National Physical Laboratory, England. The lectures on strength of metals will be given by members of the institute staff. Laboratory exercises in the testing of metals will make use of the more modern measuring instruments and apparatus.

Particulars of the course and registration details can be obtained from the director of the summer school, Prof. John M. Lessells, department of mechanical engineering, Massachusetts Institute of Technology, Cambridge, Mass.

Stainless Steel Improved By Columbium Addition

Recently it was found desirable to make up a composite structure of 18-8 nickel chromium stainless steel composed of wrought and cast material. Columbium was used to prevent intergranular corrosion. In the castings the nickel content was increased to 9.50 per cent, with silicon 0.60, carbon 0.10 and columbium 0.56 per cent. Satisfactory Izod impact values were obtained, namely, 62 foot pounds in the as cast condition and 64 foot pounds when air cooled from 1100 degrees Cent.

Governor for Automobiles Is Controlled on Dash

Adjustable to any desired speed, a new automotive governor recently placed on the market by the Hoop Products Co., 162 North Franklin street, Chicago, is controlled by the driver from the dashboard. Setting a dial determines the maximum speed desired and a lock assures tamper-proof operation. The governors and controls are of stainless steel construction throughout, with cantilever springs and ball bearings. Control is of the auxiliary diaphragm type. Sizes to fit all types of passenger and commercial vehicles are available.

Offers New Hook Bolt

Railroad ties are tightly fastened to the I-beams of trestles and viaducts by a new hook bolt recently placed on the market by the Lewis Bolt & Nut Co., Minneapolis. Under the head and extending down the body are four fins designed to bit into the wood and prevent any turning. They are designed so the bolt may be driven into a hole the same size as its diameter without splitting the wood. Both head and washer-nut are designed to seal the hole in order to prevent the wood from rotting. Bolts are threaded with Dardelet self locking threads to prevent them from working loose.

Steel Production Nears Practical Capacity

Delivery Premiums Are Offered; Record First Quarter Seen

WITH the steel industry using every effort to produce its maximum tonnage, export inquiry superposed on a domestic demand not equaled in many years and orders consistently exceeding shipments the situation resolves itself into a struggle by consumers to obtain deliveries and by producers to find means to make a heavier tonnage.

In some grades of steel sheets deliveries now are extended 22 weeks. Some blast furnace interests are sold out fully to the middle of the year.

In the present situation the question rises whether smaller mills, better able than their larger competitors to give delivery, can resort to the former plan of charging premiums for delivery. Effect of provisions of the Robinson-Patman act on this procedure have not been clarified. Premiums on export sales have been obtained for some time, notably on tin plate.

Present steel production indicates the probability of the first three months of 1937 establishing an all-time record for an initial quarter. March apparently is headed for production of more than 5,000,000 tons and the quarter for a total of 14,264,000 tons or more. This would exceed output of the first quarter of 1929 and fall only 875,000 tons short of second quarter, 1929, the highest quarterly record of all time, 15,139,000 tons. If close to 90 per cent of present capacity is engaged through second quarter, a new record for all time will be established. By comparison, total ingot production of all 1932 was only 13,322,000 tons.

With production rates approaching practical capacity steelmakers continue to add somewhat to their operating rate with a resulting advance of the national rate to 89 per cent of capacity, two points above the previous week. Pittsburgh added two points, reaching 91 per cent. Detroit regained its 100 per cent rate, Cincinnati rose four points to 72 and Cleveland four points to 82, Wheeling increased one point to 97, Birmingham three points to 80 and Eastern Pennsylvania half a point to 58 per cent. There was no change in the rates of Chicago at 82½, Youngstown at 85, New England at 97 and St. Louis at 82. Buffalo was the only center losing, a decline of three points bringing its rate to 80 per cent.

Scrap continues an important factor, with steadily rising prices. Tonnages bought for export have congested railroads at Boston, Port Richmond, N. Y., and

MARKET IN TABLOID

DEMAND Holds strong, with mills heavily sold.

PRICES Specialties follow general advance; delivery premiums offered.

PRODUCTION . . Operations gain two points to 89 per cent.

SHIPMENTS High rate is maintained as consumers press.

other ports in the absence of sufficient ships, and embargoes have been laid by railroads against accepting further shipments to these destinations. Movement to loading piers is controlled by special permits issued when a ship is ready. Railroads in New England have given notice of substantial increases in charges for storage of scrap in cars, effective April 5, in an effort to reduce the number of cars tied up awaiting unloading. Europe is deeply involved in the general scrap situation and members of the steel cartel have agreed on an international scrap control plan in an effort to solve some of the problems.

Brokers who took orders some weeks ago for 100,000 tons of pig iron for Japan are seeking to place it with producers. About 25,000 tons was offered Valley furnaces, which is said to have been refused. Other portions were offered in the Birmingham, Ala., district and to the Utah furnace. Great Britain is still pressing its inquiry for 50,000 tons and is offering \$1 higher than the market, making the offered price \$25. A London cable Friday says the Indian Iron & Steel Co. has arranged with the British Iron and Steel federation the sale of 400,000 tons of pig iron for Great Britain.

Complete closing of Chrysler and Hudson plants brought automobile production last week to 99,013 units, a loss of 2671 from the preceding week. General Motors turned out 52,600, a gain of 2900, and Ford made 34,800, an increase of 1000. This is the lowest production since the week of Feb. 20, when General Motors was just emerging from its labor tieup.

Continued advance in prices of steelmaking scrap under pressure of heavy consumption has carried the composite price 25 cents higher, to \$21.17. Scrap also exerted a lifting effect on the iron and steel composite, raising it 11 cents, to \$40.10. Unchanged prices hold the finished steel composite at \$60.70.

COMPOSITE MARKET AVERAGES

	Mar. 20	Mar. 13	Mar. 6	One Month Ago Feb., 1937	Three Months Ago Dec., 1936	One Year Ago Mar., 1936	Five Years Ago Mar., 1932
Iron and Steel	\$40.10	\$39.99	\$39.47	\$36.74	\$35.15	\$33.20	\$29.28
Finished Steel	60.70	60.70	60.70	55.92	53.90	52.32	47.09
Steelworks Scrap	21.17	20.91	20.12	19.19	16.92	14.48	7.89

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	March 20,	Feb.	Dec.	Mar.	Pig Iron	March 20,	Feb.	Dec.	March
	1937	1937	1936	1936		1937	1937	1936	1936
Steel bars, Pittsburgh	2.45c	2.20c	2.05c	1.85c	Bessemer, del. Pittsburgh	\$25.26	22.30	21.8132	20.8132
Steel bars, Chicago	2.50	2.25	2.10	1.90	Basic, Valley	23.50	20.50	20.00	19.00
Steel bars, Philadelphia	2.74	2.49	2.36	2.16	Basic, eastern del. East Pa.	25.26	22.46	21.8132	20.8132
Iron bars, Terre Haute, Ind.	2.35	2.10	1.95	1.75	No. 2 fdy., del. Pittsburgh	25.21	22.21	21.3132	20.3132
Shapes, Pittsburgh	2.25	2.05	1.90	1.80	No. 2 fdy., Chicago	24.00	21.00	20.50	19.50
Shapes, Philadelphia	2.45 1/2	2.25 1/2	2.11 1/2	2.01 1/2	Southern No. 2, Birmingham	20.38	17.63	16.88	15.50
Shapes, Chicago	2.30	2.10	1.95	1.85	Southern No. 2, del. Cincinnati	23.69	20.94	20.44	20.2007
Tank plates, Pittsburgh	2.25	2.05	1.90	1.80	No. 2X eastern, del. Phila.	26.135	23.385	22.6882	20.6882
Tank plates, Philadelphia	2.43 1/2	2.23 1/2	2.09	1.99	Malleable, Valley	24.00	21.00	20.50	19.50
Tank plates, Chicago	2.30	2.10	1.95	1.85	Malleable, Chicago	24.00	21.00	20.50	19.50
Sheets, No. 10, hot rolled, Pitts.	2.40	2.15	2.10	1.85	Lake Sup., charcoal, del. Chicago	30.04	26.54	26.2528	25.2528
Sheets, No. 24, hot ann., Pitts.	3.15	2.80	2.75	2.40	Gray forge, del. Pittsburgh	24.17	21.17	20.6741	19.6741
Sheets, No. 24, galv., Pitts.	3.80	3.40	3.35	3.10	Ferromanganese, del. Pittsburgh	99.79	84.79	82.65	80.13
Sheets, No. 10, hot rolled, Gary	2.50	2.25	2.25	1.95					
Sheets, No. 24, hot anneal., Gary	3.25	2.90	2.90	2.50	Scrap				
Sheets, No. 24, galvan., Gary	3.90	3.50	3.50	3.20	Heavy melting steel, Pittsburgh	\$23.50	\$19.65	\$18.55	\$15.75
Plain wire, Pittsburgh	2.90	2.60	2.60	2.30	Heavy melt. steel, No. 2, East Pa.	19.25	17.75	14.12 1/2	12.55
Tin plate, per base box, Pitts.	\$4.85	\$4.85	\$5.25	\$5.25	Heavy melting steel, Chicago	20.75	19.50	17.00	14.75
Wire nails, Pittsburgh	2.50	2.25	2.20	2.15	Rail for rolling, Chicago	22.75	20.75	17.50	15.75
					Railroad steel specialties, Chicago	23.25	21.00	19.00	16.25
Semifinished Material					Coke				
Sheet bars, open-hearth, Youngs.	\$37.00	\$34.00	\$32.50	\$28.50	Connellsville furnace, ovens	\$4.15	\$4.00	\$4.00	\$3.50
Sheet bars, open-hearth, Pitts.	37.00	34.00	32.50	28.50	Connellsville, foundry, ovens	4.25	4.25	4.40	4.10
Billets, open-hearth, Pittsburgh	37.00	34.00	32.50	28.40	Chicago, by-product foundry, del.	10.25	10.25	9.75	9.75
Wire rods, No. 5 to 3/8-Inch, Pitts.	47.00	43.00	40.75	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. Chrome-Nickel	Pittsburgh 2.25c
Hot Rolled No. 10, 24-48 In.	Gary 3.40c	No. 302 No. 304	Philadelphia, del. 2.45 1/2 c
Pittsburgh 2.40c	St. Louis, delivered 3.62c	Bars 24.00 25.00	New York, del. 2.50 1/2 c
Gary 2.50c	Cold Rolled No. 10	Plates 27.00 29.00	Boston, delivered 2.63 1/2 c
Chicago, delivered 2.53c	Pittsburgh 3.10c	Sheets 34.00 36.00	Bethlehem 2.35c
Detroit, del. 2.60c	Gary 3.20c	Hot strip 21.50 23.50	Chicago 2.30c
New York, del. 2.73c	Detroit, delivered 3.30c	Cold strip 28.00 30.00	Cleveland, del. 2.45c
Philadelphia, del. 2.69c	Philadelphia, del. 3.39c		Buffalo 2.35c
Birmingham 2.55c	New York, del. 3.43c		Gulf Ports 2.65c
St. Louis, del. 2.72c	Pacific ports, f.o.b. cars, dock 3.70c		Birmingham 2.40c
Pacific ports, f.o.b. cars, dock 2.95c	St. Louis 3.42c		Pacific ports, f.o.b. cars, dock 2.80c
Hot Rolled Annealed No. 24	Cold Rolled No. 20	Straight Chromes	St. Louis, del. 2.52c
Pittsburgh 3.15c	Pittsburgh 3.55c	No. No. No. No.	
Gary 3.25c	Gary 3.65c	410 430 442 446	Bars
Chicago, delivered 3.28c	Detroit, delivered 3.75c	Bars 18.50 19.00 22.50 27.50	Soft Steel
Detroit, delivered 3.35c	Philadelphia, Pa. 3.84c	Plates 21.50 22.00 25.50 30.50	(Base, 3 to 25 tons)
New York, del. 3.48c	New York, del. 3.88c	Sheets 26.50 29.00 32.50 36.50	Pittsburgh 2.45c
Philadelphia, del. 3.44c	St. Louis 3.87c	Hot strip 17.00 17.50 23.00 28.00	Chicago or Gary 2.50c
Birmingham 3.30c	Enameling Sheets	Cold stp. 22.00 22.50 28.50 36.50	Duluth 2.60c
St. Louis, del. 3.47c	Pittsburgh, No. 10 2.90c		Birmingham 2.60c
Pacific ports, f.o.b. cars, dock 3.80c	Pittsburgh, No. 20 3.50c		Cleveland 2.50c
Galvanized No. 24	Gary, No. 10 3.00c	Steel Plate	Buffalo 2.55c
Pittsburgh 3.80c	Gary, No. 20 3.60c	Pittsburgh 2.25c	Detroit, delivered 2.60c
Gary 3.90c	St. Louis, No. 10 3.22c	New York, del. 2.53c	Pacific ports, f.o.b. cars, dock 3.00c
Chicago, delivered 3.93c	St. Louis, No. 20 3.82c	Philadelphia, del. 2.43 1/2 c	Philadelphia, del. 2.74c
Philadelphia, del. 4.09c	Tin and Terne Plate	Boston, delivered 2.65c	Boston, delivered 2.85c
New York, delivered 4.13c	Gary base, 10 cents higher.	Buffalo, delivered 2.50c	New York, del. 2.78c
Birmingham 3.95c	Tin plate, coke base	Chicago or Gary 2.30c	Pitts., forg. qual. 2.80c
St. Louis, del. 4.12c	(box) Pittsburgh \$4.85	Cleveland, del. 2.44 1/2 c	
Pacific ports, f.o.b. cars, dock 4.40c	Do., waste-waste 2.75c	Birmingham 2.40c	Rail Steel
	Do., strips 2.50c	Coatesville, base 2.35c	To Manufacturing Trade
	Long ternes, No. 24 unassorted, Pitts. 4.10c	Sparrows Pt., base 2.35c	Pittsburgh 2.30c
	Do., Gary 4.20c	Pacific ports, f.o.b. cars, dock 2.80c	Chicago or Gary 2.35c
		St. Louis, delivered 2.52c	Moline, Ill. 2.35c
			Cleveland 2.35c
			Buffalo 2.20c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.39c
Pittsburgh, refined ..	2.75-7.50c

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, Cleve-	
land, 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	\$2.75
(Per pound)	
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. 1.)	\$74.00
Single loop bale ties,	
(base column, c. 1.)	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
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Alloy			
S.A.E.	Diff.	S.A.E.	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	2.70c

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	2.40c
Chicago	2.50c
Cold strip, 0.25 carbon and under, Pittsburgh,	
Cleveland	3.20c
Detroit, del.	3.40c
Worcester, Mass.	3.40c
Carbon	Cleve. Worces-
0.26—0.50	Pitts. ter, Mass. 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 $\frac{7}{8}$ -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., Chl., Cleve.	70 off
Wrought washers, Pitts., Chl., 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 less 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.	
$\frac{1}{2}$ and $\frac{3}{4}$	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			
$\frac{1}{2}$	27	10 $\frac{1}{2}$	
$\frac{3}{4}$	32	16	
1—1 $\frac{1}{4}$	35	21	
2	38 $\frac{1}{2}$	23	
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	32 $\frac{1}{2}$	18	
2 $\frac{1}{2}$ —3 $\frac{1}{2}$	33 $\frac{1}{2}$	20 $\frac{1}{2}$	
4—8	35 $\frac{1}{2}$	24	
Line Pipe Steel			
$\frac{1}{2}$, butt weld	51		
$\frac{1}{2}$ and $\frac{3}{4}$, 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		
Iron			
$\frac{1}{2}$ —1 $\frac{1}{2}$ inch, black and galv. take 4 pts. over; 2 $\frac{1}{2}$ —6-inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.			
Boiler Tubes			
C. L. Discounts, f.o.b. Pitts.			
Lap Weld Charcoal Steel			
2—2 $\frac{1}{2}$	33	1 $\frac{1}{2}$	8
2 $\frac{1}{2}$ —2 $\frac{1}{2}$	40	2—2 $\frac{1}{2}$	13
3	47	2 $\frac{1}{2}$ —2 $\frac{1}{2}$	16
3 $\frac{1}{2}$ —3 $\frac{1}{2}$	50	3	17
4	52	3 $\frac{1}{2}$ —3 $\frac{1}{2}$	18
4 $\frac{1}{2}$ —5	42	4	20
		4 $\frac{1}{2}$	21

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

2	32 $\frac{1}{2}$	18
2 $\frac{1}{2}$ —3 $\frac{1}{2}$	33 $\frac{1}{2}$	20 $\frac{1}{2}$
4—8	35 $\frac{1}{2}$	24

$\frac{1}{2}$, butt weld	51
$\frac{1}{2}$ and $\frac{3}{4}$, 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

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7 $\frac{1}{2}$ % discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7$\frac{1}{2}$%. Under 2000 pounds 15 points under base, one 5% and one 7$\frac{1}{2}$%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 pts. under base.	
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Seamless Boiler Tubes
Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from $\frac{1}{4}$ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and

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

Seamless Tubing

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

Cast Iron Water Pipe

Class B Pipe—Per Net Ton	
6-in. & over, Birm.	\$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., Chl., 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

Slabs	
Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods	
Pitts., Cleve., No. 5 to $\frac{3}{8}$ -inch incl.	47.00
Do., over $\frac{3}{8}$ to $\frac{1}{2}$ -inch incl.	52.00
Chicago up \$1; Worcester up \$2.	

Skelp	
Pitts., Chl., Young, Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton
Beehive Ovens

Connellsville, fur.	\$4.10-4.25
Connellsville, fdry.	4.50-4.75
Connell, prem. fdry.	5.50
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
Chl., ov., outside del.	9.50
Chicago, del.	10.25
New England, del.	12.00
St. Louis, del.	10.50-11.00
Birmingham, ovens	6.50
Indianapolis, del.	9.65
Cincinnati, del.	9.75
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	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	25.00
Erie, 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	24.50
Jackson, O.	24.00	24.00	23.50	24.50
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	21.00	21.00	21.00	21.00
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrows Point, Md.	25.00	25.00	24.50	25.50
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	25.58	24.46	25.96
Boston from Birmingham	26.37	26.37	25.87	26.37
Boston from Everett, Mass.	26.25	26.25	25.75	27.25
Boston from Buffalo	26.25	26.25	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.27	27.27	26.77	27.27
Brooklyn, N. Y., from Bmghm.	27.05	27.05	26.55	27.05
Canton, O., from Cleveland	25.26	25.26	25.76	26.26
Chicago from Birmingham	24.22	24.22	24.10	24.22
Cincinnati from Hamilton, O.	24.07	25.01	24.51	25.01
Cincinnati from Birmingham	23.69	23.69	22.69	23.69
Cleveland from Birmingham	24.12	24.12	23.62	24.12
Mansfield, O., from Toledo, O.	25.76	25.76	25.26	25.76
Milwaukee from Chicago	25.00	25.00	24.50	25.00
Muskegon, Mich., from Chicago	25.00	25.00	24.50	25.00
Toledo or Detroit	26.90	26.90	26.40	27.40
Newark, N. J., from Birmingham	26.01	26.01	25.51	26.01
Newark, N. J., from Bethlehem	26.39	26.39	25.89	26.39
Philadelphia from Birmingham	25.38	25.38	24.88	25.38
Philadelphia from Swedeland, Pa.	25.76	26.26	25.26	25.76
Pittsburgh district from Neville Island	24.50	24.50	24.00	24.50
Saginaw, Mich., from Detroit	26.25	26.25	25.75	26.25
St. Louis, northern	24.50	24.50	24.00	24.50

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

Copper			Strait Tin		Lead		Zinc	Alum.	Antimony	Nickel
Electro, del. Conn.	Lake, Midwest	Casting, refinery	New York Spot	Futures	N. Y.	East St. L.				
Mar. 13	16.25	16.37½	66.75	66.00	7.75	7.60	7.50	*20.00	17.00	35.00
Mar. 15	16.25	16.37½	66.50	65.25	7.75	7.60	7.50	*20.00	17.00	35.00
Mar. 16	16.25	16.37½	65.25	64.00	7.50	7.35	7.50	*20.00	17.00	35.00
Mar. 17	16.25	16.37½	65.25	63.75	7.25	7.10	7.50	*20.00	17.00	35.00
Mar. 18	16.25	16.37½	66.00	64.37½	7.25	7.10	7.50	*20.00	17.00	35.00
Mar. 19	16.25	16.37½	64.12½	62.62½	7.00	6.85	7.50	*20.00	17.00	35.00

*Nominal range 20.00 to 21.00.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 16.25c, Conn. copper

Sheets	
Yellow brass (high)	21.25
Copper, hot rolled	23.87½
*Lead, cut to jobbers	10.75
Zinc, 100-lb. base	12.50-13.00

Tubes	
High yellow brass	24.00
Seamless copper	24.62½
Rods	
High yellow brass	17.62½
Copper, hot rolled	20.62½
Anodes	
Copper, untrimmed	21.12½
Wire	
Yellow brass (high)	21.50

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	11.75-12.00
*Cleveland	12.00-12.50
*Chicago	11.75-12.25
*St. Louis	11.25-11.75

Heavy Copper and Wire	
*New York, No. 1	14.00-14.25
*Chicago, No. 1	13.50-13.75
Cleveland, No. 1	13.50-14.00
*St. Louis, No. 1	13.50-14.00

Composition Brass Borings	
New York	10.87½-11.00

Light Copper	
*New York	12.00-12.25
*Chicago	11.75-12.25
*Cleveland	11.50-11.75
*St. Louis	11.75-12.25

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis from Birmingham	24.12	24.12	23.82	24.12
St. Paul from Duluth	25.94	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.	
First Quality			
Pa., Ill., Md., Mo., Ky.	51.30	Chester, Pa., and Baltimore bases (bags) ..	43.00
Alabama, Georgia	51.30	Domestic dead - burned gr. net ton f.o.b. Chewelah, Wash. (bulk) ..	25.00
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
Second quality	35.15	Chem. bonded chrome	49.00
Malleable Bung Brick			
All bases	\$63.00	Magnesite brick	69.00
		Chem. bonded magnesite	59.00
Silica Brick			
Pennsylvania	\$51.30	Fluorspar, 85-5	
Joliet, E. Chicago	59.85	Washed gravel, duty paid, tide, net ton.	
Birmingham, Ala.	51.30	Do., Baltimore, base.	
Ladle Brick			
(Pa., O., W. Va., Mo.)		Do., del. Pittsburgh.	
Dry press	\$25.00	Spiegeleisen, 19-20% dom.	
Wire cut	23.00	Palmerston, Pa., spot.	
Magnesite			
Imported dead - burned grains, net ton f.o.b.		Do., New Orleans.	

Ferroalloys

Dollars, except Ferrochrome	
Ferromanganese, 78-82%, tidewater, duty paid.	\$95.00
Do., Baltimore, base.	95.00
Do., del. Pittsburgh.	99.75
Ferrosilicon, 50% freight allowed, c. l.	
Do., less carload	69.50
Do., 75 per cent.	77.00
Spot, \$5 a ton higher.	126-130.00
Silicomane, 2½ 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	3.59c
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	3.59c
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)	2.85c
San Francisco	2.97½c
Seattle	4.02½c
St. Louis	3.49c
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	3.69c
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, ¼-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	3.69c
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	3.84c
St. Paul	3.85c
Tulsa	8.80c

NO. 24 BLACK

Baltimore*†	4.50c
Boston (g)	4.75c
Buffalo	3.35c
Chattanooga*	4.06c
Chicago	4.45c-5.10c
Cincinnati	4.05c
Cleveland	4.68c
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	4.49c
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	5.05c
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	3.68½c
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	3.84c
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	3.68½c
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	3.84c
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	4.19c
St. Paul	4.55c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.845c
Buffalo	3.39c
Chicago	3.87c
Cincinnati	3.00c
Cleveland (b)	3.60c
Detroit	3.43c
New York† (d)	3.92c
St. Louis	3.61c

TOOL STEELS
(Applying on or east of Mississippi river; west of Mississippi 1c up.)

Base	
High speed	62c
High carbon, high chrome	41c
Oil hardening	24c
Special tool	22c
Extra tool	18½c
Regular tool	15c
Uniform extras apply.	

BOLTS AND NUTS
(100 pounds or over)

Discount	
Chicago (a)	65
Cleveland	60-5-5
Detroit	70-10
Milwaukee	65

New Orleans	65
Pittsburgh	65-5

(a) Under 100 lbs., 60 off.
(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 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 999 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, March 18

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

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
	£	s d	Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON				
Foundry, 2.50-3.00 Silicon	\$19.15	3 18 6*	\$26.59	3 5 0
Basic bessemer	19.15	3 18 6*	14.31	1 15 0
Hematite, Phos. .03-.05	21.35	4 7 6		
SEMIFINISHED STEEL				
Billets	\$30.50	6 5 0	\$24.54	3 0 0
Wire rods, No. 5 gage	46.97	9 12 6	49.09	6 0 0
FINISHED STEEL				
Standard rails	\$41.48	8 10 0	\$49.09	6 0 0
Merchant bars	2.07c	9 10 0	1.85c	5 0 0
Structural shapes	1.99c	9 2 6	1.80c	4 17 6
Plates, ½ in. or 5 mm.	2.22c	10 3 9	2.02c to 2.07c	5 9 6 to 5 12 0
Sheets, black, 24 gage or 0.5 mm.	2.83c	13 0 0	2.87c	7 15 0
Sheets, gal., 24 gage, corr.	3.43c	15 15 0	3.61c	9 15 0
Bands and strips	2.18c	10 0 0	2.22c	6 0 0
Plain wire, base	2.40c	11 0 0	2.77c	7 10 0
Galvanized wire, base	2.73c	12 10 0	2.96c	8 0 0
Wire nails, base	2.62c	12 0 0	3.14c	8 10 0
Tin plate, box 108 lbs.	\$ 5.26	1 1 6		

British ferromanganese \$80 delivered Atlantic seaboard, duty-paid.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French France	Belgian France	Reich Marks
Fdy. pig iron, Si. 2.5	\$19.76 4 1 0(a)	\$18.32 400	\$23.59 700	\$25.34 63
Basic bessemer pig iron	20.13 4 2 6(a)	17.60 275	14.66 435	27.96 (b) 69.50
Furnace coke	5.11 1 3 0	6.29 137	5.73 170	7.64 19
Billets	30.50 6 5 0	27.02 590	21.57 640	38.82 96.50
Standard rails	1.80c 8 5 0	1.64c 780	1.80c 1,200	2.40c 132
Merchant bars	2.07c 9 10 0	1.68c 800	1.16c 775	2.00c 110
Structural shapes	1.99c 9 3 0	1.64c 780	1.16c 775	1.95c 107
Plates, ½ in. or 5 mm.	2.14c 9 16 9	2.12c 1,010	1.43c 950	2.31c 127
Sheets, black	2.62c 12 0 0½	2.84c 1,350†	1.83c 1,220†	2.62c 144½
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.05c 14 0 0	4.41c 2,100	2.85c 1,900	6.73c 370
Plain wire	2.56c 11 15 0	2.77c 1,320	2.03c 1,350	3.15c 173
Bands and strips	2.23c 10 5 0	1.92c 915	1.43c 950	2.31c 127

*Basic. †British ship-plates. Continental bridge plates. \$24 ga. †1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed.
**Gold pound sterling carries a premium of 67.76 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	19.50-20.50
Buffalo, No. 2	18.00-18.50
Chicago, No. 1	20.50-21.00
Cleveland, No. 1	21.00-21.50
Cleveland, No. 2	19.50-20.00
Detroit, No. 1	18.00-18.50
Eastern Pa., No. 1	20.00-20.50
Eastern Pa., No. 2	19.00-19.50
Federal, Ill.	16.00-16.50
Granite City, R. R.	18.00-18.50
Granite City, No. 2	16.00-16.50
New York, No. 1	16.50-17.00
N. Y. dock, No. 1 exp.	16.50-17.00
Pitts., No. 1 (R. R.)	24.00-24.50
Pitts., No. 1 (dir.)	23.25-23.75
Pittsburgh, No. 2	20.00-20.50
St. Louis, R. R.	18.00-18.50
St. Louis, No. 2	16.00-16.50
Toronto, dirs. No. 1	9.75-10.50
Toronto, No. 2	8.75- 9.50
Valleys, No. 1	21.50-22.00

COMPRESSED SHEETS

Buffalo, dealers	18.00-18.50
Chicago, factory	19.50-20.00
Chicago, dealer	18.50-19.00
Cleveland	20.50-21.00
Detroit	19.00-19.50
E. Pa., new mat.	19.00-19.50
E. Pa., old mat.	17.50
Pittsburgh	23.25-23.75
St. Louis	16.00-16.50
Valleys	21.50-22.00

BUNDLED SHEETS

Buffalo	15.00-15.50
Cincinnati, del.	15.00-15.50
Cleveland	16.50-17.00
Pittsburgh	21.00-21.50
St. Louis	13.50-14.00
Toronto, dealers	6.00

SHEET CLIPPINGS, LOOSE

Chicago	14.00-14.50
Cincinnati	14.00-14.50
Detroit	14.00-14.50
St. Louis	13.00-13.50

STEEL RAILS, SHORT

Birmingham	17.00-18.00
Buffalo	23.00-24.00
Chicago (3 ft.)	23.00-23.50
Chicago (2 ft.)	25.00-25.50
Cincinnati, del.	23.00-23.50
Detroit	24.00-24.50
Pitts., open-hearth,	
3 ft. and less	26.50-27.00
St. Louis, 2 ft. & less	20.00-20.50

STEEL RAILS, SCRAP

Boston district	†16.00-16.50
Buffalo	20.50-21.50
Chicago	21.00-21.50
Pittsburgh	24.00-24.50
St. Louis	19.00-19.50
Toronto, dealers	9.00

STOVE PLATE

Birmingham	10.50-11.00
Boston district	†11.00-11.50
Buffalo	14.50-15.00
Chicago	12.00-12.50
Cincinnati, dealers	12.50-13.00
Detroit, net	12.00-12.25
Eastern Pa.	16.50
New York, Idry.	11.75-12.25
St. Louis	12.00-12.50
Toronto, deal'rs, net	7.50- 8.00

SPRINGS

Buffalo	22.50-23.50
Chicago, leaf	23.00-23.50
Chicago, coil	25.00-25.50
Eastern Pa.	25.00
Pittsburgh	27.00-27.50
St. Louis	21.50-22.00

ANGLE BARS—STEEL

Buffalo	14.50-15.00
Chicago	23.00-23.50
St. Louis	19.50-20.00

RAILROAD SPECIALTIES

Chicago	23.00-23.50
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LOW PHOSPHORUS

Buffalo, billet and bloom crops	22.00-22.50
Cleveland, billet, bloom crops	25.00-26.00
Eastern Pa., crops	26.00-26.50
Pittsburgh, billet, bloom crops	27.00-27.50
Pittsburgh, sheet bar crops	26.50-27.00

FROGS, SWITCHES

Chicago	20.50-21.00
St. Louis, cut	19.00-19.50

SHOVELING STEEL

Chicago	20.50-21.00
Federal, Ill.	16.00-16.50
Granite City, Ill.	16.00-16.50
Toronto, dealers	7.50

RAILROAD WROUGHT

Birmingham	12.00-14.00
Boston district	†10.00-10.25
Buffalo, No. 1	18.00-18.50
Buffalo, No. 2	19.50-20.50
Chicago, No. 1, net	18.50-19.00
Chicago, No. 2	20.50-21.00
Cincinnati, No. 2	18.50-19.00
Eastern Pa.	20.50-21.00
St. Louis, No. 1	15.50-16.00
St. Louis, No. 2	18.00-18.50
Toronto, No. 1 dir.	8.00

SPECIFICATION PIPE

Eastern Pa.	17.50-18.00
New York	13.50-14.00

RESHELING

Buffalo, No. 1	18.00-18.50
Chicago, No. 1	18.50-19.00
Cincin., No. 1, deal.	12.25-12.75
Cincinnati, No. 2	10.50-11.00
Cleveland, No. 2	14.00-14.50
Detroit, No. 1 new	17.50-18.00
Valleys, new, No. 1	20.50-21.00
Toronto, dealers	7.00

MACHINE TURNINGS

Birmingham	7.00- 8.00
Buffalo	12.00-12.50
Chicago	11.50-12.00
Cincinnati, dealers	12.50-13.00
Cleveland	13.50-14.00
Detroit	13.25-13.75
Eastern Pa.	13.50-14.00
New York	†9.00- 9.50
Pittsburgh	16.00-16.50
St. Louis	10.00-10.50
Toronto, dealers	6.25- 7.00
Valleys	15.00-15.50

BORINGS AND TURNINGS

<i>For Blast Furnace Use</i>	
Boston district	†8.75- 9.25

Buffalo	12.25-12.75
Cincinnati, dealers	11.75-12.25
Cleveland	14.00-14.50
Detroit	13.50-14.00
Eastern Pa.	13.00-13.50
New York	†8.50- 9.00
Pittsburgh	14.50-15.00
Toronto, dealers	6.25

CAST IRON BORINGS

Birmingham	7.00- 7.50
Boston dist. chem.	†9.50- 9.75
Boston dist. for mills	†9.00- 9.25
Buffalo	12.50-13.00
Chicago, dealers	13.00-13.50
Cincinnati, dealers	11.75-12.25
Cleveland	14.00-14.50
Detroit	13.50-14.00
E. Pa., chemical	14.00
New York	†8.50- 9.00
St. Louis	10.00-10.50
Toronto, dealers	6.75

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.	16.50
New York	†11.50-12.00
St. Louis	12.50-13.00

FORGE FLASHINGS

Boston district	†12.25-12.75
Buffalo	18.00-18.50
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	24.00-24.50
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	16.50-17.00
Chicago, elec. fur.	20.50-21.00
Eastern Pa.	18.50-19.50
St. Louis	12.50-13.00
Toronto	6.25

STEEL CAR AXLES

Birmingham	18.00-20.00
Buffalo	21.50-22.50
Boston district	†20.00-21.00
Chicago, net	24.50-25.00
Eastern Pa.	27.00
St. Louis	22.00-22.50

SHAFTING

Boston district	†24.00-25.00
Eastern Pa.	24.00-24.50
New York	†19.50-20.00
St. Louis	15.00-15.50

CAR WHEELS

Birmingham	16.00-17.00
Boston dist. iron	†13.00-13.50
Buffalo, iron	18.50-19.00
Buffalo, steel	22.00-22.50
Chicago, iron	20.50-21.00
Chicago, rolled steel	23.00-23.50

Cincinnati, iron	20.00-20.50
Eastern Pa., iron	20.00
Eastern Pa., steel	25.00
Pittsburgh, iron	20.00-20.50
Pittsburgh, steel	27.00-27.50
St. Louis, iron	18.00-18.50
St. Louis, steel	20.50-21.00

NO. 1 CAST SCRAP

Birmingham	13.00-14.00
Bos. dist. No. 1 mach.	†15.00-15.50
N. Eng. del. No. 2	15.00-15.50
N. Eng., del. textile	16.50
Buffalo, cupola	18.00-19.00
Buffalo, mach.	19.00-20.00
Chicago, agri. net	14.00-14.50
Chicago, auto	16.25-16.75
Chicago, mach. net	17.50-18.00
Chicago, railr'd net	16.50-17.00
Cincl., mach. cup.	18.00-18.50
Cleveland, mach.	20.00-20.50
Eastern Pa., cupola	21.00-22.00
E. Pa., mixed yard	18.00-18.50
Pittsburgh, cupola	19.50-20.00
San Francisco, del.	13.50-14.00
Seattle	12.00-13.00
St. Louis, No. 1	14.00-14.50
St. L. No. 1, mach.	15.50-16.00
Toronto, No. 1, mach., net	10.50-11.00

HEAVY CAST

Boston dist. break	†14.00-14.50
New England, del.	15.50-16.00
Buffalo, break	15.00-15.50
Cleveland, break	15.50-16.00
Detroit, No. 1 mach. net	13.50-14.00
Detroit, break	14.50-15.00
Detroit, auto net	15.50-16.00
Eastern Pa.	19.50
New York, break	†15.00-15.50
Pittsburgh	17.50-18.00

MALLEABLE

Birmingham, R. R.	15.00-15.50
New England, del.	18.75
Buffalo	19.50-20.00
Chicago, R. R.	22.50-23.00
Cincl., agri. del	17.50-18.00
Cleveland, rail	21.50-22.00
Detroit, auto, net	17.50-18.00
Eastern Pa., R. R.	18.50-19.50
Pittsburgh, rail	20.50-21.00
St. Louis, R. R.	19.50-20.00

RAILS FOR ROLLING

<i>5 feet and over</i>	
Birmingham	16.50-17.00
Boston	†17.50-18.00
Buffalo	20.50-21.50
Chicago	22.50-23.00
Eastern Pa.	22.00-23.00
New York	†17.50-18.00
St. Louis	20.00-20.50

LOCOMOTIVE TIRES

Chicago (cut)	23.50-24.00
St. Louis, No. 1	20.00-20.50

LOW PHOS. PUNCHINGS

Buffalo	21.50-22.50
Chicago	23.25-23.75
Eastern Pa.	26.00-27.00
Pittsburgh (heavy)	26.00-26.50
Pittsburgh (light)	25.00-25.50

Iron Ore

Lake Superior Ore	
<i>Gross ton, 51½% Lower Lake Ports</i>	
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	
<i>Cents, unit, del. E. Pa.</i>	
Foundry and basic	
56.63% con.	9.00-10.00
Cop.-free low phos.	
58-60%	nominal
Foreign Ore	
<i>Cents per unit, f.a.s. Atlantic ports</i>	
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.	\$15.85-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	22.00-22.50
*Nominal asking price.	

Manganese Ore

<i>(Nominal)</i>	
<i>Prices not including duty, cents per unit cargo lots.</i>	
Caucasian, 50-52%	34.00-36.00
So. African, 50-52%	34.00-36.00
Indian, 50-52%	34.00-36.00

Bars

Bar Prices, Page 76

Pittsburgh—Bar specifications and shipments are well ahead of last month, most of the gain in orders being credited to the few days before the March 5 price advance. However, anticipatory buying before the advance was less than the amount booked before the first-quarter increase. Orders since March 5 have been well maintained. Deliveries at present range from four to eight weeks, depending largely upon the tonnage involved. Requirements of farm implement manufacturers, auto parts makers, railroad car builders, machinery manufacturers, and other consumers are steady. Hot-rolled carbon steel bars are quoted 2.45c, Pittsburgh, and hot-rolled alloy bars, 3.00c.

Cleveland—Deliveries on commercial steel bars are extended into May on some grades. Advanced prices have had little effect in retarding business, as customers are anxious to get on rolling schedules. Stocks of most consumers are below normal, despite persistent attempts to buy ahead. The alloy bar market is particularly active in spite of suspension of shipments to partsmakers directly connected with Chrysler and Hudson. Commercial steel bars remain firm at 2.50c, Cleveland.

Chicago—With bar specifications continuing heavy, mills are able to make little inroads into backlogs and deliveries of four to six weeks generally represent the minimum. Suspension of shipments to certain strikebound plants finds no reflection in the total movement. Demand from farm implement and tractor builders continues heavy with output in some instances at record levels for this period. Little resistance has been encountered to the higher prices now effective on new business.

Philadelphia — Miscellaneous bar demand is less brisk than a week ago, although considerable railroad work lies ahead. Quarterly routine requirements are now beginning to come out from the various railroads. Deliveries on commercial steel bars range four to five weeks in most cases. Prices are strong at 2.45c, Pittsburgh, or 2.74c, Philadelphia.

New York—Commercial steel bar sellers are booked about five weeks on an average and buying is brisk, though less than a fortnight ago.

Cold Finished

Cold Finished Prices, Page 77

Pittsburgh—Cold-finished bar pro-

ducers face the prospect of a good second quarter from the standpoint of production, with backlogs at present extending well into May. New Orders dropped off following announcement of the recent price advance, but this had been anticipated and sellers since March 5 have received a number of sizable tonnages. Effect of the recent automotive labor controversies has been less than expected. Cold-finished bars are quoted 2.90c, base, Pittsburgh.

Plates

Plate Prices, Page 76

Philadelphia—Plate demand has eased slightly. Many specifications are still coming out and a substantial amount of identified work is pending for action before the end of this month, but miscellaneous demand has tapered. Plate sellers, however, are still scrutinizing inquiries closely and continue a pick and choose policy.

Six eastern producers, apart from galvanizers, submitted bids on certain of the navy requirements up for March 16—requirements totalling about 12,000 tons. These included the Bethlehem Steel Co., Bethlehem, Pa., Lukens Steel Co., Coatesville, Pa., Alan Wood Steel Co., Conshohocken, Pa., Worth Steel Co., Claymont, Del., and, it is understood, Central Iron & Steel Co., Harrisburg, Pa., among the plate makers. The Phoenix Bridge Co., Phoenixville, Pa., and the Carnegie-Illinois Steel Corp., and the Jones & Laughlin Steel Corp., Pittsburgh, completed the list of producers.

One thousand tons of tank work, the largest in some time, has been placed here. Six hundred tons of plates are required for 15 locomotives for the Atlantic Coast Line, along with substantial tonnages for car work.

Cleveland—Mills are active with backlogs extending well into April. Some headway is being made, shipments exceeding new tonnage. Railroads are expected to increase their buying program around mid-year. Railroad car fabricators claim to have enough orders to keep them at close to capacity operations for three months. Most fabricators are hindered by failure to get reasonably prompt shipments. Demand from specialty manufacturers continues above normal.

Chicago—Tank inquiries from oil companies are more numerous but needs of railroads and freight car builders still predominate in the plate market. An active call for lighter gages is coming from mis-

cellaneous users. Plate backlogs still are extensive and no slackening in shipments to railroad interests is anticipated during the coming quarter.

Boston—Plate buying, while somewhat less active, is fairly well maintained by a broad miscellaneous demand. Shipments are brisk. Although 110 tons were placed for oil tanks at Worcester, Mass., there is no large inquiry for tanks or steel pipe. An East Boothbay, Me., shipyard has the contract for a lightship at \$223,900. Plates are 2.65c, Boston, in carlots and 2.63c, Worcester, Mass.

New York—Plates are offered by some eastern mills for delivery by the middle of April or soon after. Other makers can offer little tonnage under six or seven weeks and in some cases up to 10 weeks.

Birmingham, Ala.—Demand for steel plates is steady with barge, ship repairing and tank work active.

San Francisco—Demand for plates is holding up well and quick deliveries can not be obtained, most mills being booked well in advance. Lettings were the largest for any week of the year and totaled 11,300 tons, bringing the aggregate to 20,737 tons, compared with 47,747 tons for the same period last year.

Seattle — With plate prices advanced \$7 since Jan. 1, and no deliveries possible in less than three months from purchase contracting shops are uncertain of the future. All work must be figured about six months ahead. Important projects involving plates are being considered but whether present conditions will cause deferment is not yet known.

Contracts Placed

1000 tons, chemical tanks, Publicker Commercial Alcohol Co., to Chicago Bridge & Iron Works, Chicago.

200 tons, all-welded fishing vessel, to A. M. Castle & Co., Seattle; Lake Washington Shipyards, Seattle, general contractor.

195 tons, steel derrick barge and derrick, United States engineer, Vicksburg, Miss., to Treadwell Construction Co., Midland, Pa., at \$35,495, total cost of contract; award to second lowest bidder, opening Feb. 23; previously reported as going to St. Louis Shipbuilding & Steel Co., St. Louis, low bidder, but not responsive to specifications.

140 tons, tank alterations, the Barber Co., Maurer, N. J., to Hammond Iron Works, Warren, Pa.
H. J. Williams, York, Pa., to Concrete Steel Co., Philadelphia.

Contracts Pending

2500 tons, tanks, Phillips Petroleum Co., Houston, Tex.

1000 tons, tanks, Sun Ray Oil Co., Houston, Tex.

500 tons, tanks, Beaumont, Tex.

100 tons, 36-inch welded steel pipe, East Bay municipal utility district, Oakland, Calif.; bids March 24.

Sheets

Sheet Prices, Page 76

Pittsburgh—With deliveries now ranging up to 22 weeks in some of the heavier gages, sheet producers continue hard pressed to meet the heavy demands confronting them from all classes of consumers, and have had little opportunity to reduce backlogs. In cases where books are completely filled for second quarter, consumers are still eager to obtain a place on schedule at the

price prevailing at time of shipment. Thus, the high rate of sheet mill operations appears assured for months. No. 24 hot-rolled annealed sheets are quoted 3.15c, Pittsburgh.

Cleveland—New business continues active, particularly from fabricators of farm equipment and household units, such as stoves, refrigerators and radios. It was only natural that a let-up followed the price advances, but the extent of the recession was less than expected. It is claimed that practically all the tonnage placed at the old prices for delivery the first quarter will

be shipped before April 1, but in a few cases this cannot be done.

Chicago—The problem of deliveries still is acute and while shipments to some automotive plants have been suspended because of strikes, such interests are requesting continuation of production in order that deliveries may be started promptly when operations are resumed. Backlogs are sufficient to support capacity output well into second quarter. Recent price advances have had little restricting effect on new business since consumers are concerned with placing orders sufficiently ahead to assure deliveries when needed.

Wisconsin stateboard of purchases, Madison, Wis., is taking bids until March 25 for furnishing approximately 375 tons of sheet steel for motor vehicle license plates, delivery to state prison, Waupun, Wis.

Philadelphia—Strong pressure for sheets continues, although possibly not quite as pronounced as a week ago. Producers on many grades are booked weeks ahead and in some cases have deliveries running well into third quarter. Nevertheless, certain leading sellers are refusing to consider business for delivery beyond second quarter, and apparently are seeking a definite policy with respect to quoting deliveries beyond. Their problem is complicated by the fact that they are already practically out of the market for shipments in first half and thus are in a position to lose attractive tonnage to other mills which are apparently willing to promise delivery into third quarter, with the price ruling at time of delivery to prevail.

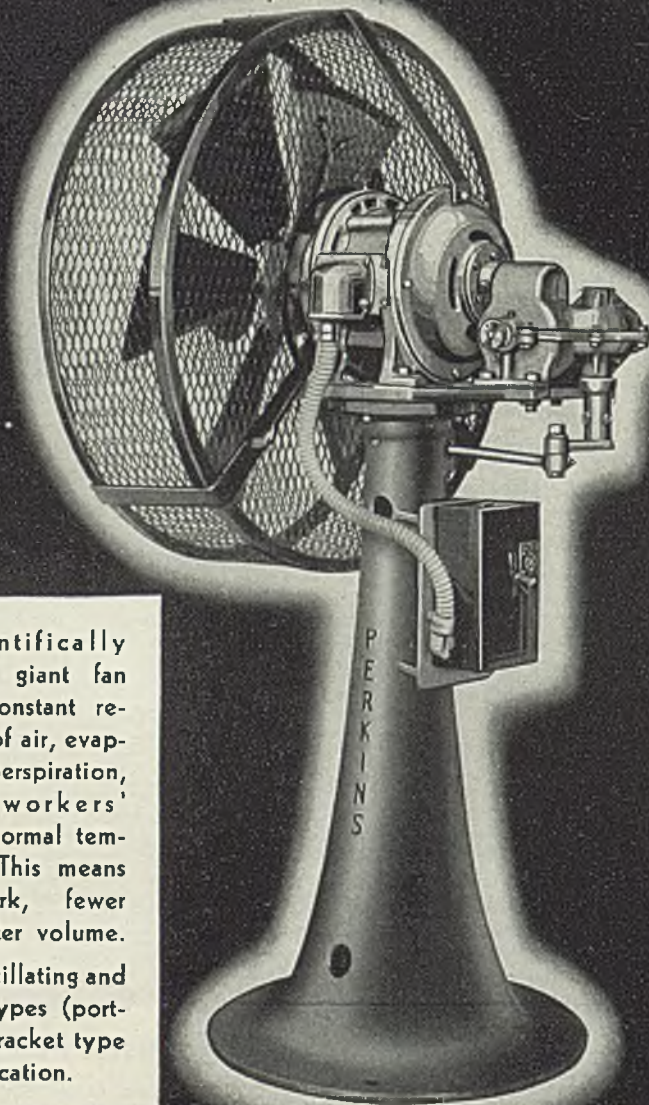
New York—A division of policy among sheet sellers is noted. Some, no longer able to offer second quarter delivery, refuse further bookings while others continue to sell at price prevailing at delivery. Offers of premiums for delivery are beginning to appear but it can not be learned that any producer has accepted tonnage on such a basis.

Cincinnati—Sheet producers have extended backlogs with some deliveries scheduled for September, the third quarter business taken at prices then current. Embargoes due to strikes react merely to relieve, in a measure, pressure for shipments to other consumers. Higher prices failed to check steady coverage of needs.

St. Louis—The recent advance in sheet prices has not affected buying, heavy orders having been received at the higher quotations. Users are apparently eager to secure supplies, and considerable business has been placed for third quarter subject to prices then prevailing.

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HOLYOKE·MASS

Pipe

Pipe Prices, Page 77

Pittsburgh—Strong demand for oil country goods even since price advance has surprised many sellers. On boiler tubes, mechanical tubing, and other lines, deliveries now range from four to six weeks, Mason Oil Co. is laying 10 miles of 4-inch line in Loving county, Texas, and Lion Refining Co., El Dorado, Ark., plans to construct a 12-mile 4-inch gasoline line.

Cleveland—Under the new price plan jobbers who do not carry stock on the consignment basis are forced to replenish stocks at the increased prices, instead of under a 60-day protection period as in the past. Their stock turnover has proved better than expected. The outlook for cast iron pipe demand depends a great deal upon the amount of PWA work that develops this spring.

Boston—Stimulated by recent \$5 advance in cast iron pipe, with sellers curtailing protection at old prices, buying is heavier, about 1200 tons being bought in New England. Merchant steel pipe is moving briskly through secondary sellers.

New York—Prices submitted on about 2800 tons of cast pipe for New York yard stocks were in line with recent advances, \$55.70 and up a ton delivered to borough yards. Four foundries are low on various classes. Quotations on fittings, man-hole covers and other castings were substantially higher, \$10 to \$15 a ton in most cases.

Ponca City, Okla.—Continental Oil Co. has awarded a 37-mile eight-inch oil line to Osage Construction Co., to run west from Geneseo, Kans. It will be fabricated by the Lindeweld method.

Seattle — With two recent increases of \$4 and \$5 a ton, cast iron pipe has reached a price in harmony with other items. The higher costs are expected to cause postponement of several projects. Some business is pending awaiting approval of federal officials. No action has been announced on 700 tons for Tacoma and Medical Lake, Wash., bids for which were opened last month.

Steel Pipe Placed

760 tons, 24-inch, Flint, Mich., to Youngstown Sheet & Tube Co., Youngstown, O.

Cast Pipe Placed

3700 tons, 24-inch and under, Mamaronck, N. Y., to United States Pipe & Foundry Co., Burlington, N. J.

1925 tons, 4 to 36-inch class C, to United States Pipe & Foundry Co., Burlington, N. J.

1000 tons, 18-inch and under, Cheyenne, Wyo., to United States Pipe & Foundry Co., Burlington, N. J.

635 tons, 6 to 30-inch, Worcester, Mass., to R. D. Wood & Co., Florence, N. J.

353 tons, 4 to 12-inch, South Pasadena, Calif., to United States Pipe & Foundry Co., Burlington, N. J.

155 tons, 6 to 10-inch, Framingham, Mass., to Warren Foundry & Pipe Co., Everett, Mass.

150 tons, small sizes, Malden, Mass., to Warren Foundry & Pipe Co., Everett, Mass.

Unspecified tonnage, 1937 requirements, Cambridge, Mass., to Warren Foundry & Pipe Co., Everett, Mass.

Cast Pipe Pending

3500 tons, 8 and 12-inch, Los Angeles; United States Pipe & Foundry Co., Burlington, N. J., low on 2400 tons; American Cast Iron Pipe Co., Birmingham, Ala., low on 800 tons and National Cast Iron Pipe Co., Birmingham, Ala., low on 300 tons.

2800 tons, 20-inch and under yard stocks, New York, Donaldson Iron Works, United States Pipe & Foundry Co., Florence Pipe & Foundry Co. and Warren Foundry & Pipe Co. low on various classes; bids March 16.

1090 tons, 4 to 12-inch, East Bay municipal utility district, Oakland, Calif.;

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WHITCOMB LOCOMOTIVES

United States Pipe & Foundry Co., Burlington, N. J., low. 125 tons, 3, 4 and 6-inch for Yakima, Wash., city irrigation system; bids March 22.

Semifinished

Semifinished Prices, Page 77

Numerous tempting offers for export billets have been made in this country recently, but mills hesitate to accept them or even to make any extended promises to inquiring domestic interests because of needs of their own finishing mills. The

great demand for semifinished has shown no slackening for many months and activity appears assured well into the future. Rerolling billets, blooms, slabs and sheet bars, Pittsburgh, are quoted \$37 per gross ton; forging blooms, billets and slabs, \$43, and skelp, 2.10c.

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has completed a large number of plant improvements. These include particularly the installation of additional molding units and sand handling and cleaning room equipment.

Behind the Scenes with STEEL

Hey-Nonny-Nonny

EVER mindful of the necessity of keeping in tune with the times, we hereby salute the arrival of spring. Whether you prefer to acknowledge March 21 or March 23 as the inaugural day of the finest of all the seasons means little. STEEL sticks to the middle ground with this issue dated March 22.

Here at the corner of West Third street and Lakeside avenue, spring has definitely arrived. Trolley cars grind by with new verve, crocuses blossoming from every wheel. Stenographers trill Mendelssohn's *Spring Song* as the staccato beat of a thousand typewriter keys marks off the rhythm.

Lake Erie is blue and placid, rimmed with dirty ice. We are moved to repeat Bob Burns' elegant paraphrase, springlike in its alriness:

*I shot an arrow into the air,
It fell to earth I know not where;
Been losing more darned arrows
that way.*

Lucky Dime

ALWAYS notoriously unlucky, we naturally lean to instances of Lady Luck beaming upon some more fortunate brethren. For example, take the case of a young fellow by the name of Koontz in Bloomington, Ind., who bought a used car for \$150 and after wheeling it proudly home for a thorough inspection, found a dime which had fallen behind a seat cushion.

Examining the coin, he discovered it to be dated 1821. Later a friend who was an amateur coin specialist investigated and told the car owner his find was worth a mere \$450 in the rare coin market.

If that had been us, we probably would have spent the dime for a hamburger without even bothering to look at the date on it.

Washed Up

IF YOU would care to bid on 50 metal drums of soft soap, U.S.P., 100 pounds each, soft soap in wood not acceptable, for the federal warehouse of the treasury department in Washington, we can tell you invitations for bids have been issued—No. 222-2805-CP-3-24.

Careful inspection of the invitations fails to disclose what the treasury department wants with

5000 pounds of soft soap. One of our associate editors, whom we strongly suspect of anti-New Deal sentiments, suggests that perhaps F.D.R. wants the soap to use on congress to push through his court-packing plan.

Anyway, you prospective bidders, please remember to "quote price only on unit specified; quote price f.o.b. destination; discounts offered for payment in less than 20 days will not be considered." Come clean, now!

Spell-Down

SOME pertinent observations on the manufacture of die-cast radiator grilles (or "grills" as our editors seem to prefer on page 34) are contained in W. J. Doring's article in this issue.

Checking up with Mr. Webster, we find it permissible to use the spelling "grill" in this connection, but personally we prefer "grille". This raises the question of whether it is possible to grill a steak on a grille or whether you must use a grill to grille it.

It might save a lot of bother to avoid use of the word altogether and refer to the product as "that thing on the front of a car which is shiny and has a lot of crossed pieces with holes between them."

Matter of Degree

SKIPPING through our favorite evening newspaper the other day, we came across the startling headline:

2 DIE, 64 KILLED AS
REX FIGHTS STORM

The two who died probably received only slight injuries.

Epitaph

HEADLINE OF THE WEEK: "He Took Headache Pills for Typhoid Fever"—Republic Steel on the front cover of the March 15 issue. Suitably ribboned across a tombstone perpetuating the memory of a man whose name began with "H" and ended in "man", the message was a startling and effective reminder of the importance of proper selection of remedies—and materials.

—SHRDLU

Transportation

Track Material Prices, Page 77

Southern railway plans purchase of upward of 5000 freight cars, according to reliable reports.

On completion of a \$4,700,000 car-building program at the West Milwaukee shops of the Chicago, Milwaukee, St. Paul & Pacific April 1 work will start on a new program involving expenditures of \$4,000,000. Only 350 hopper cars of the 1936 program remained to be built at the middle of March. The next program calls for building 1000 additional freight cars and 33 new streamlined passenger coaches, while a third is to follow for building another 1000 freight cars. In addition, the shops are air-conditioning a total of 200 coaches at the rate of two daily.

New York Central takes bids March 30 on second quarter steel requirements, an unspecified tonnage, including shapes, plates, bars, sheets, steel wheels, pipe, axles, billets, tubes, wire nails, conduit, track bands, insulated magnet wire, cab cord and roller bearings.

The Wabash has issued an inquiry for 1500 to 2000 tons shapes, bars and plates for car repair work to be performed in its own shops.

Rail Orders Placed

Delaware & Hudson, 5000 tons, to Bethlehem Steel Co., Bethlehem, Pa., for delivery around April 1.

Car Orders Placed

Grand Trunk Western, 200 automobile cars and 100 refrigerator cars to Pullman-Standard Car Mfg. Co., Chicago. Missouri-Kansas-Texas, 50 ballast cars to American Car & Foundry Co.

Car Orders Pending

Atlantic Coast line, 100 to 400 box cars, 200 automobile cars, and 100 phosphate cars, bids asked; also inquiring for 15 locomotives, 15 coaches and 15 express cars.

Central of Georgia, 600 box cars, comprising 500 of 50 tons capacity and 100 of 40 tons, bids asked.

Soo Line, 500 to 1000 cars.

Locomotives Placed

Chicago, West Pullman & Southern, two locomotives to Baldwin Locomotive Works, Eddystone, Pa.

Lehigh Valley, 10 locomotive tenders to American Locomotive Co., New York.

Locomotives Pending

Atlantic Coast Line, 15 locomotives, bids asked.

National Railways of Mexico, several locomotives in addition to previous inquiry.

Soo Line, four locomotives; bids soon.

Buses Booked

A. C. F. Motors Co., New York: Thirty

30-passenger for Staten Island Coach Co. Ltd., Staten Island, N. Y.; eleven 35-passenger, fourteen 42-passenger for Eastern Massachusetts Street Railway Co., Boston; nine 42-passenger for Pittsburgh Motor Coach Co., Pittsburgh; three 35-passenger for Pacific Gas & Electric Co., Sacramento, Calif. Twin Coach Co., Kent, O.; Twenty-eight 31-passenger for Seattle Municipal Street Railway Co., Seattle; twenty-two 23-passenger for Pittsburgh Motor Coach Co., Pittsburgh; ten 23-passenger for Toronto Transportation Co., Toronto, Ont.; six 23-passenger for Northern Texas Traction Co., Fort Worth, Tex.; five 44-passenger for Youngstown Municipal Railway, Youngstown, O.; four 23-passenger for Georgia Power Co., Atlanta, Ga.; three 41-passenger for Akron Transportation Co., Akron, O.; three 31-passenger for Omaha & Council Bluffs Street Railway Co., Omaha, Nebr.; three 25-passenger for Winnipeg Electric Co., Winnipeg, Man.; three 25-passenger for El Paso Electric Co., El Paso, Tex..

Strip

Strip Prices, Page 77

Pittsburgh—Deliveries on strip have lengthened to seven to nine weeks, due to additional buying early this month against price advance. Buying at higher quotations has been heavier than expected and apparently prices are secondary to delivery. Although stop orders have been received from automotive manufacturers affected by strikes, volume from other buyers is well maintained. Strip is quoted 2.40c, Pittsburgh.

Cleveland—Strip mills continue to operate close to capacity with little unsold for second quarter delivery. Most mills are hesitant about accepting orders for third quarter even at prices prevailing at that time and at mills' convenience. Suspension orders resulting from strikes at Hudson and Chrysler plants in Detroit have had little effect on shipments. Stock conditions of many customers are below normal and those who now discover that they have underestimated needs are in a serious position, due to extension of deliveries.

Chicago—Strip demand is active and backlogs continue heavy despite capacity schedules. Strikes have caused some suspensions in shipments but total deliveries are undiminished. What brief interruption to new buying was occasioned by recent price increases has been offset by consumers' desire to be protected on deliveries. Hot-rolled strip now is 2.50c, base, with cold-rolled strip 3.20c, Pittsburgh-Cleveland.

Boston—Heavy buying of cold strip at 3.40c, Worcester, has developed with consumers pressing for delivery. Frequently asking shipment on orders placed at recently advanced prices, buyers with old specifications

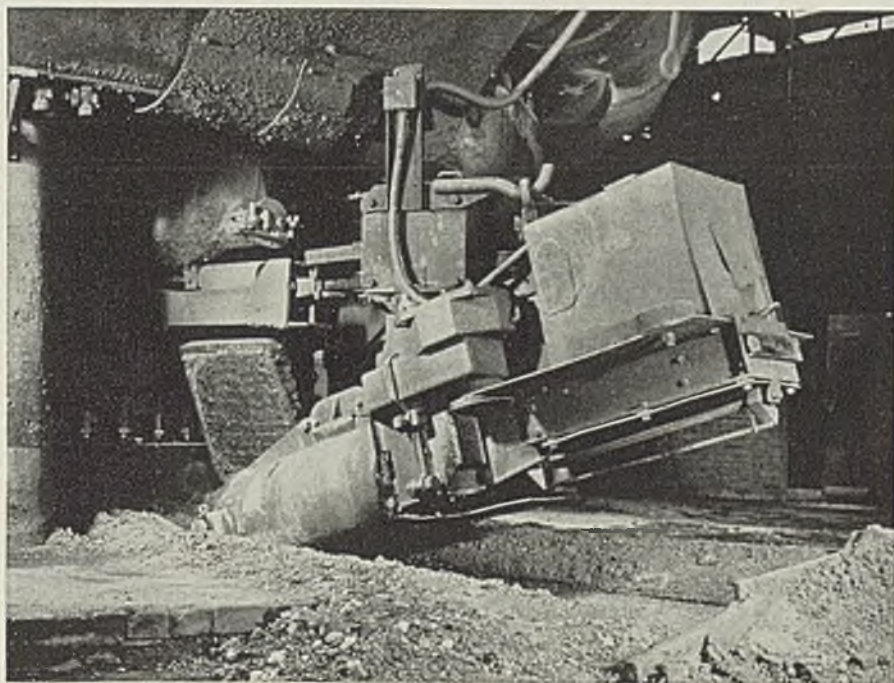
bought at lower quotations and still to be shipped seek a place on early rolling schedules to secure delivery, disregarding a \$7 difference in price. Operations are at a high rate but backlogs are being lowered only slightly, delivery being about eight weeks at most mills. Hot strip demand is heavy with four-week delivery considered good. Practically all cold strip mills will carry considerable first quarter tonnage well into next month.

New York—Producers of both hot and cold-rolled strip are able to offer little for delivery before May.

Wire

Wire Prices, Page 77

Pittsburgh—Demand from major sources for manufacturers' and merchants' wire products is exceptionally strong and producers constantly are confronted with pressure for deliveries. Shipments on quality wire average about eight weeks. Sellers report considerable buying has been done at recently advanced prices. Prices on both plain wire and merchant products are steady.



Blast Furnace No. 4

of the Corrigan-McKinney Plant of the Republic Steel Corporation being the last word in furnace design is equipped with the last word in Clay Guns, namely, the BROSIOUS TWO MOTOR ELECTRIC MECHANICAL CLAY GUN. With the BROSIOUS GUN the hole is SAFELY stopped continuously under full wind pressure, no one being required in the danger zone during plugging.

A nine cubic foot single clay barrel provides ample clay to stop any hole and there is never any need to add clay to the barrel during plugging, the control being located at any convenient point in the cast house.

No clamping mechanism is necessary and the hole is stopped the instant the nozzle reaches the hole.

TWENTY-FIVE Blast Furnaces are already equipped with Brosius Electric Guns, TWENTY in the United States and FIVE in Europe.

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Cleveland—The advanced prices have had little effect, as demand for plain and galvanized wire continues at almost same volume as three and four weeks ago. Mills have made little headway on deliveries, which are now six to eight weeks. Agricultural requirements, particularly for fencing material, is probably at its peak. Demand from automobile springmakers, and bolt and nut and wire specialty manufacturers have been more active than at any time in seven years.

Chicago—Heavy specifications for wire and wire products continue to tax mill capacity. Backlogs extend well into second quarter and with demand expanding, mills are faced with brisk schedules. Automotive strikes have enabled producers to quicken shipments in some other directions. Movement of merchant wire products is expanding as distributors prepare for active rural spring buying. Market now is established at \$2.80 for wire nails, 2.95c, for plain wire and \$48 to \$53 for wire rods.

Boston—With demand covering a wide variety of wire products, buying at higher prices has increased. Plain wire to the manufacturing trade at 3.00c, Worcester, is moving briskly, also spring wire, flats and specialties. To date the recent increase in wire

prices has not materially reduced buying except for a few days following the announcement. Deliveries are still extended with some mills not likely to clear first quarter volume until well into next month. Most current buying is for as early shipment as possible for apparent immediate consumption.

Shapes

Structural Shape Prices, Page 76

New York—Structural contracts, recently more numerous, are beginning to decline temporarily as protection expires. About 15,000 tons of new work pends in this district. First steel for the 1939 World's Fair buildings has been placed; this project ultimately to take many thousand tons within the next 18 months. Open bids on shapes for the navy and first quarter requirements for New York departments, closed since the \$4 increase in plain material, are in line with quoted prices.

Boston—Formal award of 1600 tons for the Deer Isle, Me., suspension bridge to the Phoenix Bridge Co., low bidder is being held up by the readvertising of the sub-structure contract, April 2. Inquiry is heavier

led by 3300 tons for a store, Hartford, Conn. G. Bonazzoli & Sons, Hudson, Mass., contractors, placed 162 tons of shapes and bars for a state bridge, Leominster, Mass., with Bethlehem Steel Corp., instead of a Youngstown, O., fabricator as previously reported.

Unit bids of March 16 for the Connecticut river bridge, brought out low of 7.40c per pound on 2520 tons of carbon structural steel in place and 7.05c per pound on 1088 tons of silicon structural steel in place. This is the first large job figured in New England since the advance on plain material. The low unit bid for reinforcing was 3.95c per pound on 528 tons in place. This price fails to fully reflect the recent \$6 advance on reinforcing.

Pittsburgh—Awards and inquiries have been heavy during the past week. Structural material for the new boiler house extension for the Philadelphia Electric Co., Philadelphia, 1650 tons, has been awarded to Lehigh Structural Steel Co. Pending business includes a number of projects between 500 and 1000 tons, most of them private jobs.

Philadelphia—A substantial tonnage of shapes is expected to be let before the end of this month on identified work for which protections were taken prior to the recent price advance. School work and a courthouse at Ninth and Market streets, Philadelphia, are among sizable projects in prospect.

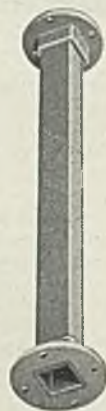
Cleveland—Most fabricators have enough tonnage on books to keep them well occupied for six to eight weeks, although mills are able to make deliveries in four to five weeks. Fabricators are now booking tonnage at the increased prices; most of them gave only ten days protection. Ingalls Iron Works, Birmingham, Ala., received an award of 800 tons for an extension to Rike-Cummer Co. department store, Dayton, O.

Chicago—Structural inquiry here continued to lag but more work is appearing in the west and southwest. New bridge inquiries involve about 5000 tons and a sludge disposal building for the Chicago sanitary district

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NEW YORK — CHICAGO — PHILADELPHIA — DETROIT — CLEVELAND

Shape Awards Compared

	Tons
Week ended March 20.....	33,013
Week ended March 13.....	35,780
Week ended March 6.....	17,597
This week, 1936.....	12,787
Weekly average, 1936.....	16,332
Weekly average, 1937.....	27,774
Weekly average, February..	22,141
Total to date, 1936.....	263,349
Total to date, 1937.....	333,283

will take 2600 tons. Bids will be taken April 21 on Mississippi river dam No. 25, involving 4000 to 5000 tons.

San Francisco—Awards totaling 16,916 tons were the largest for any week this year, bringing the aggregate to 58,390 tons compared with 31,141 tons in 1936. Two crossings involving over 1500 tons, in connection with the East Bay facilities yard of the San Francisco-Oakland bridge will come up for figures March 31.

Shape Contracts Placed

7000 tons, bridges, St. Lawrence river near Wells Island, N. Y., for Thousand Islands Bridge authority, divided as follows: 4000 tons, including wire cable American crossing, to American Bridge Co., Pittsburgh; 3000 tons, Canadian crossing, to Canadian Bridge Co., Walkerville, Ont.

3500 tons, six-story addition to Federal building, Vessey street, New York, to Karl Koch Erecting Co. Inc., New York; through Millimet Construction Co., Union City, N. J.

2400 tons, garage, department of sanitation, New York, to Bethlehem Steel Corp., Bethlehem, Pa.; through O'Driscoll-Grove Co. and H. L. Fisher, New York.

1650 tons, new boiler house extension, for Philadelphia Electric Co., Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.

1600 tons, addition to Washington Irving high school, New York, to Lehigh Structural Steel Co., New York; through D. M. W. Construction Co., Brooklyn, N. Y.

1200 tons, superstructure, bridge, Kentucky river, Frankfort, Ky., to Bethlehem Steel Corp., Bethlehem, Pa.

1040 tons, bridge FAP 843-A, De Witt county, Texas; 255 tons, truss span, to Illinois Steel Bridge Co., Jacksonville, Ill., and 785 tons, beam-spans, to North Texas Iron Steel Co., Fort Worth.

900 tons, public school, No. 152, Queens, N. Y., to Lehigh Structural Steel Co., New York; through D. M. W. Construction Co., New York.

550 tons, state bridge over Holston river, WPSO-441-8, Sullivan county, Tennessee to Vincennes Steel Corp., Vincennes, Ind.

535 tons, Brown-Thompson building, Hartford, Conn., to Standard Structural Steel Co., Hartford; Southern New England Construction Co., Hartford, general contractor.

530 tons, Kimberly Clark building, Neenah, Wis., to Joseph T. Ryerson & Son, Inc., Chicago.

485 tons, packing plant, Swift & Co., St. Louis, to Gage Structural Steel Co., Chicago.

480 tons, building addition, Columbia Presbyterian Medical Center, New York, to Harris Structural Steel Co., New York.

475 tons, public school, No. 254, Brooklyn, N. Y., to Lehigh Structural Steel Co., New York; through L. R. Rice Construction Co., New York.

460 tons, bridge, FAP 561-E, Stonewall county, Texas, to North Texas Iron & Steel Co., Fort Worth.

450 tons, administration building, New York World's Fair, 1939 Inc., Flushing, N. Y., to American Bridge Co., Pittsburgh.

435 tons, state bridges, Ellis, Blaine, Wagoner and Rogers counties, Oklahoma, to Patterson Steel Co., Tulsa, Okla.; T. C. Ottinger, Hinton, Oklahoma, general contractor.

430 tons, bridge, No. 3259, Sevier county, Arkansas, to J. B. Klein Iron & Foundry Co., Oklahoma City.

420 tons, apartment, 231 East Seventy-sixth street, New York, to Dreier Iron Works Co., New York; through Syndicate Builders Inc., New York.

420 tons, state highway bridge DE-15-152, Defiance, O., to Bethlehem Steel Corp., Bethlehem, Pa.

400 tons, conveyor frames, etc., for Jeffrey Mfg. Co., Plymouth, N. C., to Ingalls Iron Works, Birmingham, Ala.

380 tons, foundations, elevated highway, 135-146th streets, New York, to Petroleum Iron Works Co., Sharon, Pa.

370 tons, high school, Appleton, Wis., to Fort Pitt Bridge Works, Pittsburgh.

350 tons, farm implement building, fair-

grounds, Solvay, N. Y., to Syracuse Engineering Co., Syracuse, N. Y.; Millimet Construction Co., Union City, N. J., general contractor; Truscon Steel Co., awarded reinforcing bars.

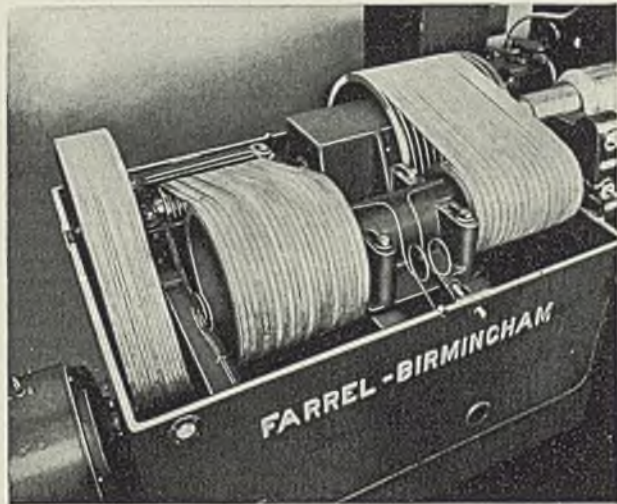
350 tons, state bridge, contract No. 1483, Schererville, Ind., to Bethlehem Steel Corp., Bethlehem, Pa.

340 tons, store building addition, for Sears-Roebuck Co., Pittsburgh, to Ingalls Iron Works, Birmingham, Ala.

325 tons, mill No. 3, Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., to Kalamazoo Foundry & Machine Co., Kalamazoo.

320 tons, state highway bridge, Route 36007, Dushore, Pa., to Phoenix Bridge Co., Phoenixville, Pa.

300 tons, Flathead hydroelectric devel-



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Farrel Heavy Duty Roll Grinders have many other important features which contribute to superior performance, better finish and increased output. Send for a complimentary copy of Bulletin No. 111 which tells about them.

The multiple "V" belt drive of the Farrel Heavy Duty Roll Grinder is notable for its smoothness and freedom from vibrations which mark the rolls and require much time and trouble to remove. Users of FARREL machines equipped with drives of this type are getting results in improved quality of finish and increased output that had formerly been thought unattainable on any roll grinder.

The headstock is a self-contained, compact, rugged unit which will give years of trouble-free service with a minimum of attention and next to nothing for upkeep. It is mounted on the same level and in line with the grinder beds; it requires no special pit. An ample number of belts transmits all the power required to rotate any roll within the capacity of the machine.

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Company, Inc.
110 Main St., Ansonia, Conn.

opment, Olson, Mont., to Kansas City Structural Steel Co., Kansas City, Kans.

285 tons, parcel post building garage and tunnel, Worcester, Mass., to New England Structural Co., Everett, Mass.; Edmund J. Rappoll Co., Cambridge, Mass., general contractor.

270 tons, bridge, Wheat road, Atlantic City, N. J., through the Eastern Engineering Co., that city, to the American Bridge Co., Pittsburgh.

265 tons, grade crossing elimination, Lehigh Valley railroad, Lodi, Seneca county, New York, to Bethlehem Steel Corp., Bethlehem, Pa.

250 tons, barracks, etc., for Floyd Bennett airport, Brooklyn, N. Y., to Harris Structural Steel Co., New York.

250 tons, building, International Harvester Co., New Orleans, to Gage Structural Steel Co., Chicago.

245 tons, Fairfax-Preston building, South-Western Bell Telephone Co., Houston, Tex., to Mosler Steel Co., Dallas, Tex.

235 tons, bridge, Kerr county, Texas, to Alamo Iron Works, San Antonio.

230 tons, false work columns, Fazler-Davis Construction Co., Chicago, to Jones & Laughlin Steel Corp., Pittsburgh.

225 tons, addition to Calaveras Cement Co., San Andreas, Calif., to Consolidated Steel Corp., Los Angeles.

220 tons, building, Dayton Rubber Co., Dayton, O., to Burger Iron Co., Akron, O.

205 tons, sheet mill, American Brass Co., Waterbury, Conn., to American Bridge Co., Pittsburgh.

200 tons, I-beams, for fabricating on job in Chester county for the Pennsylvania state highway commission, through John F. Keeler, Green Lane,

Pa., to Carnegie-Illinois Steel Corp., Pittsburgh.

180 tons, bridge, Camden county, New Jersey, through Ole Hansen, Ventnor, N. J., to Phoenix Bridge Co., Phoenixville, Pa.

175 tons, sub-station No. C, First and Grove streets, Oakland, Calif., for Pacific Gas & Electric Co., to Golden Gate Iron Works, San Francisco.

173 tons, bridge in Las Animas county, Colorado, to unnamed interest.

170 tons, Fairmount exchange building, Ohio Bell Telephone, Cleveland, to Fort Pitt Bridge Works, Pittsburgh.

165 tons, laboratory building, Ithaca, N. Y., to Genesee Bridge Co., Rochester, N. Y.

165 tons, factory building, De Villbiss Co., Toledo, O., to Austin Co., Cleveland.

160 tons, Narcotic Farms, federal project, Fort Worth, Tex., to Fort Worth Structural Steel Co.; R. F. Ball Construction Co., Fort Worth, general contractor.

150 tons, cofferdam, Cincinnati Gas & Electric Co., Cincinnati, to American Bridge Co., Pittsburgh.

145 tons, school, Somers, N. Y., to Weatherly Steel Co., New York; through R. C. Engineering Co., New York.

120 tons, building, Reliance Electric Co., Cleveland, to Mooney Iron Works, Cleveland.

115 tons, post office, Raleigh, N. C., to Dietrich Bros., Baltimore; J. M. Gregory, Raleigh, N. C., general contractor.

115 tons, steel frame dock shed, Southern railroad, New Orleans, to Virginia Bridge Co., Roanoke, Va.

105 tons, bridge, Bosque county, Texas,

to Central Texas Iron Works, Waco, Tex.

100 tons, all-welded fishing craft, to Bethlehem Steel Corp., Seattle, Wash.; Lake Washington Shipyards, Seattle, general contractor.

Shape Contracts Pending

5600 tons, shop building, Government air depot, Sacramento, Calif.; Bethlehem Steel Corp., Alameda, Calif., low.

3700 tons, viaduct, Westside Elevated highway, 153rd to 160th streets, New York; bids due March 29.

3608 tons, bridge and approaches, Connecticut river, Gill-Montague, Mass.; Daniel O'Connell's Sons Inc., Boston, low.

3250 tons, store building, for G. Fox & Co., Hartford, Conn.

3000 tons, bridge, Purcell, Okla.

2600 tons, sludge disposal building, Stickney, Ill.; bids to Chicago sanitary district, March 25.

1200 tons, spillway gates, Earp, Calif.

1000 tons, municipal power plant, Lansing, Mich.

1000 tons, hangar at Sandpoint, Wash., for naval department; bids rejected.

900 tons, public school, No. 117, Bronx N. Y.

895 tons, crossing, for Port of Oakland, East Bay facilities yard, Oakland, Calif.; bids March 31.

800 tons, slab storage yard, for Republic Steel Corp., Cleveland.

800 tons, ore bins, for Great Lakes Steel Corp., Detroit.

800 tons, bridge, Atchison, Kans.

770 tons, Woolworth store, Fifth avenue and Thirty-ninth street, New York.

720 tons, spillway gates, Phoenix, Ariz.

655 tons, crossing, over Southern Pacific tracks at 26th street, Oakland, Calif.; bids March 31.

561 tons, bridge, Colorado.

505 tons, including 10 tons fabricated stainless steel, embedded parts Spillway gates, Gundersville dam, Tennessee Valley Authority, Knoxville, Tenn., bids March 22, on fabricated material delivered.

500 tons, grade crossing elimination, Congress street, Schenectady, N. Y., for New York Central railroad.

500 tons, public school No. 41, for board of education, New Dorp, N. Y.

500 tons, grade crossing, Toledo, O.

500 tons, bridge, Jefferson City, Mo.

450 tons, state bridges, Winchendon, Royalston and Dudley-Webster, Mass., bids March 30, three contracts.

400 tons, alterations to foundry building, for Link Belt Co., Chicago.

363 tons, state span at Tacoma, Wash.; bids at Olympia, March 30.

350 tons, warehouse building with canopy and boiler house, for Upjohn Co., Kalamazoo, Mich.

204 tons, fabricated structural steel, through steel truss bridge, Westmoreland and Indiana counties, Pennsylvania; bids to state highway department, Harrisburg, Pa., March 19.

300 tons, plant addition, H. J. Heinz Co., Pittsburgh.

300 tons, building, for Benson & Rixon Co., Chicago.

300 tons, student union building, for Kentucky university, Lexington, Ky.

300 tons, public school, No. 253, Brooklyn, N. Y.

275 tons, fabricated structural steel, plate girder highway underpass, Lycoming county, Pennsylvania; bids to state highway department, Harrisburg, Pa., March 19.

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- 250 tons, retort, salt storage and ethel chloride buildings, Carneys Point, N. J., for E. I. DuPont de Nemours & Co.
- 200 tons, brick plant, for Excel Brick & Tile Co., Davenport, N. J.
- 200 tons, alterations to building, for Hotel Stalter Co., Detroit.
- 200 tons, plant No. 2, for Hudepohl Brewing Co., Cincinnati, O.
- 200 tons, public school, No. 169, Brooklyn, N. Y.
- 171 tons, gymnasium, University of California, Davis, Calif.; Herrick Iron Works, Oakland, Calif., low.
- 160 tons, building addition, Fall River Herald News, Fall River, Miss.; Lockwood-Greene, New York, engineer.
- 150 tons, ferry slips, Yerba Buena shoals, San Francisco; Minneapolis-Moline Power Implement Co., Minneapolis, low.
- 120 tons, addition to public school, No. 41, New York; Hirsch Construction Co., New York, low.
- 100 tons, sheet piling, lighthouse bureau, for Portsmouth, Va.; all three bidders quoted same price, March 8.
- 100 tons, post office, Panama City, Fla.; Beers Construction Co., Atlanta, Ga., low, bids March 12.
- 100 tons, store, Lynn, Mass.
- Unstated, five radial gate hoists for Cle Elum dam spillway, Yakima project; bids by reclamation bureau, Denver, March 30.
- Unstated tonnage, Mississippi river dam No. 25, Cap au Gris, Mo.; bids to United States engineers, St. Louis, April 21.
- Unstated tonnage, vertical lift span for Chicago, Milwaukee, St. Paul & Pacific at Portage, Wis.; project approved.
- Unstated, 50 ton crane, for Seattle light department; bids April 8.

Ferroalloys

Ferroalloy Prices, Page 78

New York—While contract buyers of ferromanganese have until the end of this month to get in tonnage before the \$15 increase becomes effective, it is believed they will not be able to anticipate their requirements to any great extent. Shipments in April may be off as a result of this buying but it is doubtful, some trade leaders declare if the effect will be seen much beyond that time. There was anticipatory buying just before this quarter, when the advance was \$5, but this covering was relatively small because then, as now, not much time was allowed to get in shipments at the lower prices.

Census Report Analyzes Wholesalers' Activities

Net sales of 88,931 wholesale establishments totaled \$17,661,691,000 in 1935, says a new census bureau analysis of that type of business. Wages of more than one billion dollars were paid to 760,000 persons and stocks carried at the end of the year were valued at more than two billion dollars.

Reinforcing

Reinforcing Bar Prices, Page 77

Pittsburgh—Although large projects are not numerous, reinforcing bar sellers have found the volume of small business steady, and shipments continue heavy. Rollings for jobbers are extended in some instances into May.

Cleveland—Mills report a fairly active market with many small awards coming from private sources. Mills have backlogs of three to four weeks, with little improvement expected throughout the month, as pending work aggregates considerable tonnage. Prices have held firm at 2.60c, Cleveland, although no real test has been offered.

Chicago—Reinforcing bar awards are moderately heavier and new building projects gradually are taking form and likely will account for a growing volume of business. State highway projects have yet to appear in sizable volume and PWA work is lighter than a year ago. Private construction, however, gradually is becoming more active.

Boston—Reinforcing bar buying, mostly in small lots, in projects bid before the recent \$6 advance, has improved as sellers withdraw pro-

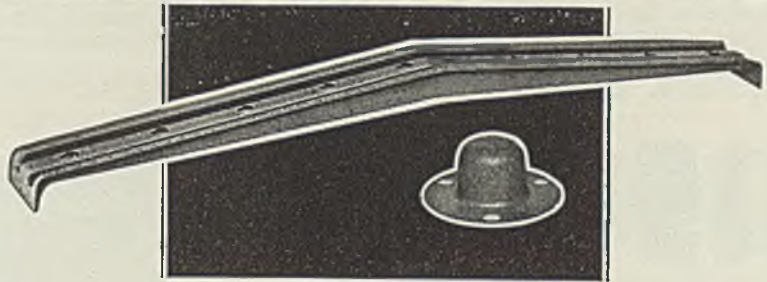
tection on such tonnage. New inquiry pending is fairly heavy, with bridges leading demand. Several projects bid during the last week reflect slightly higher quotations by contractors on reinforcing steel in place. Such estimates in several instances, however, do not fully cover the rise in bars, indicating contractors will still press for con-

New York—Most tonnage recently figured before the \$6 advance in reinforcing bars has been placed and current awards are light. Prices on considerable of this volume recently bought were far under present quotations. New inquiry is light. Tonnage figured in general contracts during the last week will test the 2.88c, f.o.b. New York, or

Concrete Awards Compared

	Tons
Week ended March 20.....	4,786
Week ended March 13.....	4,997
Week ended March 6.....	7,947
This week, 1936.....	1,630
Weekly average, 1936.....	6,005
Weekly average, 1937.....	3,986
Weekly average, February..	3,877
Total to date, 1936.....	101,365
Total to date, 1937.....	47,843

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2.98c, delivered, in the metropolitan district.

Philadelphia—While considerable work is accumulating, reinforcing bar awards are light. Apart from some state road work recently placed, buying has been confined to small lots. The largest private project involves 400 tons at Marcus Hook, Pa., for Congoleum-Nairn Inc.

Seattle—Pacific Northwest state highway programs have been delayed, awaiting approval of legislatures. Washington will open bids March 30 for a span in Tacoma involving 280 tons. Mill prices are firm at the new level 2.95c, merchant bars at 3.00c. Some small lots are being booked and local mills are still busy on backlogs.

Reinforcing Steel Awards

- 1100 tons, for Shillito store building, Cincinnati, to Pollak Steel Co., Cincinnati, through Messer & Sons, general contractor.
- 500 tons, yard facilities buildings, San Francisco-Oakland bay bridge, Oakland, Calif.; to Dunham, Carrigan & Hayden, San Francisco.
- 406 tons, narcotic farms, federal project, Fort Worth, Tex., to Fort Worth Structural Steel Co.; R. F. Ball Construction Co., Fort Worth, general contractor.
- 338 tons, bureau of reclamation, Invitation 44.116-A-1, Earp, Calif., to Soule Steel Co., Los Angeles.
- 300 tons, school, Sheboygan Wis., to Concrete Engineering Co., Chicago.
- 250 tons, Mariner Realty Co. building, Milwaukee, to W. H. Pipkorn Co., Milwaukee.
- 225 tons, gymnasium, University of California, Davis, Calif., to Concrete Engineering Co., San Francisco.
- 220 tons, procurement division, treasury department, New York, to W. Ames &

- Co., Jersey City, N. J.
- 215 tons, schedule C, low level tunnel, Oakland, Calif., to Bethlehem Steel Co., San Francisco.
- 162 tons, four bridges, Cheyenne and Lincoln county, Colorado, to unnamed interest.
- 150 tons, inclinator, Rochester, N. Y., to Genesee Bridge Co., Rochester.
- 135 tons, highway work, Otero, Valencia and Torrance county, New Mexico, to unnamed interest.
- 125 tons, factory unit, Veeder-Root Inc., Hartford, Conn., to Concrete Steel Co., Boston; R. G. Bent Co., Hartford, general contractor; Standard Structural Steel Co., Hartford, Conn., awarded structural steel.
- 123 tons, highway work and bridge, Las Animas county, Colorado, to unnamed interest.
- 122 tons, four bridges, Larimer county, Colorado, to unnamed interest.
- 115 tons, state road work, Lackawanna county, Pennsylvania, awarded through
- 100 tons, bars and shapes, mess hall, veteran's hospital, Biloxi, Miss., to Southern General Fireproofing Co., Atlanta, Ga., and Mobile Steel Co., Mobile, Ala.; R. M. Lee Co., Atlanta, general contractor.
- 100 tons, armory, Orange, N. J., to Concrete Engineering Co., New York.
- 100 tons, Pennsylvania state road work, Delaware county, through R. H. Miller, Lancaster, Pa., to Bethlehem Steel Corp., Bethlehem, Pa.
- Unstated tonnage, plant addition, Behr-Manning Corp., Watervliet, N. Y., to Albany Steel & Iron Supply Co. Inc., Albany, reinforcing, and Westside Structural Steel Co. Inc., Troy, N. Y., structurals; M. C. Tuttle Co., Boston, general contractor.

Reinforcing Steel Pending

- 400 tons, armory, West Point, to Edmund J. Rappoll Co. Inc., Cambridge, Mass., low.
- 400 tons, plant addition, Congoleum-Nairn Inc., Marcus Hook, Pa., Turner Construction Co., Philadelphia, low on general contract.
- 318 tons, two bridges over Big Tujunga

- wash, Los Angeles county, California; bids opened.
- 280 tons, state bridge, Tacoma, Wash.; bids at Olympia, March 30.
- 250 tons, highway projects, state of Indiana; bids March 20.
- 223 tons, Lyon street approach, Golden Gate bridge, San Francisco; bids opened.
- 210 tons (including 60 tons shapes and gates) Black Canyon canal, Boise project; J. A. Terteling & Son, Boise, Idaho, low.
- 178 tons, bridge, Main street, Flushing, N. Y.; Melrose Construction Co., New York, low.
- 156 tons, for U. S. veterans' hospital, Chillicothe, O.; Roach, Conneit & Laub, Cincinnati, low on general contract.

Pig Iron

Pig Iron Prices, Page 78

Pittsburgh—Strong situation in pig iron is unparalleled in recent history of the industry. Shipments are unusually heavy and producers have had little chance to replenish stocks. Market here was enlivened last week by eastern brokers inquiring for 25,000 tons at an advantageous price for export. Foundries are taking good tonnages. Carnegie-Illinois Steel Corp. has blown in its sixth furnace at Duquesne. It had been idle since 1929.

Cleveland—Considerable tonnage has been contracted for second quarter delivery by merchant producers here. Many foundries, feeling that since prices are strong, with conditions such that they probably will not decline, have contracted for considerable more tonnage than their actual requirements. Due to abnormal foreign demand for scrap and rapid increases in price, a much higher proportion of pig iron is now used by foundries in their mix. Stocks of most merchant producers are smaller as shipments continue to exceed production.

Chicago—Pig iron shipments so far in March are about 40 per cent heavier than a month ago and total deliveries are expected to compare favorably with the previous record for this period. New business is heavy and backlogs are sufficient to assure a substantial movement of iron through second quarter. The market is firm at \$24, furnace, for No. 2 foundry and malleable. Lake Superior charcoal iron is \$27, furnace.

Boston—Pig iron buying for second quarter delivery on a basis of \$25.75, Everett, Mass., for No. 2 foundry gradually gains momentum, although not yet in heavy volume. Most larger consumers in New England have substantial stocks on hand or ordered for delivery before the end of the month. Foundry melt is well sustained. Delivered prices on foundry iron in the Providence, R.

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CLEVELAND
 FINE TOOL STEELS • TUNGSTEN CARBIDE TOOLS. ETC.

I, district and Worcester, Mass., are \$27.05 and \$27.50, respectively.

New York—Pig iron trading is confined mostly to small lots, although sellers declare that these inquiries are coming out in an unexpectedly good number. Many of the larger consumers are well covered for the time being by orders placed prior to the recent price advances.

Brokers who took orders for 100,000 tons of pig iron for Japan are seeking to place it with producers. A Valley furnace was offered 25,000 tons but was unable to accept. Other tonnages were offered in the Birmingham, Ala., district and as far west as the Utah producer. A former inquiry for pig iron for Great Britain has been revived and \$1 per ton is offered above the present quotation, making the offered price \$25.

A London cable says that Carl Bendix, chairman of the London board of the Indian Iron & Steel Co., has arranged with the British Iron and Steel federation for the sale of 400,000 tons of pig iron for the English market.

Buffalo—Good demand continues for pig iron for second quarter shipment. Local producers have no first quarter iron of consequence left to sell. Consumers have become reconciled to the \$3 increase since Jan. 1, producers feel. Officials of the state department of public works notified local shippers of pig iron which was caught in the barge canal in a late November freeze last autumn that efforts to release these craft will begin this week. A late winter cold snap threatened however to hamper this work.

Philadelphia—So heavy is the melt here that some trade leaders believe that despite efforts of consumers to anticipate second quarter requirements of pig iron before recent advances became effective, such coverage will fall short of needs. Meanwhile, sellers find business brisk, particularly with smaller consumers who buy on hand-to-mouth basis.

Cincinnati—March pig iron shipments exceeded any recent month as melters specify fully heavy tonnages bought before price advances. Furnaces will extend shipments on contracts only because of own failure to complete the movement, requiring specifications be filed this month.

Birmingham, Ala.—Heavy sales of pig iron keep production at a high rate in spite of stocks in furnace yards. Shipments are at a high rate as melters have light stocks.

St. Louis—The melt of pig iron has increased further, due to volume of business being done by foundries and mills and because heavier use of iron in mixtures occasioned by the

high price and scarcity of scrap. Shipments so far this month have been at a higher average daily rate than in either January or February, and there is little doubt that the March total will be the highest of the first quarter.

Toronto, Ont.—Improvement in the iron and steel markets and increased plant operations are having a stimulating effect on merchant pig iron sales. Sales now exceed 1500 tons weekly, of which approximately 1000 tons is foundry iron. Malleable also has good call in lots of 50 to 200 tons. Producers have opened books for second quarter and a number of melters have covered. Local blast furnace representatives predict that forward delivery booking for the coming quarter will reach the highest level since 1929. Prices are firm and unchanged.

Scrap

Scrap Prices, Page 80

New York—Railroad embargoes on steel scrap within the past week have extended to all Atlantic and Gulf ports, with the exception, notably, of New York. The peak of accumulation on cars at principal ports has already been passed; nevertheless, the system inaugurated by the railroads of permitting exporters to move scrap only when able to designate boats to handle the material is expected to continue indefinitely.

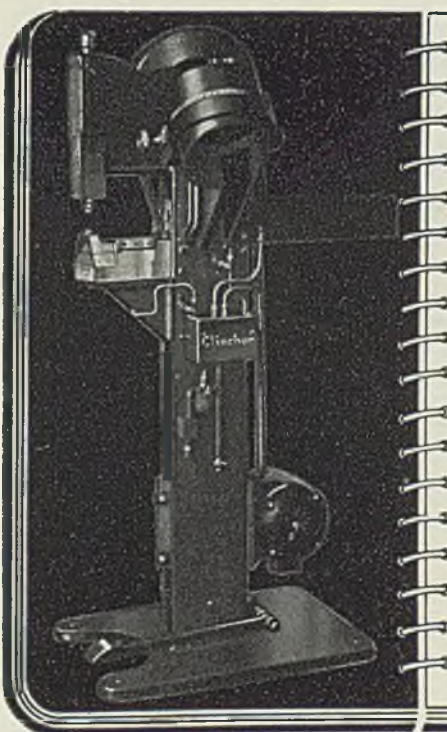
Due to these embargoes, scrap ex-

porters have encountered difficulties which, at one leading port at least, Philadelphia, has caused them within the past week to withdraw export quotations. This action may result in a freer supply of scrap for domestic consumers, and the thought is now being expressed in Philadelphia scrap circles that domestic prices, reversing the situation which has prevailed until recently, may fall below export prices once the latter again develop.

At present it is estimated that between 100,000 and 110,000 tons of scrap are on cars at eastern and Gulf ports. However, the total accumulation has dropped as indicated by the heavy movement of scrap from Philadelphia and Boston and one or two other ports affected by embargoes over the last three or four weeks.

At Philadelphia, where the largest single accumulation was noted, approximately 50,000 tons, stocks are reliably estimated to have dropped to around 35,000 tons, with several additional boats scheduled to leave over the remainder of this month. In fact it is thought that the accumulation on cars at Philadelphia will be fairly well liquidated by April 1. Stocks at Boston have been reduced substantially and at Portland, Me., where there was only a relatively small accumulation, practically all the tonnage has now been shipped out.

The movement of scrap from this country this month will be one of the heaviest on record it is believed; at the same time, some trade leaders look for a still larger movement



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a little later on, in view of the contracts placed in recent months still due for shipment. There may not be the highly concentrated movement now being witnessed, yet it is believed that on the basis of say, a 3-month period, shipments later may exceed any previous time.

Pittsburgh—With the range on No. 1 heavy melting steel at \$23.25 to \$23.75 in this district, the market remains in a strong position. Some quiet buying of heavy melting by mills at above \$23 has been reported. Railroad specialties have been very strong, bringing as high as \$27.50 recently. Open-hearth rail ends have been in good demand.

Cleveland—Purchase of several thousand tons of various grades of scrap by a leading steelmaker has enlivened the market here. On No. 1 heavy melting steel it is understood \$21.50 was paid. The market is strong and advances of 50 cents to \$1.50 have been made.

Chicago—Strength still predominates and prices of a number of grades, principally railroad items, are up 50 cents to \$1.50. Dealers and brokers again have raised bids on heavy melting steel but the mill market nominally continues \$20.50 to \$21. Scrap supplies are no more than sufficient to meet consumers' demands despite favorable conditions for collection and preparation. Steel specialty grades are strong and cast scrap is in heavier demand at higher prices. Cast iron borings are up to \$13.50.

Boston—Effective April 5 railroads will substantially increase storage charges on iron and steel scrap. The

embargo at the army base and Mystic wharf continues, with shipments to piers by special permit. The jam is gradually easing with more export cargo space available. Meanwhile, prices are climbing, \$18, dock, being paid for No. 1 heavy melting steel, \$16.50 for No. 2 and better than \$15 for No. 2 cast. Numerous grades are up 25 and 50 cents a ton. No. 1 machinery cast for Pennsylvania delivery is up \$1 a ton f.o.b. cars, strengthening prices for New England shipment.

New York—Brokers are paying \$17.50 for No. 1 heavy melting steel for domestic consumption, making this slightly higher than for export, \$17 still being paid for dock delivery. The market is firm, though with fewer advances. Demand is active and shipments heavy but feverish activity is less evident.

Buffalo—All grades of scrap continue to show great strength. Some No. 1 heavy melting steel has been sold at \$19.50 and later small lots probably have brought higher prices. Dealers who handle large tonnage are generally demanding a \$21 minimum. No. 1 machinery cast has brought \$20 and cupola cast bringing \$19, a record price of many years. Low phosphorus grades, rails and malleable have developed further strength.

Philadelphia—Leading grades of steel and cast scrap are higher than a week ago, although with the withdrawal of exporters from the market a somewhat freer supply is now available for domestic mills, which may in time result in easier local prices. No. 1 steel is now \$20 to

\$20.50, delivered; No. 2 steel \$19 to \$19.50; heavy breakable cast \$19.50 and No. 1 cupola \$21 to \$22, with various increases in other grades. The accumulation of export scrap at Port Richmond will be rather well worked off by the end of this month, it is believed, with March witnessing perhaps the heaviest export movement of scrap in the history of the local port. Close to 50,000 tons were on cars at Port Richmond March 1. Since that time an embargo went into effect, with a resultant system of permits which is likely to continue to operate indefinitely.

Detroit—Strength continues in scrap and the situation is tightened by loss of Chrysler and Hudson tonnage. Prices are higher, \$1 on most important grades. Two cargoes have cleared by water but regular lake shipments are hampered by ice.

Cincinnati—Heavy melting steel advanced another 50 cents as dealers offered \$18.50 to \$19 in efforts to bring out material. There is some speculative holding. Other grades are advanced, machine shop turnings and sheet clippings going \$1 higher. Scrap continues scarce, demand leaving little for shipment elsewhere. Foundries are active buyers because of a high rate of operations and conditions in the pig iron market.

St. Louis—Scrap iron and steel continued to advance, reaching new highs and in the case of some grades, all time highs. As has been the rule in recent weeks, greatest strength is manifest in heavy melting steel and railroad steel specialties. Of these items there is an extensive short interest, a marked scarcity and apparently limitless demand.

Birmingham, Ala.—Heavy melting steel is being held above \$14.50 though the largest buyer in the open market is demanding delivery. Dealers here have had little participation in export sales as they could not profitably meet quotations at Gulf ports.

Seattle—Japanese buyers continue active but exporters are handicapped by lack of steamship space. Sales are being closed with no delivery specified. No. 1 melting steel is strong at \$12.50 and local mills are still steady customers. Tide-water stocks are low but increasing tonnages are coming from the interior. A local scrap dealer will burn two wooden sailing ships next week, expecting to recover 250 tons of steel and copper.

Toronto, Ont.—Demand for iron and steel scrap is increasing steadily and dealers state they are experiencing difficulty in filling all orders for special grades. Shipments of heavy melting and other steel grades to the Hamilton mills are improving. Auto-



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mobile scrap is moving more freely, iron grades are in brisk demand and inquiries are fairly numerous. Prices are firming and advances are looked for immediately.

Warehouse

Warehouse Prices, Page 79

Pittsburgh—Despite fact that many consumers attempted to cover before recent advance in warehouse prices, buying since has been well maintained. Demand for sheets continues at peak as purchasers encounter difficulty in obtaining prompt shipment from mills.

Cleveland—Warehouse distributors report stock turnover at the best rate of the year. This is directly due to abnormal extension of mill deliveries on most products. New prices have received little opposition as most consumers are primarily concerned with deliveries.

Chicago—Business is fairly well sustained, considering the restricting effect of recent sharp price advances. March business compares favorably with that of February and is well ahead of the rate a year ago.

New York—Structural rivets have been advanced to 5.45c in local warehouse list, tank rivets and wrought washers remaining unchanged. Lag screws, machine bolts and nuts are now quoted list less 60 instead of 65. Buying is heavy and well spread. Some warehouse stocks are unbalanced with little improvement in mill deliveries. A few large distributors, well covered, are getting sufficient shipments, but sheets now being received were placed as far back as November and December. Some alloys shipments are arriving on orders placed last October and November.

Philadelphia—Following the recent price advance, buying eased off for two or three days, but again is active, with orders numerous.

Detroit—Higher prices are in effect, following advances in mill quotations, especially on stainless and other alloy steels. Demand is brisk, with no sign of lessening.

Cincinnati—Higher prices on warehouse items are in effect with demand undiminished. March tonnage may be heaviest for first three months. All industrial items, especially sheets, are active.

St. Louis—The stiff advances inaugurated by warehouses following the mill advance have apparently met little buying resistance. On the contrary, orders during the past week or ten days have maintained the high levels of recent weeks and users are striving for deliveries, price being secondary.

Seattle—Jobbing houses are busy executing orders placed before the recent price increase but deliveries cannot be guaranteed. Some stock items are depleted. New prices effective March 11 increased every item and Portland, Oreg., dealers are expected to adopt the schedule prevailing in Washington.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 77

Bolt, nut and rivet specifications continue heavy and while the higher prices effective on new business constitute a factor in ordering against contracts, consumption among leading users is well sustained. Automotive needs are being restricted somewhat by strikes but implement and tractor builders continue heavy schedules and railroad and equipment builders are accounting for substantial lots. Higher prices, representing advances of about 10 per cent on bolts and nuts and \$7 a ton on structural rivets have yet to be tested thoroughly, but the market is somewhat steadier.

Eastern producers allow contract customers to specify at old prices to April 1 for delivery at mill convenience thereafter. Spot buyers pay the new prices.

Tin Plate

Tin Plate Prices, Page 76

Pittsburgh—Although specifications against contracts have been easier recently, tin plate operations

are at their high peak. Mills have been engaged at 100 per cent for nearly two months and before that the rate was only slightly lower for a few weeks. Export demand is unusually strong and the price for this grade of business is advantageous. Demand for general line cans is well maintained. Because of manual labor involved, tin plate costs will be greatly increased as a result of the wage advances which went into effect last Tuesday. Other costs, such as the price of pig tin, have been rising steadily. Tin plate remains at \$4.85 per base box, Pittsburgh.

Metallurgical Coke

Coke Prices, Page 77

Coal operators in the western Pennsylvania region report that buyers who were attempting to stock in anticipation of the threatened coal strike have not been exerting the same pressure recently, apparently having come to the conclusion that the strike will be averted. Demand for Connellsville coke continues at a high rate. Beehive coke output in February, according to the bureau of mines, was 290,900 net tons, compared to 271,900 tons in January, and 153,500 tons in February, 1936.

Coke By-Products

Coke By-Product Prices, Page 77

New York—Sulphate of ammonia and naphthalene demand is much heavier, responding to the usual sea-

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sonal upturn from fertilizer and disinfectant outlets. Prices are steady and unchanged. Distillates are moving briskly to industrial consumers notably toluol and benzol, the former to lacquer makers. Phenol buying is steady.

Nonferrous Metals

Nonferrous Metal Prices, Page 78

New York—Heavy selling by speculators depressed the London metal markets last week. Lead and tin were the only domestic markets to be directly affected, the former dropping \$15 and the latter about \$40 per ton. Consumers generally withdrew from the markets due to their well covered positions and prospects of possibly obtaining additional supplies at lower levels.

Copper—Export copper dropped from around 17.45c to 17.00c, c.i.f., causing a reduction of \$10 per ton in casting copper to 16.25c, f.o.b. refinery, and a reduction of \$10 to \$15 per ton in refiners' bids. Electrolytic copper held firm at 16.25c, Connecticut, in a quiet market. Not all interests here were doing business at prevailing levels. World stocks of refined copper were reported cut 7927 tons during February with domestic stocks alone dropping 6254 tons.

Lead—Prices declined \$5 per ton on Tuesday, Wednesday and Friday, bringing the market down to 7.00c, New York, and 6.85c, East St. Louis. Easiness was due to lower prices abroad and light consumer buying.

Zinc—Prime western held firm at

7.50c, East St. Louis, on continued scarcity of supplies. The decline in prices abroad had no apparent effect on the market other than to further restrict buying.

Tin—Straits tin fluctuated widely within the range of 66.75c to 64.25c. Sales of metal here were light with the price movements reflecting developments abroad. No action was taken on quotas at the International Tin committee's meeting on Thursday and this was considered a bullish development. Prices stiffened momentarily following the announcement.

Antimony—Chinese spot held nominally unchanged at 17.00c, duty paid New York, while American spot advanced to 16.37½c, New York. Activity in the market was dull.

Steel in Europe

Foreign Steel Prices, Page 79

London — (By Cable) — Foreign trade of Great Britain in February, a result of the shorter month, fell below that of January in both exports and imports. Exports at 200,498 tons was 16,702 tons less than in January and imports at 82,896 tons, was 204 less than in January.

Some shipments of pig iron have been obtained by Great Britain from foreign countries, including Canada, but not sufficient to cover the shortage. A blast furnace plant in South Wales which has been out of blast for some time is being reconditioned. Demand continues to exceed supply in the steel and iron industry.

The Continent reports members of the steel cartel have agreed on an international scrap control scheme. Steel demand continues active and the matter of supply has been slightly improved. The French government now controls the Schneider armament activities.

Iron Ore

Iron Ore Prices, Page 80

Cleveland—Stocks of iron ore at lower lake ports and furnaces March 1 were about 3,400,000 tons less than on the comparable date last year, according to the Lake Superior Iron Ore association.

The association's report follows:

	Tons
Consumed in January	4,694,312
Consumed in February	4,443,306
Decrease in February	251,006
Consumed in February, 1936	2,632,306
On hand at furnaces, March 1	19,080,524
On Lake Erie docks, March 1	3,337,168
Total on hand at furnaces and Lake Erie docks, March 1	22,417,692
Reserve total, March 1, 1936	25,808,527

The same association reports the following receipts at lower lake ports and shipments therefrom for the season, and dock balance March 1.

Port	Receipts	Shipments	Dock bal. Mar. 1, '37
Buffalo	3,792,759	29,568	1,748
Erie	1,536,884	1,557,150	44,412
Conneaut	6,773,428	7,058,787	1,326,054
Ashtabula	4,479,943	5,200,226	972,119
Fairport	898,389	887,979	403,818
Cleveland	9,061,815	7,394,462	335,709
Lorain	2,677,341	1,292,560	3,871
Huron	704,976	832,615	209,024
Toledo	1,503,485	821,332	40,413

Total	31,481,020	23,074,679	3,337,168
Year ago	19,907,228	14,442,516	4,904,188

The Ford Motor Co. may close this week on its inquiry for 315,000 tons. It will be recalled Ford had given producers a little longer time in which to estimate costs. The opening date for shipping ore still is indefinite, although recent estimates predict April 10.

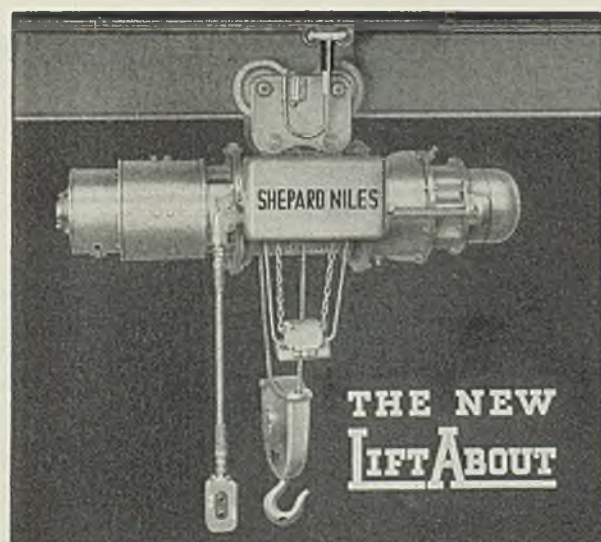
Refractories

Refractories Prices, Page 78

Pittsburgh—Larger manufacturers of refractories have announced, effective immediately, new prices for shipment only during second quarter. The advances included approximately \$6 gross per thousand on fire-clay brick and \$2 per net ton on base brick. Shipments beyond second quarter will be accepted only at prices in effect at time of shipment. The advance is caused by wage increases and other higher costs.

Belgian Imports Lead

Philadelphia — Belgian steel featured importations here during the



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week ended March 1. They included 342 tons of structural shapes, 244 tons of steel bars, 243 tons of steel bands and two tons of diamond plates.

Other ferrous importations included 30 tons of ferromanganese from Japan; and 48 tons of wire rods, 24 tons of steel tubes, 17 tons of charcoal bar iron, 10 tons of steel forgings, 38 tons of steel bars, eight tons of steel sheets and four tons of billets.

New Cold-Finished Extras

New quantity extras on cold-finished and tempered steel strip have been announced as follows, some changes having been made from the former schedule:

	Cold Rolled	Tem- pered
200,000 lbs. and over..	Ded. 15c	Ded. 15c
100,000-199,999 lbs....	Ded. 10c	Ded. 10c
50,000- 99,999 lbs....	Ded. 5c	Ded. 5c
6,000- 49,999 lbs....	Base	Base
2,000- 5,999 lbs....	Add 25c	Add 25c
1,000- 1,999 lbs....	Add 65c	Add 65c
500- 999 lbs....	Add \$1.25	Add \$2.00
300- 499 lbs....	Add 2.25	Add 4.00
200- 299 lbs....	Add 3.25	Add 6.00
100- 199 lbs....	Add 5.25	Add 10.00
50- 99 lbs....	Add 10.50	Add 15.00

Mirrors of Motordom

(Concluded from Page 26)

six-cylinder chassis. . . . Studebaker has announced a complete new line of trucks, including two additional cab-forward models in the medium and heavy-duty field as well as three new bus chassis.

Largest used car campaign ever sponsored by Pontiac is under way, with advertising in 4000 dailies and weeklies. Another recognition of the knotty problem of moving used cars Willys has rolled the 20,000th car off its assembly line since last October 1; manufacturing schedule for the season has been increased to 83,000. . . . Production of Covered Wagon Co. trailers will be near the 100-per day mark in April, says President A. G. Sherman; the Mt. Clemens, Mich., company is planning to turn out 20,000 trailers for the entire year Passenger car exports for 1936 totaled 185,547 with a value of \$107,050,861; commercial car exports added up to 107,909 valued at \$66,425,878.

Approve Bill To Enlarge Trade Commission's Power

The senate interstate commerce committee has reported favorably the bill enlarging the powers of the federal trade commission to enforce

antitrust laws where unfair trade practices are discovered.

The bill gives the commission power to hold hearings and issue orders upon its own initiative, even though a competitor may not be involved, but where public interest is involved.

Asks Battleship Bids

Announcement has been made by the navy department that bids will be received June 2 for the construction of battleship No. 55. The department stated that plans and specifications will be available about March 30 for this ship.

Equipment

Boston — Operating at capacity with large backlogs, machinery builders continue to book substantial volume of orders. Grinding machinery shops promise 10 to 12 weeks delivery on regular lines and 14 weeks on extra special types. Sales to foreign accounts are made on an extended delivery basis, 16 to 18 weeks or more. A feature has been heavy buying by makers of bearings.

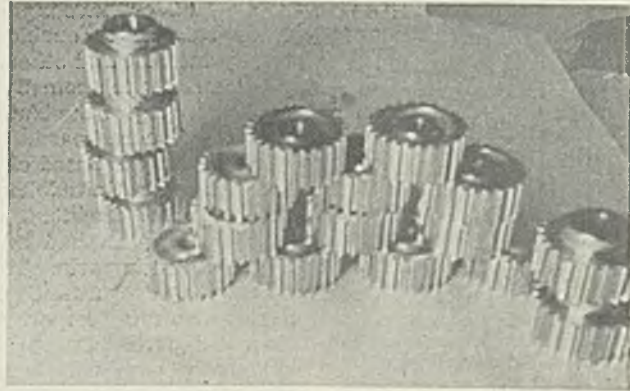
New York—Machinery orders in the East are well sustained, with volume near that booked during January and February. Deliveries are further extended. Demand is diversified, mostly for one or two tools per purchase with specially

built equipment leading. Dealers and builders are encouraged by orders, but slow deliveries, uncertainty as to future prices, labor rumblings and shortage of skilled mechanics are disturbing factors. Eastern railroads are buying cautiously.

Cleveland — Plant equipment and machine tool inquiries and demand are well sustained. Most demand is for small orders with drill presses, shapers and punches active. Price advances of approximately 10 per cent have been announced by several dealers to become effective on orders placed in last week of March and after April 1. This is the third increase caused by rising labor and material costs since November. White Motor Co., which recently announced a \$2,000,000 expansion program, is placing orders for equipment with manufacturers and reportedly purchased some equipment from the Franklin Automobile Co.

Chicago — Machinery and plant equipment sales compare favorably with previous four months despite some slackening from the January-February rate. Machine tool business this month is expected to be moderately ahead of February and active inquiries practically assure continuation of good business into April. Machine tool builders still find it difficult to hasten deliveries, one factor being shortage of skilled help. Inquiries include few large lots.

Seattle—Demand for pumping machinery, electrical, mining and road-building equipment is active. Sales have not been affected by higher prices.



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MILWAUKEE, WIS.

Full Text of U. S. Steel Union Agreement

(Concluded from Page 16)

differences but an earnest effort shall be made to settle such differences immediately in the following manner:

First, between the aggrieved employe, who is a member of the union, and the foreman of the department involved;

Second, between a member or members of the grievance committee, designated by the union, and the foreman and superintendent of the department;

Third, between a member or members of the grievance committee, designated by the union, and the general superintendent or manager of the plant;

Fourth, between the representatives of the national organization of the union and the representatives of the executives of the corporation; and

Fifth, in the event the dispute shall not have been satisfactorily settled, the matter shall then be appealed to an impartial umpire to be appointed by mutual agreement of the parties hereto. The decision of the umpire shall be final. The expense and salary incident to the services of the umpire shall be paid jointly by the corporation and the union.

Specified periods shall be agreed upon between the grievance committee and the general superintendent or manager of each plant for the presentation of grievances hereunder. Provided, however, that matters pertaining to discharges or other matters that cannot reasonably be delayed until the time of the next regular meeting may be presented at any time in accordance with the foregoing provisions.

The grievance committee for each plant shall consist of not less than three employes of that plant, and not more than ten such employes, designated by the union, who will be afforded such time off, without pay, as may be required.

First, to attend regularly scheduled committee meetings, and

Second, to attend meetings pertaining to discharges or other matters which cannot reasonably be delayed until the time of the next regular meeting.

Third, any member of the grievance committee shall have the right to visit departments other than his own at all reasonable times for the purpose of transacting the legitimate business of the grievance committee, after notice to and permission from his department superintendent or his designated representative.

The actual number of members of the grievance committee at each plant shall be mutually agreed upon between the general superintendent or manager of the plant and the union, and in no case shall there be more than one member in any department.

SECTION 8—MANAGEMENT. The management of the works and the direction of the working forces, including the right to hire, suspend or discharge for proper cause, or transfer, and the right to relieve employes from duty because of lack of work, or for other legitimate reasons, is vested exclusively in the corporation; Provided that this will not be used for purposes of discrimination against any member of the union.

SECTION 9—DISCHARGE CASES. In the event a member of the union shall be discharged from his employment from and after the date hereof, and he believes he has been unjustly dealt with, such discharge shall constitute a case arising under the method of adjusting grievances herein provided. In the event it should be decided under the

rules of this agreement that an injustice has been dealt the employe with regard to the discharge, the corporation shall reinstate such employe and pay full compensation at the employe's regular rate for the time lost. All such cases of discharge shall be taken up and disposed of within five days from the date of discharge.

SECTION 10—SAFETY AND HEALTH. The corporation shall continue to make reasonable provisions for the safety and health of its employes at the plant during the hours of their employment. Protective devices, wearing apparel and other equipment necessary to properly protect employes from injury shall be provided by the corporation in accordance with the practice now prevailing in each separate plant. Proper heating and ventilating systems shall be installed where needed.

SECTION 11—INDIVIDUAL WAGE RATES. Where alleged inequalities in wage rates prevail the matter may be taken up for local plant adjustment, and settlement made on a mutually satisfactory basis.

SECTION 12—FUTURE CONFERENCES. Joint conferences between representatives of the corporation and of the union shall commence in Pittsburgh on Feb. 7, 1938, for the purpose of negotiating an agreement with regard to wages, hours and working conditions, to take effect upon the expiration of this agreement.

SECTION 13—HOLIDAYS. The following days shall be considered holidays, during which days there shall be no regular production work, except in cases of continuous operations: July 4, Labor Day, and Christmas.

SECTION 14—TERMINATION DATE. This agreement shall remain in full force and effect until Feb. 28, 1938, inclusive.

(SIGNATURES)

(For full text of the agreement of March 2 between Carnegie-Illinois Steel Corp., and SWOC see STEEL, March 8, p. 24).

Heavy Imports Not Needed To Aid Foreign Payments

The United States does not need to import more merchandise than it exports, or have an unfavorable trade balance to enable foreigners to pay interest and other charges on the loans made them by this country, according to the National Industrial Conference board.

This theory is based chiefly on the fact that the United Kingdom, the other great creditor nation, for many years has had an excess of merchandise imports. This does not mean, however, that the United States also must import more goods than it exports. Comparison of the balance of payments reports of the two countries shows that their international transactions are quite different. Certain of America's invisible imports, in particular, are much heavier than those of the United Kingdom.

Americans in the aggregate, for example, spend more on foreign travel than do citizens of the United Kingdom. The goods purchased abroad by American tourists have the same effect on our balance of

payments as do goods imported and paid for here. They provide foreigners with dollars with which they can purchase American exports, pay interest on American loans, or meet other payments due Americans.

Other invisible imports of the United States that are much larger than those of the United Kingdom are contributions to foreign missions and charities, immigrant remittances, and dividend payments to foreigners who own American securities.

At the same time, England has several invisible exports that are far larger than the corresponding items in the American balance of payments. These provide the United Kingdom with foreign exchange which helps materially to pay for its excess of merchandise imports. Important items of this nature are the yield from foreign investments and banking services and the income from ocean shipping. In view of these differences, it is obvious that America's merchandise trade balance need bear no resemblance to that of the United Kingdom.

Record Attendance at Waste Materials Meeting

Need for greater co-operation among members was stressed at the twenty-fourth annual convention of the National Association of Waste Material Dealers Inc., held at Chicago last week. Attendance of more than 500 delegates set a new record.

Speaking at one of the sessions, George S. Brady, technical advisor to Major George L. Berry, co-ordinator for industrial co-operation, Washington, declared that industry can look forward to governmental regulation of wages and working hours for labor. Retiring President Edward B. Friedlander asserted that trade organizations can play an important part in guiding business through the social and economic changes currently taking place.

Joseph Schapiro of S. Schapiro & Sons, Baltimore, was elected president for the coming year.

General Electric Bonds Held by 21,534 Employes

General Electric Co. employes own \$23,807,700 worth of bonds in the G. E. Employes Securities Corp., the corporation reports. Bonds are owned by 21,534 individuals, an increase of 28 per cent over 1935.

The bonds are 5 per cent debentures which may pay an additional 2 per cent depending on General Electric's earnings. In 1936 bondholders received 7 per cent.



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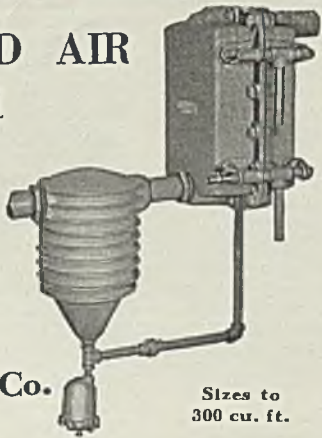
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Construction and Enterprise

Ohio

ATHENS, O.—City council has authorized purchase of three turbine pumps for municipal waterworks. Bids will be advertised for soon. John W. Dowler is city engineer.

BEDFORD, O. — City is taking bids, due March 28, for construction of sewage disposal plant, including settling tanks, sprinkling filter, sludge digestion tank and beds, connections, building and two motor-driven centrifugal pumps. Cost is estimated at \$140,000. R. F. McDowell, Chester-Twelfth building, Cleveland, is consulting engineer.

CINCINNATI — Muntler Brothers Co., 4990 Reileum avenue, will start work soon on foundry building to be located on Ralston avenue west of Spring Grove street. Cost of building is estimated at \$8,000.

CLEVELAND — White Motor Co., 842 East Seventy-ninth street, has plans in progress for plant expansion and improvements, including building additions, new machinery and new tools. Cost is estimated at \$2,000,000. Frank Bender is vice-president in charge of the program.

COLUMBUS, O. — Owens-Illinois Glass Co., Toledo, O., plans construction of \$90,000 warehouse at 711 Southwood avenue here. Mr. Snell is in charge on the site.

CORTLAND, O.—Village is having plans prepared for proposed water supply system including standpipe, etc. Cost of project is estimated at \$70,000. Wright-O'Rourke Co., Guarantee Title building, Cleveland, is consulting engineer.

DAYTON, O.—War department, air corps, Wright Field, will receive bids until March 25 for furnishing four electric hoists, circular 37-599, for delivery Wright Field.

DAYTON, O. — Air corps, war department, Wright field, will receive bids until March 29 for various quantities of soft galvanized steel wire, circular 37-610, for delivery Fairfield air depot, Osborn, O.; and until April 2 for miscellaneous lengths and sizes of seamless chrome molybdenum steel tubing, circular 37-615, for delivery various government air depots. R. W. Propst, Wright field, is contracting officer.

GEORGETOWN, O.—Village has PWA approval for construction of water softener and other improvements to existing waterworks system. Site has been purchased; bids will be asked soon. B. H. Crawford is mayor.

IRONTON, O. — City has plans for \$75,000 waterworks improvements, including settling basin, auxiliary reservoir, etc. Maturity depends on WPA approval at Washington. Leonard Howell is city manager.

JOHNSTOWN, O.—Village is contemplating construction of electric light plant. E. C. Wharton is mayor.

KENTON, O.—City is having survey made to estimate cost of projected water softening plant. M. A. McMahon is service director; Carl Simon, Van Wert, O., is consulting engineer.

LAURELVILLE, O.—Village plans improvements to waterworks and engineer is making survey of requirements. C. W. Reichelderfer is mayor.

LORAIN, O.—Ohio Public Service Co., Hanna building, Cleveland, plans construction of \$175,000 turbine generator plant including intake line and necessary concrete work. Maturity of plans awaiting approval of city council.

MARTINS FERRY, O.—Wheeling Steel Corp. plans construction of galvanizing plant as addition to its works here. It is reported that contracts will be let in about a month and work will start this spring.

MINSTER, O.—Village has WPA approval for construction of elevated tank and tower and other waterworks improvements. L. A. Drees is mayor; Champe-Finkbeiner & Associates, 1025 Nicholas building, Toledo, are consulting engineers.

MT. PLEASANT, O. — Village will advertise for bids soon for construction of waterworks system. J. Harry Glass is mayor.

NAPOLEON, O.—Village is completing plans for construction of light plant improvements including 500-horsepower boiler and auxiliary equipment. Froelich & Emery, Second National Bank building, Toledo, are consulting engineers.

OXFORD, O.—Miami University, board of trustees, plans to purchase new equipment for university power plant. State architect and engineer John P. Schooley, 705 Ohio Departments building, Columbus, O., is preparing plans.

PIQUA, O.—French Oil Machinery Co. plant was damaged by fire recently. Charles B. Upton is president and general manager.

POMEROY, O.—Meigs Water Co., Kerr's Run, plans waterworks improvements including electrification of plant and new filtration system. Burgess & Niple, 568 East Broad street, Columbus, are engineers.

PORTSMOUTH, O.—Wheeling Steel Corp., Wheeling, W. Va., plans modernization program to increase capacity of its Portsmouth works.

REPUBLIC, O.—Village has applied to PWA for funds to construct \$45,000 waterworks system, including wells, pump and building, distribution system and elevated tank. C. E. Womer is mayor. Champe-Finkbeiner & Associates, 1025 Nicholas building, Toledo, are consulting engineers.

WARREN, O.—Ohio Public Service Co., Hanna building, Cleveland, is completing plans for construction of \$2,500,000 improvements to its Mahoning river plant here, including erection of building addition, alterations, etc.

New York

ALBANY, N. Y.—Simmons Machine Tool Co., Troy road, has purchased plant of Capital District Foundry & Machine Corp., Green Island, N. Y., and is installing new equipment.

BUFFALO, N. Y.—Vanott Machine Corp., 216 Colgate avenue, is beginning construction of an addition to its machine shop, prior to installation of much new equipment. The lathe and boring mill departments will also be expanded.

LACKAWANNA, N. Y. — Bethlehem Steel Co., Bethlehem, Pa., has begun construction of additional storage space for its new sheet mill here. Storage

capacity will be increased about 25 per cent. The structure is being erected on the Hamburg turnpike.

Pennsylvania

BRADFORD, PA. — Plant of Taylor Aircraft Co. was severely damaged by fire March 16. Theodore Weld is president.

BRIDGEVILLE, PA.—American Cyanamid & Chemical Corp., 535 Fifth avenue, New York, is erecting factory building here. Martin & Nettrour Contracting Co., Diamond Bank building, Pittsburgh, has contract for the work.

MEADVILLE, PA.—Hookless Fastener Co. has awarded contract for construction of factory addition to G. A. Rutherford Co., 2725 Prospect avenue, Cleveland. Wilbur Watson & Associates, Prospect avenue, Cleveland, are engineers.

PITTSBURGH—U. S. engineer office, Federal building, will receive bids until March 24 for furnishing and delivering two 20-ton capacity monorail hoists for Emsworth lock and dam, Ohio river.

Michigan

DETROIT—Firth-Sterling Steel Co., McKeesport, Pa., has started construction of office building and warehouse at West Chicago and Oakland avenues here. Austin Co., Cleveland, is general contractor.

DETROIT—Miller Tool Mfg. Co., 1731 Sixteenth street, has awarded general contract for construction of plant addition to Connors & Fidler Construction Co., Detroit. O'Dell & Rowland, 90 Stimson avenue, are architects.

GLADSTONE, MICH. — Northwestern Veneer & Plywood Corp. will soon take bids for construction of factory addition, 125 x 202 feet. G. Arntzen, Escanaba, Mich., is architect.

HOLLAND, MICH.—City council has ordered construction of water tower and additional mains at an estimated cost of \$75,000.

MUSKEGON HEIGHTS, MICH.—Johnson Products Co. Inc. has been formed to manufacture automotive parts by Charles E. Johnson, Muskegon.

SAGINAW, MICH.—Sommers Bros. Appliance Co. manufacturer of sheet metal products, suffered severe loss by fire recently. A Sommers, Saginaw, is president.

THREE RIVERS, MICH.—Three Rivers Iron & Metal Co., 200 Broadway, has been incorporated by Norman Franklin, Three Rivers, to deal in metals.

Illinois

CHICAGO — Ni-Chrome Metal & Alloy Co., 4541 Homer street, has been formed by Edmund J. Ryan and associates to deal in metals, alloys, chemicals and allied products. Joseph Kroothe, 160 North LaSalle street, is correspondent.

Indiana

ALEXANDRIA, IND.—Johns-Manville Sales Corp., 22 East Fortieth street, New York, plans extensive expansion of facilities at its branch plant here.

Oklahoma

BLACKWELL, OKLA. — City receives bids March 23 for construction of additions to power plant, including installation of 750-horsepower boiler. E. E. Tierney is superintendent of utilities.

TULSA, OKLA. — Richardson-Gillette Supply Co. plans construction of warehouse and office building.

(Please turn to Page 100)

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(Concluded from Page 98)

Texas

DALLAS, TEX. — Board of supervisors, Dallas county, receives bids March 26 at the office of Kock & Fowler, 701 Great National Life building, for construction of waterworks improvements.

ELYSIAN FIELDS, TEX. — Panola Harrison Power Co., J. M. Pitts, president, plans construction of power line in Panola and Harrison counties, William G. Morrison, 204 Professional building, Waco, engineer for the project, receives bids March 30 for construction of the 84 miles of line.

PORT LAVACA, TEX. — City receives bids March 24 for constructing improvements to existing waterworks. F. M. Dudgeon is mayor; Ray F. Jones is engineer, P. O. Box 1861, Houston, Tex.

Wisconsin

COLEMAN, WIS. — Chadwick Woodworking Co. will build 1-story sash and door factory and install new machinery. Derrick Hubert, Menominee, Mich., is architect.

COLUMBUS, WIS. — G. D. Roberts Co., general machine shop, will start work at once on factory building estimated to cost about \$15,000.

MADISON, WIS. — Madison Gas & Electric Co. has contracted with Allis-Chalmers Mfg. Co., Milwaukee, for turbine generator costing \$651,000 and will install boiler costing \$507,000 as part of \$1,446,000 improvement program.

MILWAUKEE — Uecker Equipment Co., 1217 North Seventy-first street, manufacturer of tubular steel scaffolding, is starting work on combination warehouse and office building at 6610 West State street. Reinold Uecker is president.

MILWAUKEE — Budget of Wisconsin Public Service Corp., 1029 North Marshall street, includes \$480,000 for new dam and generating plant and substation at Tomahawk, Wis. J. P. Pulliam is president.

Minnesota

DULUTH — Minnesota Power & Light Co. will build 60 miles of 110,000-volt transmission lines from Duluth to Virginia, Minn., install heavy duty switching equipment at Duluth and transforming equipment at Virginia.

DULUTH — Peoples Brewing Co. has awarded contract for construction of addition to plant, 60 x 130 feet, to cost about \$60,000 including new machinery and equipment. Carl O. Hanson is president and general manager.

MINNEAPOLIS — Minneapolis Brewing Co. will spend \$150,000 for expansion and improvements to brewing plant including \$30,000 for new bottling equipment. Karl E. Kiewel is vice president and general manager.

MINNEAPOLIS — Midwest Paper Products Co. has been organized by J. E. Reavis and John T. Arveson to manufacture gummed sealing, wrapping tapes and paper rolls, etc. Factory will be located at 412 Sixth avenue South and new machinery will be installed.

MINNEAPOLIS — Minneapolis & St. Louis Railway Co. plans purchase of new shop machinery. John W. Devins is vice president and general manager.

SAINT PAUL — Herzog Iron Works Inc., structural steel fabricator and or-

namental iron manufacturer, plans rebuilding machine shop and sheet metal plant recently damaged by fire and explosion.

SAINT PAUL — Ford Motor Co. plans to reopen its glass plant, which is being rebuilt, having been closed since 1932. The company has made application to the city council to extend natural gas line from its assembly plant to the glass plant.

SHAKOPEE, Minn. — Northwestern Distilleries Inc. plans extensive alterations and improvements to distillery here.

Kansas

OSAWATOMIE, KANS. — City will vote April 6 on \$125,000 bond issue to finance construction of municipal gas plant. H. E. Newhouse is mayor.

PAOLO, KANS. — City will vote April 6 on \$225,000 bond issue for construction of municipal light plant and distribution system. L. G. Fuller is city clerk; Collins & Co., 339 Railway Exchange building, Kansas City, Mo., are consulting engineers.

WHITE CITY, KANS. — City has filed application with PWA for funds to finance construction of sewage disposal plant estimated to cost \$51,500. Paulette & Wilson, Salina, Kans., are engineers.

WINFIELD, KANS. — City will construct sewage disposal plant and garbage incinerator at an estimated cost of \$225,000. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., are consulting engineers.

North Dakota

WALHALLA, N. DAK. — City, H. N. Lee, auditor, will take bids closing April 7 for construction of complete municipal light plant estimated to cost \$40,000. E. L. Lium, 913 Almonte street, Grand Forks, is engineer.

South Dakota

ELK POINT, S. DAK. — Union county rural public power district has REA allotment for construction of 107 miles rural transmission lines costing about \$105,000.

FLANDREAU, S. DAK. — City plans construction of municipal light and power plant and distribution system at an estimated cost of \$168,000. Carl Hanson is city auditor.

Iowa

WATERLOO, IOWA — Rath Packing Co. has awarded contract for construction of 5-story packing plant addition, 112 x 112 feet, to Tunnick Construction Co., Davenport, Iowa. Cost is estimated at \$300,000; equipment will cost about \$175,000. John W. Rath is president; H. P. Henschlen 59 East Van Buren avenue, Chicago, is architect.

Nebraska

HARTINGTON, NEBR. — Cedar county rural electrification project, M. L. White, secretary, has applied to REA for loan of \$450,000 for construction of 350 miles rural transmission lines in Cedar county. Henningsen Engineering Co., 626 Union State Bank building, Omaha, is consulting engineer.

HASTINGS, NEBR. — City plans improvements to sewage disposal plant at an estimated cost of \$20,000. William Harm is mayor.

OMAHA, NEBR. — Nebraska Power Co., Eighteenth and Harney streets, has com-

pleted plans for construction of power plant to cost \$1,200,000. Work is expected to start by June 1; will call for bids soon. J. E. Davidson is president.

STANTON, NEBR. — Stanton county electrification district has approval of state engineer, A. C. Tilley, for construction of 271 miles rural transmission lines. O. R. Toman, 510 Barkley building, Lincoln, is consulting engineer.

Pacific Coast

CULVER CITY, CALIF. — Western Stove Co. is having a corrugated iron factory building erected on Hays street, here, at a cost of \$1000.

LOS ANGELES — Airplane Development Co. is building an addition to its plant at 830 Cerritos avenue at an estimated cost of \$2750.

LOS ANGELES — Menasco Mfg. Co. has purchased 3-acre factory site and building near its present plant at 6714 McKinley avenue and plans further expansion.

LOS ANGELES — Simonds Machinery Co., 520 East Fourth street, maker of pumping machinery, is building a new store and shop building at 451 West Fourth street. Cost is estimated at \$10,000.

VERNON, CALIF. — Angelus Sanitary Can Machine Co. is having a frame factory building erected at 4900 Pacific boulevard. Cost will be \$1900.

VERNON, CALIF. — Kinney Iron Works, 2525 East Forty-ninth street, is erecting steel frame addition to its plant here at an estimated cost of \$2500.

COLFAX, WASH. — City will receive bids March 29 for construction of \$55,000 sewage disposal plant. L. R. Stockman is engineer.

EAST SOUND, WASH. — Orcas Electric Co., a co-operative organization, has REA allotment of \$87,000 for construction of 70 miles distribution lines and installation of diesel generating plant.

EVERETT, WASH. — Puget Sound Power & Light Co. is building \$100,000 addition to Beverly Park substation where \$94,000 condenser will be installed.

MOUNT VERNON, WASH. — Miller Canning Co. Inc., Matheson building, has been organized by E. C. Miller and associates with capital of \$20,000.

SEATTLE — R. D. Bodle Co., packer of frozen fruits and berries, has acquired plant formerly owned by Pacific Coast Wood Pipe Co. and will spend \$35,000 to remodel building, \$75,000 for new equipment and machinery.

SEATTLE — City engineer, N. A. Carle, has recommended construction of proposed Magnolia Bluff water system extension. A bond issue will be necessary to float the estimated cost of \$713,000.

WENATCHEE, WASH. — Plans are being prepared for construction of proposed 50-ton mill to be constructed at Mazama Queen mine on the upper Methow river. F. M. Mitchell is superintendent.

PORTLAND, ORE. — American Sheet Metal Works Inc. will build a new plant at Slsan and Flanders streets and general contract has been awarded. Including new equipment, estimated cost is over \$100,000.

Canada

ASBESTOS, QUEBEC — Johns-Manville Sales Corp., 22 East Fortieth street, New York, will spend \$1,000,000 for extension of mine and mill capacity at its fibre mill here.